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THE
FALES & JENKS
RING TWISTER
FOR COTTON

1909

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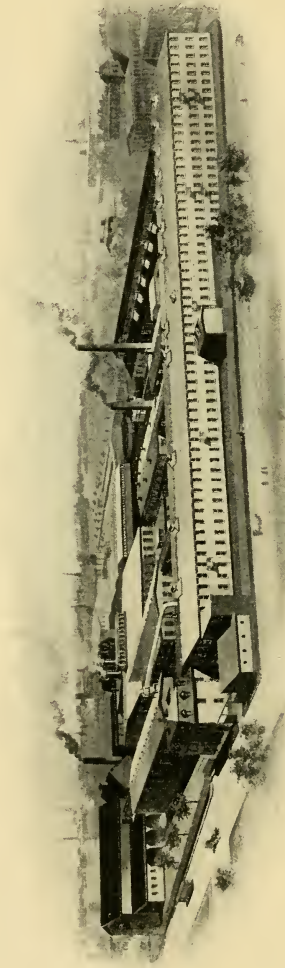




J. W. Lane.

Hargraves & Parker

Feb 1, 1911



WORKS OF THE FALES & JENKS MACHINE CO.
1909

ILLUSTRATED CATALOG
AND
HANDBOOK OF FORMULAS AND TABLES
RELATING TO
THE FALES & JENKS
RING TWISTER
FOR COTTON.

FALES & JENKS MACHINE COMPANY,

BUILDERS OF
RING SPINNING MACHINERY
FOR COTTON.

RING TWISTING MACHINERY
FOR COTTON, WOOL AND WORSTED.

PAWTUCKET, RHODE ISLAND, U.S.A.

ESTABLISHED 1830.

INCORPORATED 1876.

ALBERT A. JENKS, PRESIDENT.

LE ROY FALES, SECRETARY.

STEPHEN A. JENKS, TREASURER.

SOUTHERN OFFICE, CHARLOTTE, N.C.

J. H. MAYES, AGENT.

WRITTEN AND COMPILED BY

HERBERT G. BEEDE.

1909

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BY

FALES & JENKS MACHINE COMPANY

E. L. FREEMAN COMPANY
PRINTERS
PAWTUCKET, R. I.

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INTRODUCTION

In compiling this catalog we have endeavored to give such information as will be useful and convenient for those interested in our ring twisters.

We build both the Scotch and American system ring twisters, the latter in two types — one the well known type and the other a new and improved box-head, adjustable type.

The floor plans, lengths and general arrangement of driving pulleys, shown and described in this book, apply to either style of twister.

The twist gearing tables as given are based upon the arrangement of the twist gearing used on the old type American twister; but these tables are intended also for use with the Scotch twister and the new type box-head American twister, as will be explained in connection with the twist gearing formulas, given for each style of twister. Our new American twister has been designed so that, by the use of a convenient system of compound gearing, the extreme ranges of twist, now required in the twisting of yarns for various purposes, may be easily and quickly obtained.

In our ply twist tables up to and including six ply, we have covered the full range and general variations of twist now used for various classes of work in the yarn and weaving mills of the United States.

Our production tables of ply yarns, from two to six ply inclusive, are based on the average

results actually obtained in practice, and furthermore we have endeavored, not only to give the production of the different numbers of yarn, but also to show, in connection with the table of bobbin dimensions, the general conditions upon which that production is based.

Recognizing the importance of proper bobbins for the various sizes of rings and varieties of twisting, we have prepared a set of bobbin drawings showing the several styles of bobbins used, together with a table of dimensions for both wet and dry twist, including also weight of yarn on the various sizes and styles of bobbins.

For convenience in finding the relative speeds of cylinder and spindle, for different sizes of cylinder and spindle-whirl, we have introduced our cylinder speed tables.

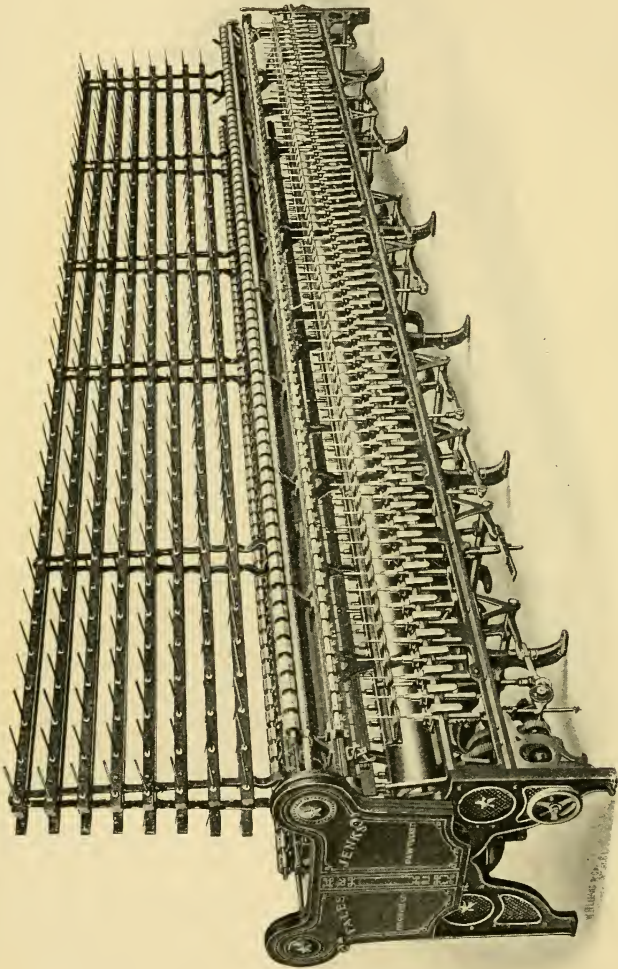
The specification form, which we have given in this book, shows the information required to enable us to properly execute an order for ring twisters.

We are always ready to give any information desired concerning our ring twisting machinery, or in regard to our ring spinning machinery, illustrated and described in our book, "The Fales & Jenks Ring Spinning Frame for Cotton."

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RING TWISTER



RING TWISTER AS BUILT FROM 1880 TO 1907
CUT SHOWS WET TWISTER WITH REVERSIBLE BRASS PLATE RING RAIL

RING TWISTER

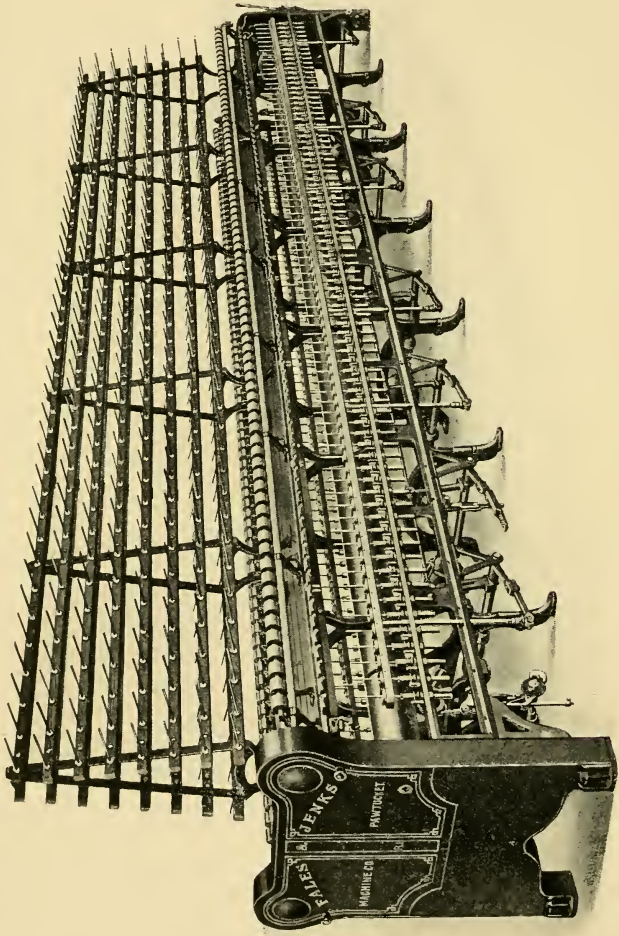
OLD TYPE—AMERICAN SYSTEM

FOR WET OR DRY TWISTING

The well-known type of twister shown on the opposite page has been our standard since 1880. This type we build in three widths — 36 inches, 39 inches and 42 inches. The 36 inch twister is made in two heights — for 5 to 6 inch and 6½ to 7 inch traverse, while the 39 and 42 inch twisters are made in one height only — for 5 to 6 inch traverse.

Numerous improvements have been applied from time to time to meet the requirements of the trade. Among the improvements of recent years may be mentioned, in order of their application, the following: — Upright shaft and change gear drive for the builder motion; adjustable jack gear stands for either single or double twist gearing; water trough with glass rod lifting device; guide rod traverse motion driven from foot end roll; lifting thread board with blocks and porcelain guides; our patent ring rail lock for doffing; adjustable feet for centres; ring rail wind-down, and many other improvements, all of which have been embodied in our new box-head type of twister.

The old type of twister has always given perfect satisfaction, and we are still building it for those desiring to match their present equipment.



RING TWISTER WITH BOX-HEAD
CUT SHOWS DRY TWISTER WITH CAST IRON RING RAIL

RING TWISTER

BOX-HEAD TYPE—AMERICAN SYSTEM FOR WET OR DRY TWISTING

On the opposite page is shown a cut of our new type American twister with box-head. This twister we have designed and built with the following points in view: to make a rigid, substantial twister by means of ribbing and bracing; to make a simple twister, easily oiled and cleaned; to make a convenient twister with a wide range of twist gearing easily accessible, and finally, to make an adjustable twister easily leveled and completely adjustable for the different lengths of traverse.

This type of twister is built in three widths — 36 inches, 39 inches and 42 inches — each width of one height only, but adjustable for any length of traverse from 5 inches to 7 inches. The overall lengths, with the various combinations of pulleys and outside bearings, are the same as given for our old type of twister.

The Box-head retains the general form and neat appearance of our older type. An exclusive feature of this head is the heavy inside cross rib, which serves not only to strengthen the head, but also to completely separate the upper from the lower part. This latter feature is important since it obviates the liability of dropping gears, nuts and wrenches into the lower part of the head, and it also prevents the dangerous accumulation of oily waste and fly therein.

The upper part of the head is enclosed by hinged doors, provided with spring latches,

while the lower part has loose covers which can easily be removed without loosening bolts, nuts or screws. The opening in the back of the head necessary for the introduction of the cylinder shaft and jack gear stand, is made sufficiently large to allow the easy removal of the cylinder, and is provided with a cover to prevent the entrance of fly and dirt into the head.

The Foot End and Centres have been entirely redesigned. They have been provided with heavier ribbing to obtain strength, with smooth surfaces to prevent collection of fly and dirt and with elongated bolt holes for the up and down adjustment of the spindle rails.

A New Patent Adjustable Foot has been applied to every support, including the head and foot end as well as the centres. This adjustable foot is unquestionably the neatest, simplest and most substantial device for the purpose, now on the market. It consists of a cast iron shoe as a support, a large jack screw for the adjustment and bolts for clamping the shoe securely in place. The shoe encloses the jack screw, and thus prevents it from collecting fly and dirt.

The Frame Work is of the regular construction, with angle roller beams and heavy box rails. The box rails have web pieces for bracing between the centres, as well as for bolting to the centres. On the 42 inch width of twister, which is designed for heavy work, we use an extra heavy box rail. An exclusive and valuable feature of our new twister is the construction and arrangement by which the box rails with all the attached parts may be raised or lowered to suit the various conditions of traverse, for wet or dry and for fine or coarse work.

The Ring Rails are made in two styles, one the well known Jenks reversible brass plate ring rail, which is intended for wet twisting only, the other the common cast iron ring rail, which is used on both wet and dry twisters.

The brass plate ring rail consists of a series of brass plates, in which the rings are inserted, each plate supported at the back and firmly riveted between two T shaped iron bars, the whole forming one complete section of ring rail.

The cast iron ring rails are made strong and rigid by means of deep flanges, both front and back, extending the full length of the under side. All ring rails are made in short lengths with two lifting rods only for each rail.

The Creel can be made in almost any style and size to suit requirements.

The most common form is the rack creel with cast iron creel stands, horizontal skewer rails and wire skewers. This form of creel can be made for any number of ply from two up to the limit of practical operation. The creel stands are made strong and rigid and are firmly secured to the deck by bolts extending through cross girts which in turn are bolted to the roller beams. The skewer rails are securely bolted to lugs on the creel stands, while the skewers extend entirely through the rails and are fastened with a nut at the back.

For fine work we can furnish a vertical or spinning style of creel. This creel is usually made two stories high to take only one skewer per spindle, as it is generally considered better to double the yarn before twisting. This creel is rigidly supported by means of upright rods securely bolted to cross girts, fastened to the roller beams, while each end of the creel is braced and supported by adjustable castings bolted to

a cast iron base, which in turn is bolted to a cross girt.

The Cylinders may be either 7 or 8 inches in diameter, as required, and are always made in short lengths to insure strength and durability.

The noise of the cylinder has been practically eliminated by the use of a short head end section, which effectually prevents the vibration due to the gearing from producing a hum in the cylinder. The cylinder bearings are of ample dimensions and are self-oiling.

For heavy twisting we usually furnish a double grooved cast iron pulley in place of the tin cylinder. These grooved pulleys are made either 6, 7 or 8 inches in diameter and are carried on a shaft of ample size, supported by bearings closely spaced throughout the length of the twister.

The Driving Shaft is unusually large and is supported at its outer end by a substantial outrigger, which effectually prevents any belt strain from affecting the cylinder. The outrigger is made with a cross bar which can be easily removed when changing pulleys. In the case of the grooved pulley the driving shaft is a continuation of the pulley shaft.

The Driving Pulleys are made in sizes from 7 inches to 18 inches in diameter, and from 2 inch to 4 inch face. The loose pulley is provided with an oil cavity, and is either supported by a stationery self-oiling bushing or carried on a revolving pulley bushing fastened to the driving shaft, as may be preferred. The driving pulleys are always placed at the foot end of the twister.

All Gearing is totally enclosed. All the spur gears are cut on automatic machinery, and the

worm gears are accurately hobbled on special machines. All gear shaft bearings have been increased in length and size, and generous oil pockets are provided so that every bearing can be oiled from the back of the head, while the twister is running. The thrust of the builder motion worm is sustained by a hardened steel collar provided with special means for lubrication.

The Twist Gearing as now arranged differs somewhat from that of the old type of twister. The modern requirements for twisting demand a very wide range of twist, and in order to meet this we have introduced a system of compound gearing, whereby it is possible, not only to match the twist constant of any old type twister, but also to obtain almost any twist by changing either the cylinder gear, the variable cylinder gear, or the regular twist gear. All of these gears are interchangeable, so that one set of twist gears will make all the required changes without any change of the jack gear. With this system of twist gearing each side of the twister can be geared independently and a wide difference of twist obtained, since the variable cylinder gear and the regular twist gear on each side are change gears. The twist gearing is entirely within the box-head, which provides sufficient space for any required range of gearing.

The Builder Motion has been changed slightly from our old pattern, but retains the various styles and combinations, being arranged for straight, taper top, reverse taper top, warp, filling or a combination of any two as desired. The change from one wind to the other of any combination is easily and quickly made, since both the cams and the builder arm remain always

in place. The builder is driven by means of a train of spur and bevel gears, and an upright shaft, worm and worm gear, with the result that practically all back-lash in the cam motion is prevented. We still retain, but in a new and more convenient form, our method of changing the speed of the wave by the use of a change or lay gear. This arrangement, first introduced by us some ten years ago is already familiar to the users of our machinery. One of the features of our new twister is the ring rail wind down, which is so arranged that it can be easily and conveniently operated from the front of the head end by means of a special independent crank.

When the crank is inserted, a clutch is unlocked and the ring rails may then be raised or lowered as desired. The withdrawal of the crank allows the clutch to positively lock again and the regular traverse of the ring rail continues as before. The Jenks patent doffer lock, which holds down the ring rail for doffing, now appears in new form with heavier doffer beam, corrugated foot lever and adjustable lock.

The Roll Stands are of smooth and pleasing design; are strong and substantial; are all milled to a standard, and the roll bearings are provided with German silver bushings, which not only obviate the wear of the roll necks, but which are themselves easily replaced when worn.

The Bottom Rolls for dry twisters are made of steel, and are accurately ground to stand the test of limit gauges, which have a variation of only one and one-half thousandths of an inch either side of the specified size.

For wet twisters the bottom rolls are made of brass tubing, the female end being formed by a malleable iron plug, while the male end consists of a steel plug on which the roll neck is formed.

The Top Rolls for dry twisters are made of cast iron carefully turned and polished. For wet twisters the top rolls are made of cast iron and covered with brass tubing, while the ends of the rolls are painted to prevent rusting.

The Feed Roll Combinations for either wet or dry twisting are as follows: single line bottom and top rolls; double line bottom and single line top rolls; also double line bottom and double line top rolls. The bottom rolls are almost invariably $1\frac{1}{2}$ inches in diameter, while the top rolls for the first two styles are usually $2\frac{1}{8}$ inches in diameter, and for the last style are usually $1\frac{3}{4}$ inches in diameter. The bottom rolls can be furnished either plain, fluted, or bossed and fluted, as desired, but the top rolls are usually furnished plain. The feed rolls of all styles may be run either outwardly or inwardly, as desired.

Cap Bars are provided to hold the top rolls in position for both the single line bottom and top roll, and the double line bottom and top roll styles, but are not required for the double line bottom and single line top roll style. The cap bars are of neat design, are strong and substantial, and all available space is given to the length of top rolls. A rack is provided on the cap bars for each top roll, so that upon their removal from the bottom rolls, they may be supported on the rack by means of their trunions.

The Water Troughs used for wet twisting are located directly back of the feed rolls. These troughs are made of sheet brass, strengthened back and front by being crimped onto wire rods and are locked onto a series of trough stands by means of clamps at the front of each stand. They are made in from one to three lengths to

suit the twister, and are coupled together by means of outside flanged couplings and rubber packings, so that the trough is in effect continuous from end to end. The foot end of each trough is now provided with our new screw cock outlet, provided with a leather packing washer, which can be easily renewed when necessary. The trough ends and couplings are not only soldered, but also riveted to the sheet brass, as experience has proved that the solder will deteriorate and the trough if not riveted will eventually leak. The glass trough rods are carried by fingers supported by a lifter shaft at the back of the troughs, so arranged that, by means of a lifter handle at the foot end of the twister, the glass rods may be lifted out and swung back, leaving the trough free from obstructions and thus convenient for cleaning.

The Guide Rods are located directly back of and close to the roll stands, so that the yarn is accurately guided to the feed rolls. The guide rods are provided with cast iron shoes, which lock into the supporting stands, but which are free to move lengthwise for the traverse. By moving the rods slightly beyond the traverse limits in either direction, the entire rod may be easily removed from the supporting stands.

For dry twisters we provide a wooden guide rod with common iron guide wires. For wet twisters, intended for fine work, we provide a wooden guide rod with a special brass guide and drip wire; but for coarse work we now use a sectional bronze rod with porcelain guides. For wet twisting the guides are so arranged that the surplus water is returned to the water trough.

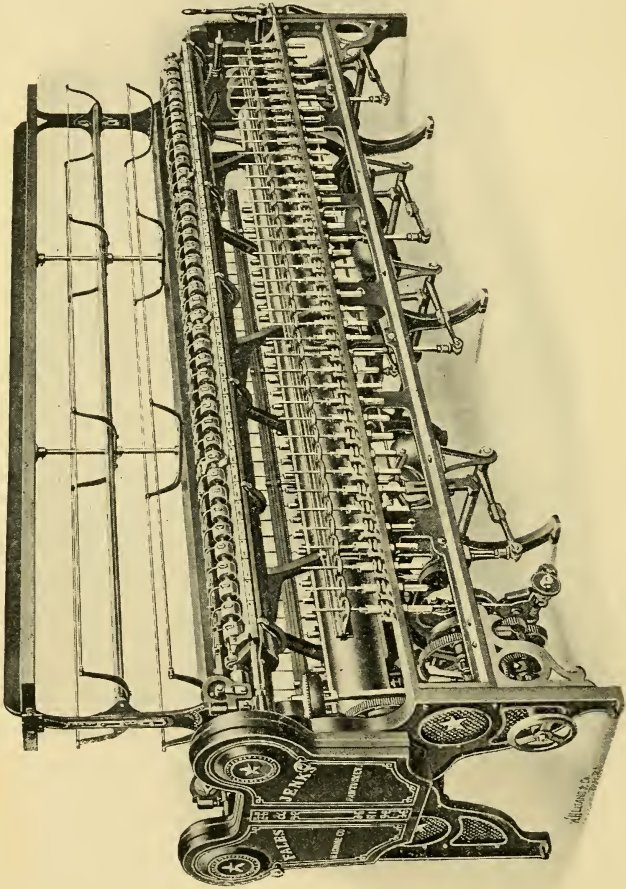
The Guide Rod Traverse Motion now applied to all our twisters is our patent geared motion

with adjustable traverse; it is located at the foot end of the twister, and is driven by a worm extending from the end of the roll. These motions are compact units with all gearing encased, and each side of the twister is provided with a separate motion.

The Spindles which we furnish with our twisters are all manufactured in our own plant, on machinery specially designed and built by us for the purpose. The fact that we have manufactured spindles for more than half a century demonstrates our extensive experience in this important part of our business. We can furnish various styles and types of spindles, and have a large list of sizes suited to all grades of work from the finest to the coarsest ring twisting.

The Rings furnished with our twisters are of various styles and sizes. For dry twisting, up to a 3 inch ring, we usually furnish either double flanged ring in a cast iron holder, or a common flanged ring. Above the 3 inch size the common vertical is preferred. For wet twisting, up to and including a 3 inch ring, we can furnish band rings for the Jenks reversible brass plate ring rails also band rings in brass or iron plate holders screwed to top of cast iron ring rails. Common vertical rings in cast iron ring rails can be furnished in any size from $1\frac{1}{2}$ inches to $4\frac{1}{2}$ inches in diameter.

The Thread Boards usually furnished are the Walmsley lifting. For dry twisting they are usually made with blocks and common iron guide wires. For wet twisting we furnish a solid board, or a board with blocks, either of which can be provided with the oblong brass guide, or our porcelain guide with a retaining guide wire.



RING TWISTER, SCOTCH SYSTEM
CUT SHOWS VERTICAL OR SPINNING STYLE OF CREEL

RING TWISTER

SCOTCH SYSTEM WITH SINGLE CYLINDER FOR WET TWISTING ONLY

On the opposite page is shown a cut of our Scotch system single cylinder twister.

The Scotch system of wet twisting was introduced into this country some thirty years ago, by the Scotch makers of sewing thread, and its use has been confined almost exclusively to the manufacture of thread since that time.

In this system the bottom rolls, which are always made of brass tubing $2\frac{1}{2}$ inches in diameter, revolve in the water trough; thus the yarn in passing under the roll is immersed in the water.

The bottom rolls, top rolls, cap bars, guide rods and thread boards are all carried by a dead roll at the back of the trough. The entire mechanism is counterweighted and, being provided with a quadrant and worm at the foot end of the twister, can be easily raised from the trough to facilitate cleaning.

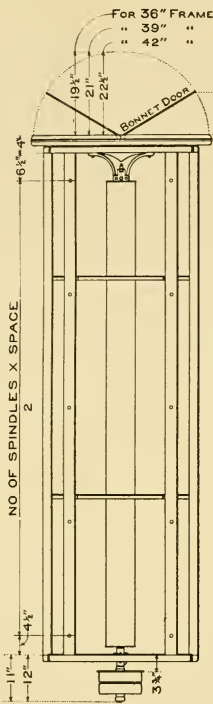
A great improvement in our later twisters of this style lies in the method of attaching the required parts to the dead roll. Formerly it was necessary, in the event of any breakage, to strip all the parts from this roll. In our later machines all parts are so attached that they can be separately removed and replaced.

As far as applicable all the improvements mentioned in connection with the old type American twister have been applied to our Scotch twisters.

The single cylinder Scotch twister is made in the 36 inch width only, but in two heights — for 5 inch and 6 inch traverse.

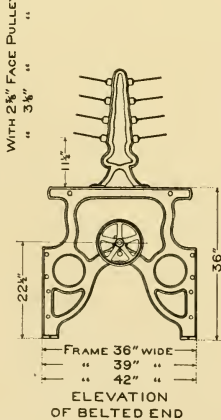
The cut opposite shows the vertical or spinning style of creel as applied to twisters and is particularly desirable for fine two or three ply work, as it allows the use of a fair sized creel spool without the danger of breaking back.

FLOOR PLAN FOR TWISTERS

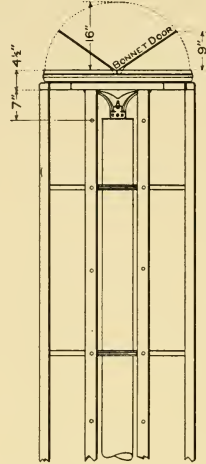


TWISTER WITHOUT BEARING
OUTSIDE OF DRIVING PULLEYS
(FOR OVER ALL LENGTHS, SEE TABLES)

7" REQUIRED TO REMOVE PULLEYS
AND 9" TO OPEN BONNET DOORS

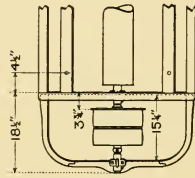


WHEN FURNISHED WITH BELT GUARD
DIMENSIONS REMAIN THE SAME



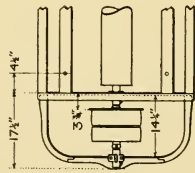
GEARED END OF SINGLE CYLINDER TWISTER
FOR SCOTCH SYSTEM
(FOR OVER ALL LENGTHS, SEE NOTES)

9" REQUIRED TO OPEN BONNET DOORS



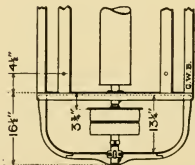
BELTED END
WITH OUTSIDE BOX 4 1/2" LONG
AND 15 1/2" BRACKETS

7" REQUIRED TO REMOVE PULLEYS



BELTED END
WITH OUTSIDE BOX 4 1/2" LONG
AND 14 1/2" BRACKETS

7" REQUIRED TO REMOVE PULLEYS



BELTED END
WITH OUTSIDE BOX 4 1/2" LONG
AND 13 1/2" BRACKETS

7" REQUIRED TO REMOVE PULLEYS

FLOOR PLAN AND END ELEVATION

LENGTH TABLE

LENGTH OF TWISTERS WITH 2 5/8 INCH FACE DRIVING PULLEYS WITHOUT OUTSIDE BEARING

LENGTH OVER ALL

NO. OF SPINDLES	LENGTH OVER ALL										
	2 1/2 IN. GAUGE	2 3/4 IN. GAUGE	3 IN. GAUGE	3 1/4 IN. GAUGE	3 1/2 IN. GAUGE	4 IN. GAUGE	4 1/2 IN. GAUGE	5 IN. GAUGE	5 1/2 IN. GAUGE	6 IN. GAUGE	
40	6 ft. 4 in.	6 ft. 9 in.	7 ft. 2 in.	7 ft. 7 in.	8 ft. 0 in.	8 ft. 10 in.	9 ft. 8 in.	10 ft. 6 in.	11 ft. 4 in.	12 ft. 2 in.	
44	6 ft. 9 in.	7 ft. 2 3/4 in.	7 ft. 8 in.	8 ft. 1 3/4 in.	8 ft. 7 in.	9 ft. 6 in.	10 ft. 6 in.	11 ft. 6 in.	12 ft. 6 in.	13 ft. 6 in.	
48	7 ft. 2 in.	7 ft. 8 in.	8 ft. 2 in.	8 ft. 8 in.	9 ft. 2 in.	9 ft. 9 in.	10 ft. 2 in.	11 ft. 2 in.	12 ft. 2 in.	13 ft. 2 in.	
52	7 ft. 7 in.	8 ft. 1 3/4 in.	8 ft. 8 in.	9 ft. 2 3/4 in.	9 ft. 9 in.	10 ft. 2 3/4 in.	11 ft. 2 in.	12 ft. 2 in.	13 ft. 2 in.	14 ft. 2 in.	
56	8 ft. 0 in.	8 ft. 7 in.	9 ft. 2 in.	9 ft. 9 in.	10 ft. 4 in.	11 ft. 6 in.	12 ft. 8 in.	13 ft. 10 in.	14 ft. 10 in.	15 ft. 10 in.	
60	8 ft. 5 in.	9 ft. 0 3/4 in.	9 ft. 8 in.	10 ft. 3 3/4 in.	10 ft. 11 in.	12 ft. 2 in.	13 ft. 5 in.	14 ft. 8 in.	15 ft. 11 in.	17 ft. 2 in.	
64	8 ft. 10 in.	9 ft. 6 in.	10 ft. 2 in.	10 ft. 10 in.	11 ft. 6 in.	12 ft. 10 in.	14 ft. 2 in.	15 ft. 6 in.	16 ft. 10 in.	18 ft. 2 in.	
68	9 ft. 3 in.	9 ft. 11 3/4 in.	10 ft. 8 in.	11 ft. 4 3/4 in.	12 ft. 1 in.	13 ft. 6 in.	14 ft. 11 in.	16 ft. 4 in.	17 ft. 9 in.	19 ft. 2 in.	
72	9 ft. 8 in.	10 ft. 5 in.	11 ft. 2 in.	11 ft. 11 in.	12 ft. 8 in.	14 ft. 2 in.	15 ft. 8 in.	17 ft. 2 in.	18 ft. 8 in.	20 ft. 2 in.	
76	10 ft. 1 in.	10 ft. 10 3/4 in.	11 ft. 8 in.	12 ft. 5 3/4 in.	13 ft. 3 in.	14 ft. 10 in.	16 ft. 5 in.	18 ft. 0 in.	19 ft. 7 in.	21 ft. 2 in.	
80	10 ft. 6 in.	11 ft. 4 in.	12 ft. 2 in.	13 ft. 0 in.	13 ft. 10 in.	15 ft. 6 in.	17 ft. 2 in.	18 ft. 10 in.	20 ft. 6 in.	22 ft. 2 in.	
84	10 ft. 11 in.	11 ft. 9 3/4 in.	12 ft. 8 in.	13 ft. 6 3/4 in.	14 ft. 5 in.	16 ft. 2 in.	17 ft. 11 in.	19 ft. 8 in.	21 ft. 5 in.	23 ft. 2 in.	
88	11 ft. 4 in.	12 ft. 3 in.	13 ft. 2 in.	14 ft. 1 in.	15 ft. 0 in.	16 ft. 10 in.	18 ft. 8 in.	20 ft. 6 in.	22 ft. 4 in.	24 ft. 2 in.	
92	11 ft. 9 in.	12 ft. 8 3/4 in.	13 ft. 8 in.	14 ft. 7 3/4 in.	15 ft. 7 in.	17 ft. 6 in.	19 ft. 5 in.	21 ft. 4 in.	23 ft. 3 in.	25 ft. 2 in.	
96	12 ft. 2 in.	13 ft. 2 in.	14 ft. 2 in.	15 ft. 2 in.	16 ft. 2 in.	18 ft. 2 in.	20 ft. 2 in.	22 ft. 2 in.	24 ft. 2 in.	26 ft. 2 in.	
100	12 ft. 7 in.	13 ft. 7 3/4 in.	14 ft. 8 in.	15 ft. 8 3/4 in.	16 ft. 9 in.	18 ft. 10 in.	20 ft. 11 in.	23 ft. 0 in.	25 ft. 1 in.	27 ft. 2 in.	
104	13 ft. 0 in.	14 ft. 1 in.	15 ft. 2 in.	16 ft. 3 in.	17 ft. 4 in.	19 ft. 6 in.	21 ft. 8 in.	23 ft. 10 in.	26 ft. 0 in.	28 ft. 2 in.	
108	13 ft. 5 in.	14 ft. 6 3/4 in.	15 ft. 8 in.	16 ft. 9 3/4 in.	17 ft. 11 in.	20 ft. 2 in.	22 ft. 5 in.	25 ft. 8 in.	28 ft. 11 in.	30 ft. 2 in.	
112	13 ft. 10 in.	15 ft. 0 in.	16 ft. 2 in.	17 ft. 4 in.	18 ft. 6 in.	20 ft. 10 in.	23 ft. 2 in.	25 ft. 6 in.	27 ft. 10 in.	30 ft. 2 in.	
116	14 ft. 3 in.	15 ft. 5 3/4 in.	16 ft. 8 in.	17 ft. 10 3/4 in.	19 ft. 1 in.	21 ft. 6 in.	23 ft. 11 in.	26 ft. 4 in.	28 ft. 9 in.	31 ft. 2 in.	
120	14 ft. 8 in.	15 ft. 11 in.	17 ft. 2 in.	18 ft. 5 in.	19 ft. 8 in.	22 ft. 2 in.	24 ft. 8 in.	27 ft. 2 in.	29 ft. 8 in.	32 ft. 2 in.	
124	15 ft. 1 in.	16 ft. 4 3/4 in.	17 ft. 8 in.	18 ft. 11 3/4 in.	20 ft. 3 in.	22 ft. 10 in.	25 ft. 5 in.	28 ft. 0 in.	30 ft. 7 in.	33 ft. 2 in.	
128	15 ft. 6 in.	16 ft. 10 in.	18 ft. 2 in.	19 ft. 6 in.	20 ft. 10 in.	23 ft. 6 in.	26 ft. 2 in.	28 ft. 10 in.	31 ft. 6 in.	34 ft. 2 in.	
132	15 ft. 11 in.	17 ft. 3 3/4 in.	18 ft. 8 in.	20 ft. 0 3/4 in.	21 ft. 5 in.	24 ft. 2 in.	26 ft. 11 in.	29 ft. 8 in.	32 ft. 5 in.	35 ft. 2 in.	
136	16 ft. 4 in.	17 ft. 9 in.	19 ft. 2 in.	20 ft. 7 in.	22 ft. 0 in.	24 ft. 10 in.	27 ft. 8 in.	30 ft. 6 in.	33 ft. 4 in.	36 ft. 2 in.	

FOR ADDITIONS TO THE ABOVE LENGTHS SEE NOTES AT END OF TABLE

LENGTH TABLE—(Continued)

LENGTH OF TWISTERS WITH 2 5/8 INCH FACE DRIVING PULLEYS WITHOUT OUTSIDE BEARING

LENGTH OVER ALL

NO. OF SPINDLES	LENGTH OVER ALL										
	2 1/2 IN. GAUGE	2 3/4 IN. GAUGE	3 IN. GAUGE	3 1/4 IN. GAUGE	3 1/2 IN. GAUGE	4 IN. GAUGE	4 1/2 IN. GAUGE	5 IN. GAUGE	5 1/2 IN. GAUGE	6 IN. GAUGE	6 IN. GAUGE
140	16 ft. 9 in.	18 ft. 2 1/2 in.	19 ft. 8 in.	21 ft. 1 1/2 in.	22 ft. 7 in.	25 ft. 6 in.	28 ft. 5 in.	31 ft. 4 in.	34 ft. 3 in.	37 ft. 2 in.	37 ft. 2 in.
144	17 ft. 7 in.	18 ft. 8 in.	20 ft. 2 in.	21 ft. 8 in.	23 ft. 2 in.	26 ft. 2 in.	29 ft. 2 in.	32 ft. 2 in.	35 ft. 2 in.	38 ft. 2 in.	38 ft. 2 in.
148	17 ft. 7 in.	19 ft. 1 1/2 in.	20 ft. 8 in.	22 ft. 2 1/2 in.	23 ft. 9 in.	26 ft. 10 in.	29 ft. 11 in.	33 ft. 0 in.	36 ft. 1 in.	39 ft. 2 in.	39 ft. 2 in.
152	18 ft. 0 in.	19 ft. 7 in.	21 ft. 2 in.	22 ft. 9 in.	24 ft. 4 in.	27 ft. 6 in.	30 ft. 8 in.	33 ft. 10 in.	37 ft. 0 in.	40 ft. 2 in.	40 ft. 2 in.
156	18 ft. 5 in.	20 ft. 0 1/2 in.	21 ft. 8 in.	23 ft. 3 1/2 in.	24 ft. 11 in.	28 ft. 2 in.	31 ft. 5 in.	34 ft. 8 in.	37 ft. 11 in.	41 ft. 2 in.	41 ft. 2 in.
160	18 ft. 10 in.	20 ft. 6 in.	22 ft. 2 in.	23 ft. 10 in.	25 ft. 6 in.	28 ft. 10 in.	32 ft. 2 in.	35 ft. 6 in.	38 ft. 10 in.	42 ft. 2 in.	42 ft. 2 in.
164	19 ft. 3 in.	20 ft. 1 1/2 in.	22 ft. 8 in.	24 ft. 4 1/2 in.	26 ft. 1 in.	29 ft. 6 in.	32 ft. 11 in.	36 ft. 4 in.	39 ft. 9 in.	43 ft. 2 in.	43 ft. 2 in.
168	19 ft. 8 in.	21 ft. 5 in.	23 ft. 2 in.	24 ft. 11 in.	26 ft. 8 in.	30 ft. 2 in.	33 ft. 8 in.	37 ft. 2 in.	40 ft. 8 in.	44 ft. 2 in.	44 ft. 2 in.
172	20 ft. 1 in.	21 ft. 10 1/2 in.	23 ft. 8 in.	25 ft. 5 1/2 in.	27 ft. 3 in.	30 ft. 10 in.	34 ft. 5 in.	38 ft. 0 in.	41 ft. 7 in.	45 ft. 2 in.	45 ft. 2 in.
176	20 ft. 6 in.	22 ft. 4 in.	24 ft. 2 in.	26 ft. 0 in.	27 ft. 10 in.	31 ft. 6 in.	35 ft. 2 in.	38 ft. 10 in.	42 ft. 6 in.	46 ft. 2 in.	46 ft. 2 in.
180	20 ft. 11 in.	22 ft. 9 1/2 in.	24 ft. 8 in.	26 ft. 6 1/2 in.	28 ft. 5 in.	32 ft. 2 in.	35 ft. 11 in.	39 ft. 8 in.	43 ft. 6 in.	47 ft. 2 in.	47 ft. 2 in.
184	21 ft. 4 in.	23 ft. 3 in.	25 ft. 2 in.	27 ft. 1 in.	29 ft. 0 in.	32 ft. 10 in.	36 ft. 8 in.	40 ft. 6 in.	44 ft. 4 in.	48 ft. 2 in.	48 ft. 2 in.
188	21 ft. 9 in.	23 ft. 8 1/2 in.	25 ft. 8 in.	27 ft. 7 1/2 in.	29 ft. 7 in.	33 ft. 6 in.	37 ft. 5 in.	41 ft. 4 in.	45 ft. 2 in.	49 ft. 2 in.	49 ft. 2 in.
192	22 ft. 2 in.	24 ft. 2 in.	26 ft. 2 in.	28 ft. 2 in.	30 ft. 2 in.	34 ft. 2 in.	38 ft. 2 in.	42 ft. 2 in.	46 ft. 2 in.	50 ft. 2 in.	50 ft. 2 in.
196	22 ft. 7 in.	24 ft. 7 1/2 in.	26 ft. 8 in.	28 ft. 8 1/2 in.	30 ft. 9 in.	34 ft. 10 in.	38 ft. 11 in.	43 ft. 0 in.	47 ft. 0 in.	51 ft. 2 in.	51 ft. 2 in.
200	23 ft. 0 in.	25 ft. 1 in.	27 ft. 2 in.	29 ft. 3 in.	31 ft. 4 in.	35 ft. 6 in.	39 ft. 8 in.	43 ft. 8 in.	48 ft. 8 in.	53 ft. 2 in.	53 ft. 2 in.
204	23 ft. 5 in.	25 ft. 6 1/2 in.	27 ft. 8 in.	29 ft. 9 1/2 in.	31 ft. 11 in.	36 ft. 2 in.	40 ft. 5 in.	44 ft. 5 in.	49 ft. 5 in.	54 ft. 2 in.	54 ft. 2 in.
208	23 ft. 10 in.	26 ft. 0 in.	28 ft. 2 in.	30 ft. 4 in.	32 ft. 6 in.	36 ft. 10 in.	41 ft. 2 in.	45 ft. 2 in.	50 ft. 2 in.	55 ft. 2 in.	55 ft. 2 in.
212	24 ft. 3 in.	26 ft. 5 1/2 in.	28 ft. 8 in.	30 ft. 10 1/2 in.	33 ft. 1 in.	37 ft. 6 in.	41 ft. 11 in.	46 ft. 11 in.	51 ft. 11 in.	56 ft. 2 in.	56 ft. 2 in.
216	24 ft. 8 in.	26 ft. 11 in.	29 ft. 8 in.	31 ft. 5 in.	33 ft. 8 in.	38 ft. 2 in.	42 ft. 8 in.	47 ft. 8 in.	52 ft. 8 in.	57 ft. 2 in.	57 ft. 2 in.
220	25 ft. 1 in.	27 ft. 4 1/2 in.	29 ft. 2 in.	31 ft. 11 1/2 in.	34 ft. 3 in.	38 ft. 10 in.	43 ft. 6 in.	48 ft. 6 in.	53 ft. 6 in.	58 ft. 2 in.	58 ft. 2 in.
224	25 ft. 6 in.	27 ft. 10 in.	30 ft. 2 in.	32 ft. 10 in.	34 ft. 10 in.	39 ft. 6 in.	44 ft. 6 in.	49 ft. 6 in.	54 ft. 6 in.	59 ft. 2 in.	59 ft. 2 in.
228	25 ft. 11 in.	28 ft. 3 1/2 in.	30 ft. 8 in.	33 ft. 0 1/2 in.	35 ft. 5 in.	40 ft. 2 in.	45 ft. 2 in.	50 ft. 2 in.	55 ft. 2 in.	60 ft. 2 in.	60 ft. 2 in.
232	26 ft. 4 in.	28 ft. 9 in.	31 ft. 2 in.	33 ft. 7 in.	36 ft. 0 in.	40 ft. 10 in.	45 ft. 10 in.	50 ft. 10 in.	55 ft. 10 in.	60 ft. 2 in.	60 ft. 2 in.
236	26 ft. 9 in.	29 ft. 2 1/2 in.	31 ft. 8 in.	34 ft. 1 1/2 in.	36 ft. 7 in.	41 ft. 6 in.	46 ft. 6 in.	51 ft. 6 in.	56 ft. 6 in.	61 ft. 2 in.	61 ft. 2 in.

FOR ADDITIONS TO THE ABOVE LENGTHS SEE NOTES AT END OF TABLE

LENGTH TABLE — (Continued)

LENGTH OF TWISTERS WITH 2½ INCH FACE DRIVING PULLEYS WITHOUT OUTSIDE BEARING

NO. OF SPINDLES	LENGTH OVER ALL				
	2½ IN. GAUGE	2¾ IN. GAUGE	3 IN. GAUGE	3¼ IN. GAUGE	3½ IN. GAUGE
240	27 ft. 2 in.	29 ft. 8 in.	32 ft. 2 in.	34 ft. 8 in.	37 ft. 2 in.
244	27 ft. 7 in.	30 ft. 1¼ in.	32 ft. 8 in.	35 ft. 2½ in.	37 ft. 9 in.
248	28 ft. 0 in.	30 ft. 7 in.	33 ft. 2 in.	35 ft. 9 in.	38 ft. 4 in.
252	28 ft. 5 in.	31 ft. 0¼ in.	33 ft. 8 in.	36 ft. 3¼ in.	38 ft. 11 in.
256	28 ft. 10 in.	31 ft. 6 in.	34 ft. 2 in.	36 ft. 10 in.	39 ft. 6 in.
260	29 ft. 3 in.	31 ft. 11¼ in.	34 ft. 8 in.	37 ft. 4½ in.	40 ft. 1 in.
264	29 ft. 8 in.	32 ft. 5 in.	35 ft. 2 in.	37 ft. 11 in.	40 ft. 8 in.
268	30 ft. 1 in.	32 ft. 10¼ in.	35 ft. 8 in.	38 ft. 5½ in.	41 ft. 3 in.
272	30 ft. 6 in.	33 ft. 4 in.	36 ft. 2 in.	39 ft. 0 in.	41 ft. 10 in.
276	30 ft. 11 in.	33 ft. 9¼ in.	36 ft. 8 in.	39 ft. 6¼ in.	42 ft. 5 in.
280	31 ft. 4 in.	34 ft. 3 in.	37 ft. 2 in.	40 ft. 1 in.	
284	31 ft. 9 in.	34 ft. 8¼ in.	37 ft. 8 in.	40 ft. 7¼ in.	
288	32 ft. 2 in.	35 ft. 2 in.	38 ft. 2 in.	41 ft. 2 in.	
292	32 ft. 7 in.	35 ft. 7¼ in.	38 ft. 8 in.	41 ft. 8¼ in.	
296	33 ft. 0 in.	36 ft. 1 in.	39 ft. 2 in.	42 ft. 3 in.	
300	33 ft. 5 in.	36 ft. 6¼ in.	39 ft. 8 in.		
304	33 ft. 10 in.	37 ft. 0 in.	40 ft. 2 in.		
308	34 ft. 3 in.	37 ft. 5¼ in.	40 ft. 8 in.		
312	34 ft. 8 in.	37 ft. 11 in.	41 ft. 2 in.		
316	35 ft. 1 in.	38 ft. 4¼ in.	41 ft. 8 in.		
320	35 ft. 6 in.	38 ft. 10 in.			
324	35 ft. 11 in.	39 ft. 3¼ in.			
328	36 ft. 4 in.	39 ft. 9 in.			
332	36 ft. 9 in.	40 ft. 2¼ in.			
336	37 ft. 2 in.	40 ft. 8 in.			
340	37 ft. 7 in.	41 ft. 1¼ in.			

ADDITIONS TO LENGTHS GIVEN IN TABLE

Twisters, AMERICAN SYSTEM, wet or dry:—

Without Outside Bearing,

3⅛ inch face Driving Pulleys, add 1 inch.

With Outside Bearing,

2⅝ or 3⅛ inch face Driving Pulleys, with 13¼ inch Outrigger Brackets and 4½ in. Box, add 5½ inches.

3⅝ inch face Driving Pulleys, with 14¼ inch

Outrigger Brackets and 4½ in. Box, add 6½ inches.

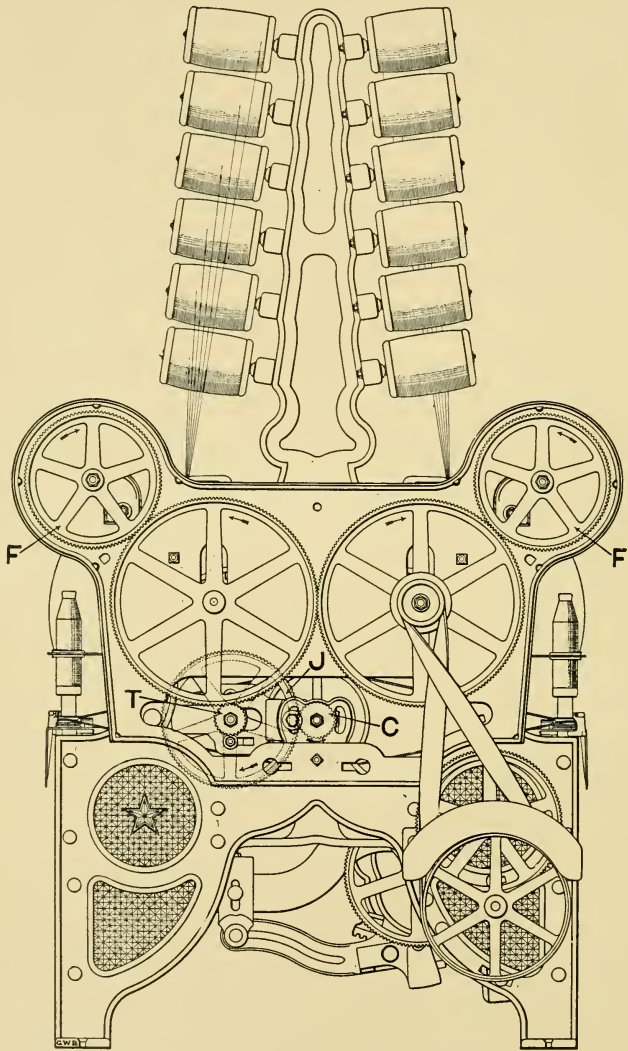
4⅝ inch face Driving Pulleys, with 15¼ inch

Outrigger Brackets and 4½ in. Box, add 7½ inches.

Twisters, SCOTCH SYSTEM, wet only:—

This Style of Twister is 1 inch longer in all cases, than the American Style.

TWIST GEARING FOR TWISTING



HEAD END SHOWING TWIST GEARING
AMERICAN SYSTEM

TWIST FORMULAS

SINGLE CYLINDER AMERICAN TWISTER

C=CYLINDER GEAR.

J=JACK GEAR.

T=TWIST CHANGE GEAR.

F=FRONT ROLL GEAR.

O=CIRCUM. OF FRONT ROLL.

R=RATIO CYL. TO WHIRL.

$$\frac{J \times F \times R}{C \times T \times O} = \text{TWIST PER INCH.}$$

$$\frac{J \times F \times R}{C \times O} = \text{TWIST CONSTANT.}$$

$$\frac{\text{TWIST CONSTANT}}{\text{TWIST CHANGE GEAR}} = \text{TWIST PER INCH.}$$

$$\frac{\text{TWIST CONSTANT}}{\text{TWIST PER INCH}} = \text{TWIST CHANGE GEAR.}$$

EXAMPLES:—

CYLINDER GEAR 60 T.

JACK GEAR 80 T.

TWIST CHANGE GEAR 16 T.

FRONT ROLL GEAR 112 T.

CIRCUM. $1\frac{1}{2}$ " FRONT ROLL 4.7124". RATIO 7" CYL. TO 1" WHIRL 6.18.

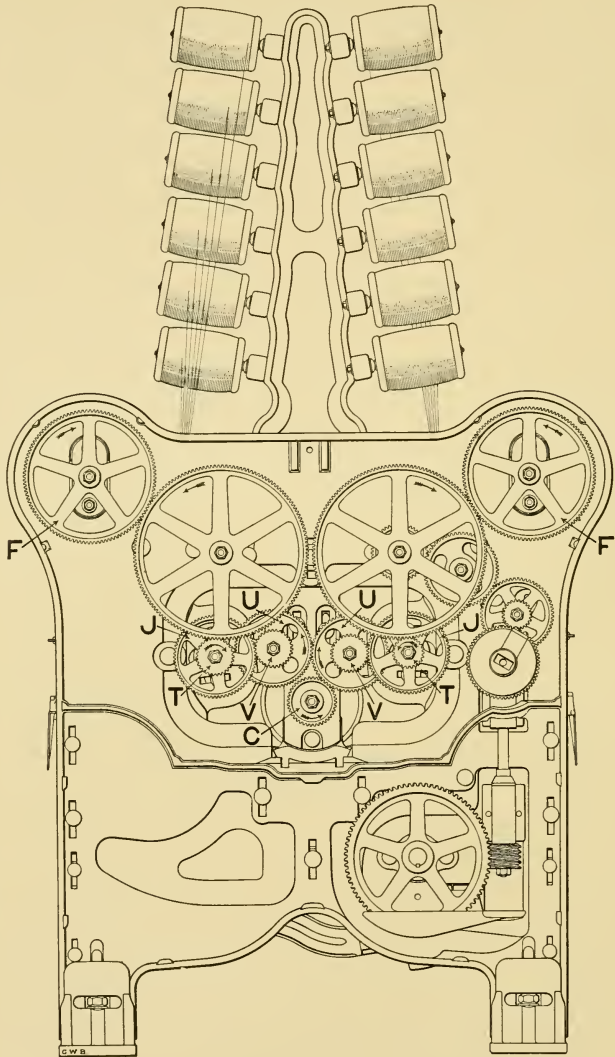
$$\frac{80 \times 112 \times 6.18}{60 \times 16 \times 4.7124} = 12.24, \text{ TWIST PER INCH.}$$

$$\frac{80 \times 112 \times 6.18}{60 \times 4.7124} = 195.84, \text{ TWIST CONSTANT.}$$

$$\frac{195.84}{16} = 12.24, \text{ TWIST PER INCH.}$$

$$\frac{195.84}{12.24} = 16, \text{ TWIST CHANGE GEAR.}$$

TWIST GEARING FOR TWISTING



**BOX-HEAD SHOWING TWIST GEARING
ALSO BUILDER MCTION GEARING
AMERICAN SYSTEM**

TWIST FORMULAS

SINGLE CYLINDER BOX-HEAD AMERICAN TWISTER

C=CYLINDER GEAR.

U=UNIVERSAL JACK GEAR.

V=VARIABLE CYLINDER GEAR. **J**=JACK GEAR.

T=TWIST CHANGE GEAR.

F=FRONT ROLL GEAR.

O=CIRCUM. OF FRONT ROLL.

R=RATIO CYL. TO WHIRL.

$$\frac{U \times J \times F \times R}{C \times V \times T \times O} = \text{TWIST PER INCH.}$$

$$\frac{U \times J \times F \times R}{C \times V \times O} = \text{TWIST CONSTANT.}$$

$$\frac{\text{TWIST CONSTANT}}{\text{TWIST CHANGE GEAR}} = \text{TWIST PER INCH.}$$

$$\frac{\text{TWIST CONSTANT}}{\text{TWIST PER INCH}} = \text{TWIST CHANGE GEAR.}$$

EXAMPLES:—

CYLINDER GEAR 52 T.

UNIVERSAL JACK GEAR 64 T.

VARIABLE CYLINDER GEAR 60 T.

JACK GEAR 65 T.

TWIST CHANGE GEAR 16 T.

FRONT ROLL GEAR 112 T.

CIRCUM. $1\frac{1}{2}$ " FRONT ROLL 4.7124".

RATIO 7" CYL. TO 1" WHIRL 6.18.

$$\frac{64 \times 65 \times 112 \times 6.18}{52 \times 60 \times 16 \times 4.7124} = 12.24, \text{ TWIST PER INCH.}$$

$$\frac{64 \times 65 \times 112 \times 6.18}{52 \times 60 \times 4.7124} = 195.84, \text{ TWIST CONSTANT.}$$

$$\frac{195.84}{16} = 12.24, \text{ TWIST PER INCH.}$$

$$\frac{195.84}{12.24} = 16, \text{ TWIST CHANGE GEAR.}$$

BOX-HEAD GEARING

TWIST GEARING

All the twist gearing tables given in this book are applicable to the new box-head twister as well as to the old type twister. By referring, however, to the two preceding pages it will be seen, first, that the arrangement of the twist gearing differs from that of the old type twister, and secondly, that the formulas given for each are different. The new twister has compound twist gearing which, as will be noted by reference to the preceding cut, can be easily arranged to gear each side of the twister independently. This compound gearing is designed to give a wide range of twist, and thus meet the present requirements in twisting. By the use of the regular change gears only, a very large variation in twist may be obtained, since the cylinder gear C may be varied from 26 to 52 teeth, the variable cylinder gear V from 18 to 60 or 70 teeth depending upon the width of twister, and the regular twist change gear T from 16 to 60 teeth.

The actual difference between the old type twister, for which the twist gearing tables were originally intended, and the new box-head twister is that, in place of the cylinder gear C and the jack gear J, we now have the cylinder gear C, the universal jack gear U, the variable cylinder gear V and the jack gear J. Now in selecting the proper gearing to match the twist of the old type twister, we use the same gears for the variable cylinder gear V that are given in the tables for the regular cylinder gear, so that the jack gear J of the old type twister must have an equivalent in the cylinder gear C, the universal jack gear U, and the jack gear J of the new box-head twister or, stated in the terms of the two twist formulas,

$$\text{Jack J} = \frac{\text{Universal Jack U} \times \text{Jack J}}{\text{Cylinder C}}$$

The following list shows the equivalent gearing which will produce the twist per inch given in the tables:

For 36 inch and 39 inch twisters:

$$\text{Jack 80 T} = \frac{\text{Universal Jack 64 T} \times \text{Jack 65 T}}{\text{Cylinder 52 T}}$$

$$\text{Jack 96 T} = \frac{\text{Universal Jack 64 T} \times \text{Jack 66 T}}{\text{Cylinder 44 T}}$$

$$\text{Jack 112 T} = \frac{\text{Universal Jack 64 T} \times \text{Jack 70 T}}{\text{Cylinder 40 T}}$$

$$\text{Jack 120 T} = \frac{\text{Universal Jack 64 T} \times \text{Jack 75 T}}{\text{Cylinder 40 T}}$$

For 42 inch twisters:

$$\text{Jack 96 T} = \frac{\text{Universal Jack 72 T} \times \text{Jack 68 T}}{\text{Cylinder 51 T}}$$

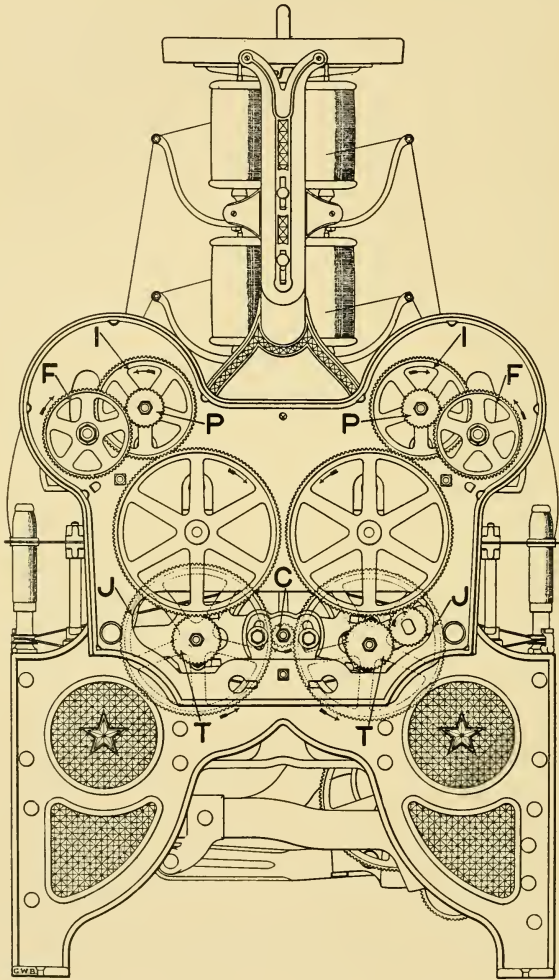
$$\text{Jack 112 T} = \frac{\text{Universal Jack 72 T} \times \text{Jack 70 T}}{\text{Cylinder 45 T}}$$

$$\text{Jack 120 T} = \frac{\text{Universal Jack 72 T} \times \text{Jack 75 T}}{\text{Cylinder 45 T}}$$

$$\text{Jack 132 T} = \frac{\text{Universal Jack 72 T} \times \text{Jack 77 T}}{\text{Cylinder 42 T}}$$

LAY GEAR

The lay gear or builder motion change gear, as will be noted by reference to the preceding cut, is much more conveniently located than on the older type of twister, being enclosed in the upper right hand part of the head with the twist gearing. This gear, which is the same as a cylinder gear or a twist change gear, may be varied from 16 to 60 teeth according to requirements.



HEAD END SHOWING TWIST GEARING
SCOTCH SYSTEM

CUT SHOWS VERTICAL OR SPINNING STYLE CREEL

TWIST FORMULAS

SINGLE CYLINDER SCOTCH TWISTER

C=CYLINDER GEAR.

J=JACK GEAR.

T=TWIST CHANGE GEAR.

I=INTERMEDIATE ROLL GEAR.

P=PINION.

F=FRONT ROLL GEAR.

O=CIRCUM.OF FRONT ROLL.

R=RATIO CYL. TO WHIRL.

$$\frac{J \times I \times F \times R}{C \times T \times P \times O} = \text{TWIST PER INCH.}$$

$$\frac{J \times I \times F \times R}{C \times P \times O} = \text{TWIST CONSTANT.}$$

$$\frac{\text{TWIST CONSTANT}}{\text{TWIST CHANGE GEAR}} = \text{TWIST PER INCH.}$$

$$\frac{\text{TWIST CONSTANT}}{\text{TWIST PER INCH}} = \text{TWIST CHANGE GEAR.}$$

EXAMPLES:—

CYLINDER GEAR 60 T.

JACK GEAR 80 T.

TWIST CHANGE GEAR 16 T.

INTERMEDIATE JACK GEAR 80 T.

PINION 30 T.

FRONT ROLL GEAR 70 T.

CIRCUM. OF 2½" FRONT ROLL 7.854".

RATIO 7" CYL. TO 1" WHIRL 6.18.

$$\frac{80 \times 80 \times 70 \times 6.18}{60 \times 16 \times 30 \times 7.854} = 12.24, \text{ TWIST PER INCH.}$$

$$\frac{80 \times 80 \times 70 \times 6.18}{60 \times 30 \times 7.854} = 195.84, \text{ TWIST CONSTANT.}$$

$$\frac{195.84}{16} = 12.24, \text{ TWIST PER INCH.}$$

$$\frac{195.84}{12.24} = 16, \text{ TWIST CHANGE GEAR.}$$

The TWIST TABLES for the SINGLE CYLINDER SCOTCH TWISTER are the same as for the American Twister.

The gearing of the Scotch Twister is so arranged that, with the same Cylinder, Whirl, Cylinder Gear, Jack Gear and Twist Gear, the same twist is produced as on the American Twister; that is, the 2½ inch Roll of the Scotch Twister with 30 tooth Pinion, 80 tooth Intermediate Roll Gear and 70 tooth Front Roll Gear is equal to the 1½ inch Roll of the American Twister with 112 tooth Front Roll Gear.

TWIST GEARING TABLE

36" AND 39" TWISTERS

CYLINDER 7 INCHES DIAM. WHIRL 1 INCH DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 618

FRONT ROLL 1½ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 60 T. Jack 80 T.	Cyl. 50 T. Jack 80 T.	Cyl. 40 T. Jack 80 T.	Cyl. 40 T. Jack 96 T.	Cyl. 36 T. Jack 96 T.	Cyl. 30 T. Jack 96 T.
16	12.24	14.69	18.36	22.03	24.48	29.38
17	11.52	13.82	17.28	20.74	23.04	27.65
18	10.88	13.06	16.32	19.58	21.76	26.11
19	10.31	12.37	15.46	18.55	20.61	24.74
20	9.79	11.75	14.69	17.63	19.58	23.50
21	9.33	11.19	13.99	16.79	18.65	22.38
22	8.90	10.68	13.35	16.02	17.80	21.36
23	8.51	10.22	12.77	15.33	17.03	20.44
24	8.16	9.79	12.24	14.69	16.32	19.58
25	7.83	9.40	11.75	14.10	15.67	18.80
26	7.53	9.04	11.30	13.56	15.06	18.08
27	7.25	8.70	10.88	13.06	14.51	17.40
28	6.99	8.39	10.49	12.59	13.99	16.78
29	6.75	8.10	10.13	12.16	13.51	16.20
30	6.53	7.83	9.79	11.75	13.06	15.67
31	6.32	7.58	9.48	11.37	12.63	15.16
32	6.12	7.34	9.18	11.02	12.24	14.68
33	5.93	7.12	8.90	10.68	11.87	14.24
34	5.76	6.91	8.64	10.37	11.52	13.82
35	5.60	6.71	8.39	10.07	11.19	13.43
36	5.44	6.53	8.16	9.79	10.88	13.06
37	5.29	6.35	7.94	9.53	10.59	12.70
38	5.15	6.18	7.73	9.28	10.31	12.36
39	5.02	6.03	7.53	9.04	10.04	12.06
40	4.90	5.88	7.34	8.81	9.79	11.75
41	4.78	5.73	7.16	8.60	9.55	11.46
42	4.66	5.60	6.99	8.39	9.33	11.20
43	4.55	5.47	6.83	8.20	9.11	10.94
44	4.45	5.34	6.68	8.01	8.90	10.68
45	4.35	5.22	6.53	7.83	8.70	10.44
46	4.26	5.11	6.39	7.66	8.51	10.22
47	4.17	5.00	6.25	7.50	8.33	10.00
48	4.08	4.90	6.12	7.34	8.16	9.80
49	4.00	4.80	6.00	7.19	7.99	9.66
50	3.92	4.70	5.88	7.05	7.83	9.40
51	3.84	4.61	5.76	6.91	7.68	9.22
52	3.77	4.52	5.65	6.78	7.53	9.04
53	3.70	4.43	5.54	6.65	7.39	8.87
54	3.63	4.35	5.44	6.53	7.25	8.70
55	3.56	4.27	5.34	6.41	7.12	8.55
56	3.50	4.20	5.25	6.29	6.99	8.39
57	3.44	4.12	5.15	6.18	6.87	8.25
58	3.38	4.05	5.06	6.08	6.75	8.10
59	3.32	3.98	4.98	5.97	6.64	7.97
60	3.26	3.92	4.90	5.88	6.53	7.83
Constants	195.84	235.01	293.76	352.51	391.68	470.02

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE—(Continued)

36" AND 39" TWISTERS

CYLINDER 7 INCHES DIAM. WHIRL 1 INCH DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 6.18

FRONT ROLL 1½ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

TWIST PER INCH

Change Gears	TWIST PER INCH					
	Cyl. 30 T. Jack 112 T.	Cyl. 27 T. Jack 112 T.	Cyl. 24 T. Jack 112 T.	Cyl. 24 T. Jack 120 T.	Cyl. 21 T. Jack 120 T.	Cyl. 18 T. Jack 120 T.
16	34.27	38.08	42.84	45.90	52.46	61.20
17	32.26	35.84	40.32	43.20	49.37	57.60
18	30.46	33.85	38.08	40.80	46.63	54.40
19	28.86	32.07	36.08	38.65	44.17	51.54
20	27.42	30.46	34.27	36.72	41.97	48.96
21	26.11	29.01	32.64	34.97	39.97	46.63
22	24.92	27.69	31.16	33.38	38.15	44.51
23	23.84	26.49	29.80	31.93	36.49	42.57
24	22.85	25.39	28.56	30.60	34.97	40.80
25	21.93	24.37	27.42	29.38	33.57	39.17
26	21.09	23.43	26.36	28.25	32.28	37.66
27	20.30	22.57	25.39	27.20	31.09	36.27
28	19.58	21.76	24.48	26.23	29.98	34.97
29	18.91	21.01	23.64	25.32	28.94	33.77
30	18.28	20.31	22.85	24.48	27.98	32.64
31	17.69	19.65	22.11	23.69	27.07	31.59
32	17.14	19.04	21.42	22.95	26.23	30.60
33	16.62	18.46	20.77	22.25	25.43	29.67
34	16.13	17.92	20.16	21.60	24.69	28.80
35	15.67	17.41	19.58	20.98	23.98	27.98
36	15.23	16.92	19.04	20.40	23.31	27.20
37	14.82	16.47	18.53	19.85	22.68	26.46
38	14.43	16.03	18.04	19.33	22.09	25.77
39	14.06	15.62	17.58	18.83	21.52	25.11
40	13.71	15.23	17.14	18.36	20.98	24.48
41	13.37	14.86	16.72	17.91	20.47	23.88
42	13.05	14.51	16.32	17.49	19.98	23.31
43	12.75	14.17	15.94	17.08	19.52	22.77
44	12.46	13.85	15.58	16.69	19.08	22.25
45	12.19	13.54	15.23	16.32	18.65	21.76
46	11.92	13.25	14.90	15.97	18.25	21.29
47	11.67	12.96	14.58	15.63	17.86	20.83
48	11.42	12.69	14.28	15.30	17.49	20.40
49	11.19	12.43	13.99	14.99	17.13	19.98
50	10.97	12.19	13.71	14.69	16.79	19.58
51	10.75	11.95	13.44	14.40	16.46	19.20
52	10.55	11.72	13.18	14.12	16.14	18.83
53	10.35	11.50	12.93	13.86	15.84	18.48
54	10.15	11.28	12.69	13.60	15.54	18.13
55	9.97	11.08	12.46	13.35	15.26	17.80
56	9.79	10.88	12.24	13.11	14.99	17.49
57	9.62	10.69	12.03	12.88	14.72	17.18
58	9.45	10.50	11.82	12.66	14.47	16.88
59	9.29	10.33	11.62	12.45	14.23	16.60
60	9.14	10.15	11.42	12.24	13.99	16.32
Constants	548.35	609.28	685.44	734.40	839.32	979.20

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE

36" AND 39" TWISTERS

CYLINDER 7 INCHES DIAM. WHIRL $1\frac{1}{8}$ INCHES DIAM.
RATIO OF CYLINDER TO WHIRL 1 TO 5.61

FRONT ROLL $1\frac{1}{2}$ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 60 T. Jack 80 T.	Cyl. 50 T. Jack 80 T.	Cyl. 40 T. Jack 80 T.	Cyl. 40 T. Jack 96 T.	Cyl. 36 T. Jack 96 T.	Cyl. 30 T. Jack 96 T.
16	11.11	13.33	16.67	20.00	22.22	26.67
17	10.46	12.55	15.69	18.82	20.92	25.10
18	9.88	11.85	14.82	17.78	19.75	23.70
19	9.36	11.23	14.04	16.84	18.71	22.46
20	8.89	10.67	13.33	16.00	17.78	21.33
21	8.47	10.16	12.70	15.24	16.93	20.32
22	8.08	9.70	12.12	14.55	16.16	19.39
23	7.73	9.28	11.59	13.91	15.46	18.55
24	7.41	8.89	11.11	13.33	14.82	17.78
25	7.11	8.53	10.67	12.80	14.22	17.07
26	6.84	8.20	10.26	12.31	13.68	16.41
27	6.58	7.90	9.88	11.85	13.17	15.80
28	6.35	7.62	9.52	11.43	12.70	15.24
29	6.13	7.36	9.20	11.03	12.26	14.71
30	5.93	7.11	8.89	10.67	11.85	14.22
31	5.73	6.88	8.60	10.32	11.47	13.76
32	5.56	6.67	8.33	10.00	11.11	13.33
33	5.39	6.46	8.08	9.70	10.77	12.93
34	5.23	6.27	7.84	9.41	10.46	12.55
35	5.08	6.10	7.62	9.14	10.16	12.19
36	4.94	5.93	7.41	8.89	9.88	11.86
37	4.80	5.77	7.21	8.65	9.61	11.54
38	4.68	5.61	7.02	8.42	9.36	11.22
39	4.56	5.47	6.84	8.21	9.12	10.94
40	4.44	5.33	6.67	8.00	8.89	10.67
41	4.34	5.20	6.50	7.80	8.67	10.40
42	4.23	5.08	6.35	7.62	8.47	10.16
43	4.13	4.96	6.20	7.44	8.27	9.92
44	4.04	4.85	6.06	7.27	8.08	9.70
45	3.95	4.74	5.93	7.11	7.90	9.48
46	3.86	4.64	5.80	6.96	7.73	9.28
47	3.78	4.54	5.67	6.81	7.57	9.08
48	3.70	4.44	5.56	6.67	7.41	8.89
49	3.63	4.35	5.44	6.53	7.26	8.71
50	3.56	4.27	5.33	6.40	7.11	8.53
51	3.49	4.18	5.23	6.27	6.97	8.36
52	3.42	4.10	5.13	6.15	6.84	8.20
53	3.35	4.03	5.03	6.04	6.71	8.05
54	3.29	3.95	4.94	5.93	6.58	7.90
55	3.23	3.88	4.85	5.82	6.46	7.76
56	3.17	3.81	4.76	5.71	6.35	7.62
57	3.12	3.74	4.68	5.61	6.24	7.49
58	3.07	3.68	4.60	5.52	6.13	7.36
59	3.01	3.62	4.52	5.42	6.03	7.23
60	2.96	3.56	4.44	5.33	5.93	7.11
Constants	177.78	213.33	266.67	320.00	355.56	426.67

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE—(Continued)

36" AND 39" TWISTERS

CYLINDER 7 INCHES DIAM. WHIRL $1\frac{1}{8}$ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 5.61

FRONT ROLL $1\frac{1}{2}$ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 30 T. Jack 112 T.	Cyl. 27 T. Jack 112 T.	Cyl. 24 T. Jack 112 T.	Cyl. 24 T. Jack 120 T.	Cyl. 21 T. Jack 120 T.	Cyl. 18 T. Jack 120 T.
16	31.11	34.57	38.89	41.67	47.62	55.56
17	29.28	32.53	36.60	39.22	44.82	52.29
18	27.65	30.73	34.57	37.04	42.33	49.38
19	26.20	29.11	32.75	35.09	40.10	46.78
20	24.89	27.65	31.11	33.33	38.10	44.44
21	23.70	26.34	29.63	31.74	36.28	42.33
22	22.63	25.14	28.28	30.30	34.63	40.40
23	21.64	24.05	27.05	28.99	33.13	38.65
24	20.74	23.05	25.93	27.78	31.75	37.04
25	19.91	22.12	24.89	26.67	30.48	35.56
26	19.14	21.27	23.93	25.64	29.30	34.19
27	18.44	20.48	23.05	24.69	28.22	32.92
28	17.78	19.75	22.22	23.81	27.21	31.75
29	17.16	19.07	21.46	22.99	26.27	30.65
30	16.59	18.44	20.74	22.22	25.40	29.63
31	16.06	17.84	20.07	21.51	24.58	28.67
32	15.56	17.28	19.44	20.83	23.81	27.78
33	15.08	16.76	18.86	20.20	23.09	26.94
34	14.64	16.27	18.30	19.61	22.41	26.14
35	14.22	15.80	17.78	19.05	21.77	25.40
36	13.83	15.36	17.28	18.52	21.16	24.69
37	13.45	14.95	16.82	18.02	20.59	24.02
38	13.10	14.55	16.37	17.54	20.05	23.39
39	12.76	14.18	15.95	17.09	19.54	22.79
40	12.44	13.83	15.56	16.67	19.05	22.22
41	12.14	13.49	15.18	16.26	18.58	21.68
42	11.85	13.17	14.82	15.87	18.14	21.16
43	11.58	12.86	14.47	15.50	17.72	20.67
44	11.31	12.57	14.14	15.15	17.32	20.20
45	11.06	12.29	13.83	14.81	16.93	19.75
46	10.82	12.02	13.53	14.49	16.56	19.32
47	10.59	11.77	13.24	14.18	16.21	18.91
48	10.37	11.52	12.96	13.89	15.87	18.52
49	10.16	11.29	12.70	13.61	15.55	18.14
50	9.96	11.06	12.44	13.33	14.24	17.78
51	9.76	10.84	12.20	13.07	14.94	17.43
52	9.57	10.64	11.97	12.82	14.65	17.09
53	9.39	10.44	11.74	12.57	14.38	16.77
54	9.22	10.24	11.52	12.35	14.11	16.46
55	9.05	10.06	11.31	12.12	13.85	16.16
56	8.89	9.88	11.11	11.90	13.61	15.87
57	8.73	9.70	10.92	11.70	13.37	15.59
58	8.58	9.54	10.73	11.49	13.14	15.33
59	8.44	9.37	10.55	11.30	12.91	15.07
60	8.30	9.22	10.37	11.11	12.70	14.81
Constants	497.78	553.09	622.22	666.67	761.90	888.89

TWIST GEARING TABLE

36" AND 39" TWISTERS

CYLINDER 7 INCHES DIAM. WHIRL 1½ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 5.12

FRONT ROLL 1½ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 60 T. Jack 80 T.	Cyl. 50 T. Jack 80 T.	Cyl. 40 T. Jack 80 T.	Cyl. 40 T. Jack 96 T.	Cyl. 36 T. Jack 96 T.	Cyl. 30 T. Jack 96 T.
16	10.14	12.17	15.21	18.25	20.28	24.34
17	9.54	11.45	14.32	17.18	19.09	22.91
18	9.01	10.82	13.52	16.23	18.03	21.63
19	8.54	10.25	12.81	15.37	17.08	20.49
20	8.11	9.74	12.17	14.60	16.23	19.47
21	7.73	9.27	11.59	13.91	15.45	18.54
22	7.38	8.85	11.06	13.28	14.75	17.70
23	7.05	8.47	10.58	12.70	14.11	16.93
24	6.76	8.11	10.14	12.17	13.52	16.23
25	6.49	7.79	9.73	11.68	12.98	15.58
26	6.24	7.49	9.36	11.23	12.48	14.98
27	6.01	7.21	9.01	10.82	12.02	14.42
28	5.79	6.95	8.69	10.43	11.59	13.91
29	5.59	6.71	8.39	10.07	11.19	13.43
30	5.41	6.49	8.11	9.74	10.82	12.98
31	5.23	6.28	7.85	9.42	10.47	12.56
32	5.07	6.09	7.61	9.13	10.14	12.18
33	4.92	5.90	7.37	8.85	9.83	11.80
34	4.77	5.73	7.16	8.59	9.54	11.45
35	4.64	5.56	6.95	8.34	9.27	11.13
36	4.51	5.41	6.76	8.11	9.01	10.82
37	4.39	5.26	6.58	7.89	8.77	10.52
38	4.27	5.12	6.40	7.69	8.54	10.24
39	4.16	4.99	6.24	7.49	8.32	9.98
40	4.06	4.87	6.08	7.30	8.11	9.74
41	3.96	4.75	5.94	7.12	7.91	9.50
42	3.86	4.64	5.79	7.00	7.73	9.28
43	3.77	4.53	5.66	6.79	7.55	9.06
44	3.69	4.43	5.53	6.64	7.38	8.85
45	3.61	4.33	5.41	6.49	7.21	8.65
46	3.53	4.23	5.29	6.35	7.05	8.46
47	3.45	4.14	5.18	6.21	6.90	8.28
48	3.38	4.05	5.07	6.08	6.76	8.11
49	3.31	3.97	4.97	6.96	6.62	7.95
50	3.25	3.89	4.87	5.84	6.49	7.78
51	3.18	3.82	4.77	5.73	6.36	7.64
52	3.12	3.74	4.68	5.62	6.24	7.49
53	3.06	3.67	4.59	5.51	6.12	7.35
54	3.00	3.61	4.51	5.41	6.01	7.21
55	2.95	3.54	4.42	5.31	5.90	7.08
56	2.90	3.48	4.35	5.22	5.79	6.96
57	2.85	3.42	4.27	5.12	5.69	6.84
58	2.80	3.36	4.20	5.04	5.59	6.72
59	2.75	3.30	4.12	4.95	5.50	6.60
60	2.70	3.25	4.06	4.87	5.41	6.49
Constants	162.25	194.70	243.37	292.05	324.50	389.40

TWIST GEARING TABLE —(Continued)

36" AND 39" TWISTERS

CYLINDER 7 INCHES DIAM. WHIRL 1½ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 5.12

FRONT ROLL 1½ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

TWIST PER INCH

Change Gears	TWIST PER INCH					
	Cyl. 30 T. Jack 112 T.	Cyl. 27 T. Jack 112 T.	Cyl. 24 T. Jack 112 T.	Cyl. 24 T. Jack 120 T.	Cyl. 21 T. Jack 120 T.	Cyl. 18 T. Jack 120 T.
16	28.39	31.55	35.49	38.03	43.46	50.70
17	26.72	29.69	33.40	35.79	40.90	47.72
18	25.24	28.04	31.55	33.80	38.63	45.07
19	23.91	26.57	29.89	32.02	36.60	42.70
20	22.72	25.24	28.39	30.42	34.77	40.56
21	21.63	24.03	27.04	28.97	33.11	38.63
22	20.65	22.94	25.81	27.65	31.61	36.88
23	19.75	21.95	24.69	26.45	30.23	35.27
24	18.93	21.03	23.66	25.35	28.97	33.80
25	18.17	20.19	22.71	24.34	27.81	32.45
26	17.47	19.41	21.84	23.40	26.74	31.20
27	16.83	18.70	21.03	22.53	25.75	30.05
28	16.23	18.03	20.28	21.73	24.83	28.97
29	15.67	17.41	19.58	20.98	23.98	27.97
30	15.14	16.83	18.93	20.28	23.18	27.04
31	14.65	16.28	18.32	19.63	22.43	26.17
32	14.20	15.77	17.75	19.01	21.73	25.35
33	13.77	15.30	17.21	18.44	21.07	24.58
34	13.36	14.85	16.70	17.90	20.45	23.86
35	12.98	14.42	16.22	17.38	19.87	23.18
36	12.62	14.02	15.77	16.90	19.32	22.53
37	12.28	13.64	15.35	16.44	18.79	21.93
38	11.96	13.28	14.94	16.01	18.30	21.35
39	11.65	12.94	14.56	15.60	17.83	20.80
40	11.36	12.62	14.20	15.21	17.38	20.28
41	11.08	12.31	13.85	14.84	16.96	19.79
42	10.82	12.02	13.52	14.49	16.56	19.32
43	10.56	11.74	13.21	14.15	16.17	18.87
44	10.33	11.47	12.91	13.83	15.80	18.44
45	10.10	11.22	12.62	13.52	15.45	18.03
46	9.87	10.97	12.35	13.23	15.12	17.64
47	9.67	10.74	12.08	12.95	14.79	17.26
48	9.46	10.52	11.83	12.68	14.49	16.90
49	9.27	10.30	11.59	12.42	14.19	16.56
50	9.09	10.10	11.36	12.17	13.91	16.23
51	8.91	9.90	11.13	11.93	13.63	15.91
52	8.74	9.71	10.92	11.70	13.37	15.60
53	8.57	9.52	10.71	11.48	13.12	15.31
54	8.41	9.35	10.52	11.27	12.88	15.02
55	8.26	9.18	10.32	11.06	12.64	14.75
56	8.12	9.01	10.14	10.87	12.42	14.49
57	7.97	8.86	9.96	10.67	12.20	14.23
58	7.83	8.70	9.79	10.49	11.99	13.99
59	7.70	8.56	9.62	10.31	11.79	13.75
60	7.57	8.41	9.46	10.14	11.59	13.52
Constants	454.30	504.78	567.87	608.44	695.36	811.25

TWIST GEARING TABLE

36" AND 39" TWISTERS

CYLINDER 7 INCHES DIAM. WHIRL $1\frac{3}{8}$ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 4.70

FRONT ROLL $1\frac{1}{2}$ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 60 T. Jack 80 T.	Cyl. 50 T. Jack 80 T.	Cyl. 40 T. Jack 80 T.	Cyl. 40 T. Jack 96 T.	Cyl. 36 T. Jack 96 T.	Cyl. 30 T. Jack 96 T.
16	9.31	11.17	13.96	16.76	18.62	22.34
17	8.76	10.51	13.14	15.77	17.52	21.03
18	8.27	9.93	12.41	14.89	16.55	19.86
19	7.84	9.41	11.76	14.11	15.68	18.81
20	7.45	8.94	11.17	13.40	14.89	17.87
21	7.09	8.51	10.64	12.77	14.18	17.02
22	6.77	8.12	10.16	12.19	13.54	16.25
23	6.48	7.77	9.71	11.66	12.95	15.54
24	6.21	7.45	9.31	11.17	12.41	14.89
25	5.96	7.15	8.94	10.72	11.92	14.30
26	5.73	6.87	8.59	10.31	11.46	13.75
27	5.52	6.62	8.27	9.93	11.03	13.24
28	5.32	6.38	7.98	9.57	10.64	12.77
29	5.14	6.16	7.70	9.24	10.27	12.33
30	4.96	5.96	7.45	8.94	9.93	11.92
31	4.80	5.77	7.21	8.65	9.61	11.53
32	4.65	5.59	6.98	8.38	9.31	11.17
33	4.51	5.42	6.77	8.12	9.03	10.83
34	4.38	5.26	6.57	7.89	8.76	10.51
35	4.26	5.11	6.38	7.66	8.51	10.21
36	4.14	4.96	6.21	7.45	8.27	9.93
37	4.03	4.83	6.04	7.25	8.05	9.66
38	3.92	4.70	5.88	7.06	7.84	9.41
39	3.82	4.58	5.73	6.87	7.64	9.17
40	3.72	4.47	5.59	6.70	7.45	8.94
41	3.63	4.36	5.45	6.54	7.27	8.72
42	3.55	4.26	5.32	6.38	7.09	8.51
43	3.46	4.16	5.20	6.23	6.93	8.31
44	3.39	4.06	5.08	6.09	6.77	8.12
45	3.31	3.97	4.96	5.96	6.62	7.94
46	3.24	3.88	4.86	5.83	6.48	7.77
47	3.17	3.80	4.75	5.70	6.34	7.61
48	3.10	3.72	4.65	5.59	6.21	7.45
49	3.04	3.65	4.56	5.47	6.08	7.30
50	2.98	3.57	4.47	5.36	5.96	7.15
51	2.92	3.50	4.38	5.26	5.84	7.01
52	2.86	3.44	4.30	5.16	5.73	6.87
53	2.81	3.37	4.22	5.06	5.62	6.74
54	2.76	3.31	4.14	4.96	5.52	6.62
55	2.71	3.25	4.06	4.87	5.42	6.50
56	2.66	3.19	3.99	4.79	5.32	6.38
57	2.61	3.14	3.92	4.70	5.23	6.27
58	2.57	3.08	3.85	4.62	5.14	6.16
59	2.52	3.03	3.79	4.54	5.05	6.06
60	2.48	2.98	3.72	4.47	4.96	5.96
Constants	148.94	178.73	223.41	268.09	297.88	357.46

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE—(Continued)

36" AND 39" TWISTERS

CYLINDER 7 INCHES DIAM. WHIRL $1\frac{3}{8}$ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 4.70

FRONT ROLL $1\frac{1}{2}$ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 30 T. Jack 112 T.	Cyl. 27 T. Jack 112 T.	Cyl. 24 T. Jack 112 T.	Cyl. 24 T. Jack 120 T.	Cyl. 21 T. Jack 120 T.	Cyl. 18 T. Jack 120 T.
16	26.06	28.96	32.58	34.91	39.90	46.54
17	24.53	27.26	30.66	32.85	37.55	43.81
18	23.17	25.74	28.96	31.03	35.46	41.37
19	21.95	24.39	27.44	29.40	33.60	39.19
20	20.85	23.17	26.06	27.93	31.92	37.24
21	19.86	22.07	24.82	26.60	30.40	35.46
22	18.96	21.06	23.70	25.39	29.01	33.85
23	18.13	20.15	22.66	24.28	27.75	32.38
24	17.38	19.31	21.72	23.27	26.60	31.03
25	16.68	18.53	20.85	22.34	25.53	29.79
26	16.04	17.82	20.05	21.48	24.55	28.64
27	15.45	17.16	19.31	20.69	23.64	27.58
28	14.89	16.55	18.62	19.95	22.80	26.60
29	14.38	15.98	17.98	19.26	22.01	25.68
30	13.90	15.45	17.38	18.62	21.28	24.82
31	13.45	14.95	16.82	18.02	20.59	24.02
32	13.03	14.48	16.29	17.45	19.95	23.27
33	12.64	14.04	15.80	16.92	19.34	22.57
34	12.27	13.63	15.33	16.43	18.77	21.90
35	11.92	13.24	14.89	15.96	18.24	21.28
36	11.58	12.87	14.48	15.51	17.73	20.69
37	11.27	12.52	14.09	15.10	17.25	20.13
38	10.97	12.19	13.72	14.70	16.80	19.60
39	10.69	11.88	13.37	14.32	16.37	19.09
40	10.43	11.58	13.03	13.96	15.96	18.62
41	10.17	11.30	12.71	13.62	15.57	18.16
42	9.93	11.03	12.41	13.30	15.20	17.73
43	9.70	10.78	12.12	12.99	14.84	17.32
44	9.48	10.53	11.85	12.69	14.51	16.93
45	9.27	10.30	11.58	12.41	14.18	16.55
46	9.07	10.07	11.33	12.14	13.88	16.19
47	8.87	9.86	11.09	11.88	13.58	15.84
48	8.69	9.65	10.86	11.64	13.30	15.51
49	8.51	9.46	10.64	11.40	13.03	15.20
50	8.34	9.27	10.43	11.17	12.77	14.89
51	8.18	9.09	10.22	10.95	12.52	14.60
52	8.02	8.91	10.02	10.74	12.28	14.32
53	7.87	8.74	9.84	10.54	12.04	14.05
54	7.72	8.58	9.65	10.34	11.82	13.79
55	7.58	8.42	9.48	10.16	11.61	13.54
56	7.45	8.27	9.31	9.97	11.40	13.30
57	7.32	8.13	9.15	9.80	11.20	13.06
58	7.19	7.99	8.99	9.63	10.01	12.84
59	7.07	7.85	8.84	9.47	10.82	12.62
60	6.95	7.72	8.69	9.31	10.64	12.41
Constants	417.03	463.37	521.29	558.53	638.32	744.70

TWIST GEARING TABLE

36" AND 39" TWISTERS

CYLINDER 7 INCHES DIAM. WHIRL $1\frac{1}{2}$ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 4.35

FRONT ROLL $1\frac{1}{2}$ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 60 T.	Cyl. 50 T.	Cyl. 40 T.	Cyl. 40 T.	Cyl. 36 T.	Cyl. 30 T.
	Jack 80 T.	Jack 80 T.	Jack 80 T.	Jack 96 T.	Jack 96 T.	Jack 96 T.
16	8.62	10.34	12.92	15.51	17.23	20.68
17	8.11	9.73	12.16	14.60	16.22	19.46
18	7.66	9.19	11.49	13.79	15.32	18.38
19	7.26	8.71	10.88	13.06	14.51	17.41
20	6.89	8.27	10.34	12.41	13.79	16.54
21	6.56	7.88	9.85	11.82	13.13	15.75
22	6.27	7.52	9.40	11.28	12.53	15.04
23	5.99	7.19	8.99	10.79	11.99	14.38
24	5.74	6.89	8.62	10.34	11.49	13.79
25	5.51	6.62	8.27	9.93	11.03	13.23
26	5.30	6.36	7.95	9.54	10.60	12.72
27	5.11	6.13	7.66	9.19	10.21	12.25
28	4.92	5.91	7.38	8.86	9.85	11.82
29	4.75	5.70	7.13	8.56	9.51	11.41
30	4.60	5.51	6.89	8.27	9.19	11.03
31	4.45	5.34	6.67	8.00	8.89	10.67
32	4.31	5.17	6.46	7.75	8.62	10.34
33	4.18	5.01	6.27	7.52	8.35	10.03
34	4.05	4.87	6.08	7.30	8.11	9.73
35	3.94	4.73	5.91	7.09	7.88	9.45
36	3.83	4.60	5.74	6.89	7.66	9.19
37	3.73	4.47	5.59	6.71	7.45	8.94
38	3.63	4.35	5.44	6.53	7.26	8.71
39	3.53	4.24	5.30	6.36	7.07	8.48
40	3.45	4.14	5.17	6.20	6.89	8.27
41	3.36	4.03	5.04	6.05	6.72	8.07
42	3.28	3.94	4.92	5.91	6.56	7.88
43	3.21	3.85	4.81	5.77	6.41	7.69
44	3.13	3.76	4.70	5.64	6.27	7.52
45	3.06	3.67	4.59	5.51	6.13	7.35
46	3.00	3.60	4.50	5.39	5.99	7.19
47	2.93	3.52	4.40	5.28	5.87	7.04
48	2.87	3.45	4.31	5.17	5.74	6.89
49	2.81	3.38	4.22	5.06	5.63	6.75
50	2.76	3.31	4.14	4.96	5.51	6.62
51	2.70	3.24	4.05	4.87	5.41	6.49
52	2.65	3.18	3.95	4.77	5.30	6.36
53	2.60	3.12	3.90	4.68	5.20	6.24
54	2.55	3.06	3.83	4.60	5.11	6.13
55	2.51	3.01	3.76	4.51	5.01	6.02
56	2.46	2.95	3.69	4.43	4.92	5.91
57	2.42	2.90	3.63	4.35	4.84	5.80
58	2.38	2.85	3.57	4.28	4.75	5.70
59	2.34	2.80	3.50	4.21	4.67	5.61
60	2.30	2.76	3.45	4.14	4.60	5.51
Constants	137.85	165.41	206.77	248.13	275.70	330.84

TWIST GEARING TABLE—(Continued)

36" AND 39" TWISTERS

CYLINDER 7 INCHES DIAM. WHIRL 1½ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 4.35

FRONT ROLL 1½ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

TWIST PER INCH

Change Gears	TWIST PER INCH					
	Cyl. 30 T. Jack 112 T.	Cyl. 27 T. Jack 112 T.	Cyl. 24 T. Jack 112 T.	Cyl. 24 T. Jack 120 T.	Cyl. 21 T. Jack 120 T.	Cyl. 18 T. Jack 120 T.
16	24.12	23.80	30.15	32.31	36.92	43.08
17	22.70	25.23	28.38	30.41	34.75	40.54
18	21.44	23.83	26.80	28.72	32.82	38.29
19	20.31	22.57	25.39	27.21	31.09	36.28
20	19.30	21.44	24.12	25.85	29.54	34.46
21	18.38	20.42	22.97	24.62	28.13	32.82
22	17.54	19.49	21.93	23.50	26.85	31.33
23	16.78	18.65	20.98	22.48	25.69	29.97
24	16.08	17.87	20.10	21.54	24.62	28.72
25	15.44	17.15	19.30	20.68	23.63	27.57
26	14.85	16.49	18.56	19.88	22.72	26.51
27	14.30	15.88	17.87	19.15	21.88	25.53
28	13.79	15.32	17.23	18.46	21.10	24.62
29	13.31	14.79	16.64	17.83	20.37	23.77
30	12.87	14.30	16.08	17.23	19.69	22.98
31	12.45	13.83	15.56	16.68	19.06	22.23
32	12.06	13.40	15.08	16.15	18.46	21.54
33	11.70	13.00	14.62	15.66	17.90	20.89
34	11.35	12.61	14.19	15.20	17.38	20.27
35	11.03	12.25	13.78	14.77	16.88	19.69
36	10.72	11.91	13.40	14.36	16.41	19.15
37	10.43	11.59	13.04	13.97	15.97	18.63
38	10.16	11.29	12.70	13.60	15.55	18.14
39	9.90	11.00	12.37	13.25	15.15	17.67
40	9.65	10.72	12.06	12.92	14.77	17.23
41	9.41	10.46	11.77	12.61	14.41	16.81
42	9.19	10.21	11.49	12.31	14.07	16.41
43	8.98	9.97	11.22	12.02	13.74	16.03
44	8.77	9.75	10.97	11.75	13.43	15.66
45	8.58	9.53	10.72	11.49	13.13	15.32
46	8.39	9.32	10.49	11.24	12.84	14.98
47	8.21	9.12	10.27	11.00	12.57	14.66
48	8.04	8.93	10.05	10.77	12.31	14.36
49	7.88	8.75	9.85	10.55	12.06	14.07
50	7.72	8.58	9.65	10.34	11.82	13.79
51	7.57	8.41	9.46	10.14	11.58	13.51
52	7.42	8.25	9.28	9.94	11.36	13.25
53	7.28	8.09	9.10	9.75	11.15	13.00
54	7.15	7.94	8.93	9.57	10.94	12.76
55	7.02	7.80	8.77	9.40	10.74	12.53
56	6.89	7.66	8.62	9.23	10.55	12.31
57	6.77	7.52	8.46	9.07	10.36	12.09
58	6.65	7.39	8.32	8.91	10.19	11.88
59	6.54	7.27	8.18	8.76	10.01	11.68
60	6.43	7.15	8.04	8.62	9.85	11.49
Constants	385.98	428.86	482.47	516.93	590.78	689.25

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE

36" AND 39" TWISTERS

CYLINDER 7 INCHES DIAM. WHIRL 1 $\frac{5}{8}$ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 4.04

FRONT ROLL 1 $\frac{1}{2}$ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 60 T. Jack 80 T.	Cyl. 50 T. Jack 80 T.	Cyl. 40 T. Jack 80 T.	Cyl. 40 T. Jack 96 T.	Cyl. 36 T. Jack 96 T.	Cyl. 30 T. Jack 96 T.
16	8.00	9.60	12.00	14.40	16.00	19.20
17	7.53	9.04	11.30	13.56	15.06	18.07
18	7.11	8.53	10.67	12.80	14.23	17.07
19	6.74	8.09	10.11	12.13	13.48	16.17
20	6.40	7.68	9.60	11.52	12.80	15.36
21	6.10	7.32	9.14	10.97	12.19	14.63
22	5.82	6.98	8.73	10.48	11.64	13.97
23	5.57	6.68	8.35	10.02	11.13	13.36
24	5.33	6.40	8.00	9.60	10.67	12.80
25	5.12	6.15	7.68	9.22	10.24	12.29
26	4.92	5.91	7.39	8.86	9.85	11.82
27	4.74	5.69	7.11	8.54	9.48	11.38
28	4.57	5.49	6.86	8.23	9.14	10.97
29	4.41	5.30	6.62	7.95	8.83	10.60
30	4.27	5.12	6.40	7.68	8.54	10.24
31	4.13	4.96	6.19	7.43	8.26	9.91
32	4.00	4.80	6.00	7.20	8.00	9.60
33	3.88	4.66	5.82	6.98	7.76	9.31
34	3.77	4.52	5.65	6.78	7.53	9.04
35	3.66	4.39	5.49	6.58	7.32	8.78
36	3.56	4.27	5.33	6.40	7.11	8.54
37	3.46	4.15	5.19	6.23	6.92	8.30
38	3.37	4.04	5.05	6.06	6.74	8.09
39	3.28	3.94	4.92	5.91	6.57	7.88
40	3.20	3.84	4.80	5.76	6.40	7.68
41	3.12	3.75	4.68	5.62	6.25	7.49
42	3.05	3.66	4.57	5.49	6.10	7.32
43	2.98	3.57	4.47	5.36	5.95	7.15
44	2.91	3.49	4.36	5.24	5.82	6.98
45	2.85	3.41	4.27	5.12	5.69	6.83
46	2.78	3.34	4.17	5.01	5.57	6.68
47	2.72	3.27	4.09	4.90	5.45	6.54
48	2.67	3.20	4.00	4.80	5.33	6.40
49	2.61	3.14	3.92	4.70	5.23	6.27
50	2.56	3.07	3.84	4.61	5.12	6.15
51	2.51	3.01	3.77	4.52	5.02	6.02
52	2.46	2.95	3.69	4.43	4.92	5.91
53	2.42	2.90	3.62	4.35	4.83	5.80
54	2.37	2.85	3.56	4.27	4.74	5.69
55	2.33	2.79	3.49	4.19	4.66	5.59
56	2.29	2.74	3.43	4.12	4.57	5.49
57	2.25	2.70	3.37	4.04	4.49	5.39
58	2.21	2.65	3.31	3.97	4.41	5.30
59	2.17	2.60	3.25	3.91	4.34	5.21
60	2.13	2.56	3.20	3.84	4.27	5.12
Constants	128.03	153.63	192.04	230.45	256.05	307.26

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE—(Continued)

36" AND 39" TWISTERS

CYLINDER 7 INCHES DIAM. WHIRL 1 $\frac{5}{8}$ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 4.04

FRONT ROLL 1 $\frac{1}{2}$ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 30 T. Jack 112 T.	Cyl. 27 T. Jack 112 T.	Cyl. 24 T. Jack 112 T.	Cyl. 24 T. Jack 120 T.	Cyl. 21 T. Jack 120 T.	Cyl. 18 T. Jack 120 T.
16	22.40	24.89	28.01	30.01	34.29	40.01
17	21.09	23.43	26.36	28.24	32.28	37.65
18	19.92	22.13	24.89	26.67	30.48	35.56
19	18.87	20.96	23.58	25.27	28.88	33.69
20	17.92	19.92	22.40	24.01	27.43	32.01
21	17.07	18.97	21.34	22.86	26.13	30.48
22	16.29	18.10	20.37	21.82	24.94	29.10
23	15.59	17.32	19.48	20.87	23.86	27.83
24	14.94	16.60	18.67	20.00	22.86	26.67
25	14.34	15.93	17.92	19.20	21.95	25.61
26	13.79	15.32	17.23	18.46	21.10	24.62
27	13.28	14.75	16.60	17.78	20.32	23.71
28	12.80	14.23	16.00	17.15	19.60	22.86
29	12.36	13.73	15.45	16.56	18.92	20.07
30	11.95	13.28	14.94	16.00	18.29	21.34
31	11.56	12.85	14.45	15.49	17.70	20.65
32	11.20	12.45	14.00	15.00	17.15	20.00
33	10.86	12.07	13.58	14.55	16.63	19.40
34	10.54	11.71	13.18	14.12	16.14	18.83
35	10.24	11.38	12.80	13.72	15.68	18.29
36	9.96	11.06	12.45	13.34	15.24	17.78
37	9.69	10.76	12.11	12.98	14.83	17.30
38	9.43	10.48	11.79	12.63	14.44	16.85
39	9.19	10.21	11.49	12.31	14.07	16.41
40	8.96	9.96	11.20	12.00	13.72	16.00
41	8.74	9.71	10.93	11.71	13.38	15.61
42	8.54	9.48	10.67	11.43	13.06	15.24
43	8.34	9.26	10.42	11.16	12.76	14.89
44	8.15	9.05	10.18	10.91	12.47	14.55
45	7.97	8.85	9.96	10.67	12.19	14.23
46	7.79	8.66	9.74	10.44	11.93	13.92
47	7.63	8.47	9.53	10.21	11.67	13.62
48	7.47	8.30	9.33	10.00	11.43	13.34
49	7.32	8.13	9.14	9.80	11.20	13.06
50	7.17	7.97	8.96	9.60	10.97	12.80
51	7.03	7.81	8.79	9.41	10.76	12.55
52	6.89	7.66	8.62	9.23	10.55	12.31
53	6.76	7.52	8.45	9.06	10.35	12.08
54	6.64	7.38	8.30	8.89	10.16	11.85
55	6.52	7.24	8.15	8.73	9.98	11.64
56	6.40	7.11	8.00	8.57	9.80	11.43
57	6.29	6.99	7.86	8.42	9.63	11.23
58	6.18	6.87	7.73	8.28	9.46	10.04
59	6.08	6.75	7.59	8.14	9.30	10.85
60	5.97	6.64	7.47	8.00	9.14	10.67
Constants	358.47	398.30	448.09	480.10	548.68	640.13

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE

36" AND 39" TWISTERS

CYLINDER 7 INCHES DIAM. WHIRL $1\frac{3}{4}$ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 3,77

FRONT ROLL $1\frac{1}{2}$ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 60 T.	Cyl. 50 T.	Cyl. 40 T.	Cyl. 40 T.	Cyl. 36 T.	Cyl. 30 T.
	Jack 80 T.	Jack 80 T.	Jack 80 T.	Jack 96 T.	Jack 96 T.	Jack 96 T.
16	7.47	8.96	11.20	13.44	14.93	17.92
17	7.03	8.43	10.54	12.65	14.06	16.87
18	6.64	7.96	9.96	11.95	13.27	15.93
19	6.29	7.55	9.43	11.32	12.58	15.09
20	5.97	7.17	8.96	10.75	11.95	14.34
21	5.69	6.83	8.53	10.24	11.38	13.65
22	5.43	6.52	8.15	9.77	10.86	13.03
23	5.19	6.23	7.79	9.35	10.39	12.47
24	4.98	5.97	7.47	8.96	9.96	11.95
25	4.78	5.73	7.17	8.60	9.56	11.47
26	4.60	5.51	6.89	8.27	9.19	11.03
27	4.42	5.31	6.64	7.96	8.85	10.62
28	4.27	5.12	6.40	7.68	8.53	10.24
29	4.12	4.94	6.18	7.42	8.24	9.89
30	3.98	4.78	5.97	7.17	7.96	9.56
31	3.85	4.62	5.78	6.94	7.71	9.25
32	3.73	4.48	5.60	6.72	7.47	8.96
33	3.62	4.34	5.43	6.52	7.24	8.69
34	3.51	4.22	5.27	6.32	7.03	8.43
35	3.41	4.10	5.12	6.14	6.83	8.19
36	3.32	3.98	4.98	5.97	6.64	7.96
37	3.23	3.87	4.84	5.81	6.46	7.75
38	3.14	3.77	4.72	5.66	6.29	7.55
39	3.06	3.68	4.59	5.51	6.13	7.35
40	2.99	3.58	4.48	5.38	5.97	7.17
41	2.91	3.50	4.37	5.24	5.83	6.99
42	2.84	3.41	4.27	5.12	5.69	6.83
43	2.78	3.33	4.17	5.00	5.56	6.67
44	2.72	3.26	4.07	4.89	5.43	6.52
45	2.65	3.19	3.98	4.78	5.31	6.37
46	2.60	3.12	3.90	4.67	5.19	6.23
47	2.54	3.05	3.81	4.58	5.08	6.10
48	2.49	2.99	3.73	4.48	4.98	5.98
49	2.44	2.93	3.66	4.39	4.88	5.85
50	2.39	2.87	3.58	4.30	4.78	5.73
51	2.34	2.81	3.51	4.22	4.69	5.62
52	2.30	2.76	3.45	4.14	4.60	5.51
53	2.25	2.70	3.38	4.06	4.51	5.41
54	2.21	2.65	3.32	3.98	4.42	5.31
55	2.17	2.61	3.26	3.91	4.34	5.21
56	2.13	2.56	3.20	3.84	4.27	5.12
57	2.10	2.52	3.14	3.77	4.19	5.03
58	2.06	2.47	3.09	3.71	4.12	4.94
59	2.02	2.43	3.04	3.64	4.05	4.86
60	1.99	2.39	2.99	3.58	3.98	4.78
Constants	119.47	143.36	179.20	215.04	238.94	286.73

TWIST GEARING TABLE —(Continued)

36" AND 39" TWISTERS

CYLINDER 7 INCHES DIAM. WHIRL $1\frac{3}{4}$ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 3.77

FRONT ROLL $1\frac{1}{2}$ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 30 T.	Cyl. 27 T.	Cyl. 24 T.	Cyl. 24 T.	Cyl. 21 T.	Cyl. 18 T.
	Jack 112 T.	Jack 112 T.	Jack 112 T.	Jack 120 T.	Jack 120 T.	Jack 120 T.
16	20.91	23.23	26.13	28.00	32.00	37.33
17	19.68	21.86	24.60	26.35	30.12	35.14
18	18.58	20.65	23.23	24.89	28.45	33.19
19	17.61	19.56	22.01	23.58	26.95	31.44
20	16.73	18.58	20.91	22.40	25.60	29.87
21	15.93	17.70	19.91	21.33	24.38	28.45
22	15.21	16.89	19.01	20.36	23.27	27.15
23	14.54	16.16	18.18	19.48	22.26	25.97
24	13.94	15.49	17.42	18.67	21.33	24.89
25	13.38	14.87	16.73	17.92	20.48	23.89
26	12.87	14.30	16.08	17.23	19.69	22.98
27	12.39	13.77	15.49	16.59	18.96	22.12
28	11.95	13.27	14.93	16.00	18.29	21.33
29	11.53	12.82	14.42	15.45	17.66	20.60
30	11.15	12.39	13.94	14.93	17.07	19.91
31	10.79	11.99	13.49	14.45	16.52	19.27
32	10.45	11.62	13.07	14.00	16.00	18.67
33	10.14	11.26	12.67	13.58	15.52	18.10
34	9.84	10.93	12.30	13.18	15.06	17.57
35	9.56	10.62	11.95	12.80	14.63	17.07
36	9.29	10.32	11.62	12.44	14.22	16.59
37	9.04	10.05	11.30	12.11	13.84	16.14
38	8.80	9.78	11.00	11.79	13.47	15.72
39	8.58	9.53	10.72	11.49	13.13	15.32
40	8.36	9.29	10.45	11.20	12.80	14.93
41	8.16	9.07	10.20	10.93	12.49	14.57
42	7.96	8.85	9.96	10.67	12.19	14.22
43	7.78	8.64	9.72	10.42	11.91	13.89
44	7.60	8.45	9.50	10.18	11.64	13.58
45	7.43	8.26	9.29	9.96	11.38	13.27
46	7.27	8.08	9.09	9.74	11.13	12.99
47	7.12	7.91	8.90	9.53	10.89	12.71
48	6.97	7.74	8.71	9.33	10.67	12.44
49	6.83	7.59	8.53	9.14	10.45	12.19
50	6.69	7.43	8.36	8.96	10.24	11.95
51	6.56	7.29	8.20	8.78	10.04	11.71
52	6.43	7.15	8.04	8.62	9.85	11.49
53	6.31	7.01	7.89	8.45	9.66	11.27
54	6.19	6.88	7.74	8.30	9.48	11.06
55	6.08	6.76	7.60	8.15	9.31	10.86
56	5.97	6.64	7.47	8.00	9.14	10.67
57	5.87	6.52	7.34	7.86	8.98	10.48
58	5.77	6.41	7.21	7.72	8.83	10.30
59	5.67	6.30	7.09	7.59	8.68	10.12
60	5.58	6.19	6.97	7.47	8.53	9.96
Constants	334.51	371.68	418.14	448.01	512.01	597.35

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE

36" AND 39" TWISTERS

CYLINDER 8 INCHES DIAM. WHIRL 1 INCH DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 7.04

FRONT ROLL 1½ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 60 T. Jack 80 T.	Cyl. 50 T. Jack 80 T.	Cyl. 40 T. Jack 80 T.	Cyl. 40 T. Jack 96 T.	Cyl. 36 T. Jack 96 T.	Cyl. 30 T. Jack 96 T.
16	13.94	16.73	20.92	25.10	27.89	33.46
17	13.12	15.75	19.68	23.62	26.25	31.50
18	12.39	14.87	18.59	22.31	24.79	29.75
19	11.74	14.09	17.61	21.14	23.48	28.18
20	11.15	13.39	16.73	20.08	22.31	26.77
21	10.62	12.75	15.94	19.12	21.25	25.50
22	10.14	12.17	15.21	18.25	20.28	24.34
23	9.70	11.64	14.55	17.46	19.40	23.28
24	9.30	11.15	13.94	16.73	18.59	22.31
25	8.92	10.71	13.39	16.06	17.85	21.42
26	8.58	10.30	12.87	15.45	17.16	20.59
27	8.26	9.92	12.39	14.87	16.53	19.83
28	7.97	9.56	11.95	14.34	15.94	19.12
29	7.69	9.23	11.54	13.85	15.39	18.46
30	7.44	8.92	11.15	13.39	14.87	17.85
31	7.20	8.64	10.79	12.95	14.39	17.27
32	6.97	8.37	10.46	12.55	13.94	16.73
33	6.76	8.11	10.14	12.17	13.52	16.22
34	6.56	7.87	9.84	11.81	13.12	15.75
35	6.37	7.65	9.56	11.47	12.75	15.30
36	6.20	7.44	9.30	11.15	12.39	14.87
37	6.03	7.24	9.04	10.85	12.06	14.47
38	5.87	7.05	8.81	10.57	11.74	14.09
39	5.72	6.86	8.58	10.30	11.44	13.73
40	5.58	6.69	8.37	10.04	11.15	13.39
41	5.44	6.53	8.16	9.79	10.88	13.06
42	5.31	6.38	7.97	9.56	10.62	12.75
43	5.19	6.23	7.78	9.34	10.38	12.45
44	5.07	6.08	7.61	9.13	10.14	12.17
45	4.96	5.95	7.44	8.92	9.92	11.90
46	4.85	5.82	7.27	8.73	9.70	11.64
47	4.75	5.70	7.12	8.54	9.49	11.39
48	4.65	5.58	6.97	8.37	9.30	11.16
49	4.55	5.46	6.83	8.20	9.11	10.93
50	4.46	5.35	6.69	8.03	8.92	10.71
51	4.37	5.25	6.56	7.87	8.75	10.50
52	4.29	5.15	6.44	7.72	8.58	10.30
53	4.21	5.05	6.31	7.58	8.42	10.10
54	4.13	4.96	6.20	7.44	8.26	9.92
55	4.06	4.87	6.08	7.30	8.11	9.73
56	3.98	4.78	5.98	7.17	7.97	9.56
57	3.91	4.70	5.87	7.05	7.83	9.39
58	3.85	4.62	5.77	6.92	7.69	9.23
59	3.78	4.54	5.67	6.81	7.56	9.07
60	3.72	4.46	5.58	6.69	7.44	8.92
Constants	223.09	267.71	334.64	401.57	446.19	535.42

TWIST GEARING TABLE —(Continued)

36" AND 39" TWISTERS

CYLINDER 8 INCHES DIAM. WHIRL 1 INCH DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 7.04

FRONT ROLL $1\frac{1}{2}$ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 30 T. Jack 112 T.	Cyl. 27 T. Jack 112 T.	Cyl. 24 T. Jack 112 T.	Cyl. 24 T. Jack 120 T.	Cyl. 21 T. Jack 120 T.	Cyl. 18 T. Jack 120 T.
16	39.04	43.38	48.80	52.29	59.76	69.72
17	36.74	40.83	45.93	49.21	56.24	65.62
18	34.70	38.56	43.38	46.48	53.12	61.97
19	32.88	36.53	41.10	44.03	50.32	58.71
20	31.23	34.70	39.04	41.83	47.81	55.77
21	29.75	33.05	37.18	39.84	45.53	53.12
22	28.39	31.55	35.49	38.03	43.46	50.70
23	27.16	30.18	33.95	36.37	41.57	48.50
24	26.03	28.92	32.53	34.86	39.84	46.48
25	24.99	27.76	31.23	33.46	38.24	44.62
26	24.03	26.70	30.03	32.18	36.77	42.90
27	23.14	25.71	28.92	30.99	35.41	41.31
28	22.31	24.79	27.89	29.88	34.15	39.84
29	21.54	23.93	26.93	28.85	32.97	38.46
30	20.82	23.14	26.03	27.89	31.87	37.18
31	20.15	22.39	25.19	26.99	30.84	35.98
32	19.52	21.69	24.40	26.14	29.88	34.86
33	18.93	21.03	23.66	25.35	28.97	33.80
34	18.37	20.41	22.97	24.61	28.12	32.81
35	17.85	19.83	22.31	23.90	27.32	31.87
36	17.35	19.28	21.69	23.24	26.56	30.99
37	16.88	18.76	21.10	22.61	25.84	30.15
38	16.44	18.27	20.55	22.02	25.16	29.36
39	16.02	17.80	20.02	21.45	24.52	28.60
40	15.62	17.35	19.52	20.92	23.90	27.89
41	15.24	16.93	19.04	20.40	23.32	27.21
42	14.88	16.53	18.59	19.92	22.76	26.56
43	14.53	16.14	18.16	19.46	22.24	25.94
44	14.20	15.77	17.75	19.01	21.73	25.35
45	13.88	15.42	17.35	18.59	21.25	24.79
46	13.58	15.09	16.97	18.19	20.79	24.25
47	13.29	14.77	16.61	17.80	20.34	23.73
48	13.02	14.46	16.27	17.43	19.92	23.24
49	12.75	14.16	15.94	17.07	19.51	22.76
50	12.49	13.88	15.62	16.73	19.12	22.31
51	12.25	13.61	15.31	16.40	18.75	21.87
52	12.02	13.35	15.02	16.09	18.39	21.45
53	11.79	13.10	14.73	15.78	18.04	21.05
54	11.57	12.85	14.46	15.49	17.71	20.66
55	11.36	12.62	14.20	15.21	17.38	20.28
56	11.16	12.40	13.94	14.94	17.07	19.92
57	10.96	12.18	13.70	14.68	16.77	19.57
58	10.77	11.97	13.46	14.43	16.49	19.23
59	10.59	11.76	13.23	14.18	16.21	18.91
60	10.41	11.57	13.01	13.94	15.94	18.59
Constants	624.66	694.07	780.83	836.60	956.12	1115.47

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE

36" AND 39" TWISTERS

CYLINDER 8 INCHES DIAM. WHIRL $1\frac{1}{8}$ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 6.39

FRONT ROLL $1\frac{1}{2}$ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 60 T.	Cyl. 50 T.	Cyl. 40 T.	Cyl. 40 T.	Cyl. 36 T.	Cyl. 30 T.
	Jack 80 T.	Jack 80 T.	Jack 80 T.	Jack 96 T.	Jack 96 T.	Jack 96 T.
16	12.66	15.19	18.98	22.78	25.31	30.37
17	11.91	14.29	17.87	21.44	23.82	28.59
18	11.25	13.50	16.87	20.25	22.50	27.00
19	10.66	12.79	15.99	19.18	21.32	25.58
20	10.13	12.15	15.19	18.22	20.25	24.30
21	9.64	11.57	14.46	17.36	19.29	23.14
22	9.20	11.05	13.81	16.57	18.41	22.09
23	8.80	10.56	13.21	15.85	17.61	21.13
24	8.44	10.12	12.66	15.19	16.87	20.25
25	8.10	9.72	12.15	14.58	16.20	19.44
26	7.79	9.35	11.68	14.02	15.58	18.69
27	7.50	9.00	11.25	13.50	15.00	18.00
28	7.23	8.68	10.85	13.02	14.46	17.36
29	6.98	8.38	10.47	12.57	13.97	16.76
30	6.75	8.10	10.12	12.15	13.50	16.20
31	6.53	7.84	9.80	11.76	13.06	15.68
32	6.33	7.59	9.49	11.39	12.66	15.19
33	6.14	7.36	9.20	11.05	12.27	14.73
34	5.96	7.15	8.93	10.72	11.91	14.29
35	5.79	6.94	8.68	10.41	11.57	13.89
36	5.63	6.75	8.44	10.12	11.25	13.50
37	5.47	6.57	8.21	9.85	10.95	13.13
38	5.33	6.39	7.99	9.59	10.66	12.79
39	5.19	6.23	7.79	9.35	10.38	12.46
40	5.06	6.07	7.59	9.11	10.12	12.15
41	4.94	5.93	7.41	8.89	9.88	11.85
42	4.82	5.79	7.23	8.68	9.64	11.57
43	4.71	5.65	7.06	8.48	9.42	11.30
44	4.60	5.52	6.90	8.28	9.20	11.05
45	4.50	5.40	6.75	8.10	9.00	10.80
46	4.40	5.28	6.60	7.92	8.80	10.57
47	4.31	5.17	6.46	7.76	8.62	10.34
48	4.22	5.06	6.33	7.59	8.44	10.13
49	4.13	4.96	6.20	7.44	8.27	9.92
50	4.05	4.86	6.07	7.29	8.10	9.72
51	3.97	4.76	5.96	7.15	7.94	9.53
52	3.89	4.67	5.84	7.01	7.79	9.35
53	3.82	4.58	5.73	6.88	7.64	9.17
54	3.75	4.50	5.62	6.75	7.50	9.00
55	3.68	4.42	5.52	6.63	7.36	8.84
56	3.62	4.34	5.42	6.51	7.23	8.68
57	3.55	4.26	5.33	6.39	7.11	8.53
58	3.49	4.19	5.24	6.28	6.98	8.38
59	3.43	4.12	5.15	6.18	6.86	8.24
60	3.38	4.05	5.06	6.07	6.75	8.10
Constants	202.50	242.99	303.74	364.49	404.99	485.99

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE—(Continued)

36" AND 39" TWISTERS

CYLINDER 8 INCHES DIAM. WHIRL $1\frac{1}{8}$ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 6.39

FRONT ROLL $1\frac{1}{2}$ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

TWIST PER INCH

Change Gears	TWIST PER INCH					
	Cyl. 30 T. Jack 112 T.	Cyl. 27 T. Jack 112 T.	Cyl. 24 T. Jack 112 T.	Cyl. 24 T. Jack 120 T.	Cyl. 21 T. Jack 120 T.	Cyl. 18 T. Jack 120 T.
16	35.44	39.37	44.30	47.46	54.24	63.28
17	33.35	37.06	41.69	44.67	51.05	59.56
18	31.50	35.00	39.37	42.19	48.21	56.25
19	29.84	33.16	37.30	39.97	45.68	53.29
20	28.35	31.50	35.44	37.97	43.39	50.62
21	27.00	30.00	33.75	36.16	41.33	48.21
22	25.77	28.64	32.22	34.52	39.45	46.02
23	24.65	27.39	30.82	33.02	37.73	44.02
24	23.62	26.25	29.53	31.64	36.16	42.19
25	22.68	25.20	28.35	30.37	34.71	40.50
26	21.81	24.23	27.26	29.21	33.38	38.94
27	21.00	23.33	26.25	28.12	32.14	37.50
28	20.25	22.50	25.31	27.12	30.99	36.16
29	19.55	21.72	24.44	26.18	29.93	34.91
30	18.90	21.00	23.62	25.31	28.93	33.75
31	18.29	20.32	22.86	24.50	27.99	32.66
32	17.72	19.69	22.15	23.73	27.12	31.64
33	17.18	19.09	21.48	23.01	26.30	30.68
34	16.68	18.53	20.85	22.33	25.52	29.78
35	16.20	18.00	20.25	21.70	24.80	28.93
36	15.75	17.50	19.69	21.10	24.11	28.12
37	15.32	17.03	19.15	20.52	23.46	27.36
38	14.92	16.58	18.65	19.98	22.84	26.64
39	14.54	16.15	18.17	19.47	22.25	25.96
40	14.17	15.75	17.72	18.98	21.70	25.31
41	13.83	15.37	17.29	18.52	21.17	24.69
42	13.50	15.00	16.87	18.08	20.66	24.11
43	13.19	14.65	16.48	17.66	20.18	23.55
44	12.89	14.32	16.11	17.26	19.72	23.01
45	12.60	14.00	15.75	16.87	19.29	22.50
46	12.32	13.70	15.41	16.51	18.87	22.01
47	12.06	13.40	15.08	16.16	18.46	21.54
48	11.81	13.13	14.76	15.82	18.08	21.09
49	11.57	12.86	14.46	15.50	17.71	20.66
50	11.34	12.60	14.17	15.19	17.36	20.25
51	11.12	12.35	13.90	14.89	17.02	19.85
52	10.91	12.12	13.63	14.61	16.69	19.47
53	10.70	11.89	13.37	14.33	16.37	19.10
54	10.50	11.67	13.12	14.06	16.07	18.75
55	10.31	11.45	12.89	13.81	15.78	18.41
56	10.13	11.25	12.66	13.56	15.50	18.08
57	9.95	11.05	12.43	13.32	15.23	17.76
58	9.78	10.86	12.22	13.09	14.97	17.45
59	9.61	10.68	12.01	12.87	14.71	17.16
60	9.45	10.50	11.81	12.66	14.46	16.87
Constants	566.99	629.99	708.73	759.36	867.84	1012.48

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE

36" AND 39" TWISTERS

CYLINDER 8 INCHES DIAM. WHIRL 1¼ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 5.83

FRONT ROLL 1½ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 60 T. Jack 80 T.	Cyl. 50 T. Jack 80 T.	Cyl. 40 T. Jack 80 T.	Cyl. 40 T. Jack 96 T.	Cyl. 36 T. Jack 96 T.	Cyl. 30 T. Jack 96 T.
16	11.55	13.86	17.32	20.78	23.09	27.71
17	10.87	13.04	16.30	19.56	21.74	26.08
18	10.26	12.32	15.40	18.48	20.53	24.63
19	9.72	11.67	14.59	17.50	19.45	23.34
20	9.24	11.09	13.86	16.63	18.48	22.17
21	8.80	10.56	13.20	15.84	17.60	21.11
22	8.40	10.08	12.60	15.12	16.80	20.15
23	8.03	9.64	12.05	14.46	16.07	19.28
24	7.70	9.24	11.55	13.86	15.40	18.48
25	7.39	8.87	11.08	13.30	14.78	17.74
26	7.11	8.53	10.66	12.79	14.21	17.05
27	6.84	8.21	10.26	12.32	13.69	16.42
28	6.60	7.92	9.90	11.88	13.20	15.84
29	6.37	7.64	9.56	11.47	12.74	15.29
30	6.16	7.39	9.24	11.09	12.32	14.78
31	5.96	7.15	8.94	10.73	11.92	14.30
32	5.77	6.93	8.66	10.39	11.55	13.86
33	5.60	6.72	8.40	10.08	11.20	13.44
34	5.43	6.52	8.15	9.78	10.87	13.04
35	5.28	6.33	7.92	9.50	10.56	12.67
36	5.13	6.15	7.70	9.24	10.26	12.32
37	4.99	5.99	7.49	8.99	9.99	11.98
38	4.86	5.83	7.29	8.75	9.72	11.67
39	4.74	5.68	7.11	8.53	9.47	11.37
40	4.62	5.54	6.93	8.31	9.24	11.09
41	4.51	5.41	6.76	8.11	9.01	10.81
42	4.40	5.28	6.60	7.92	8.80	10.56
43	4.30	5.16	6.44	7.73	8.59	10.31
44	4.20	5.04	6.30	7.56	8.40	10.08
45	4.11	4.93	6.16	7.39	8.21	9.85
46	4.02	4.82	6.02	7.23	8.03	9.64
47	3.93	4.72	5.90	7.08	7.86	9.43
48	3.85	4.62	5.77	6.93	7.70	9.24
49	3.77	4.52	5.66	6.79	7.54	9.05
50	3.70	4.43	5.54	6.65	7.39	8.87
51	3.62	4.35	5.43	6.52	7.25	8.70
52	3.55	4.26	5.33	6.40	7.11	8.52
53	3.49	4.18	5.23	6.27	6.97	8.36
54	3.42	4.11	5.13	6.16	6.84	8.21
55	3.36	4.03	5.04	6.05	6.72	8.06
56	3.30	3.96	4.95	5.94	6.60	7.92
57	3.24	3.89	4.86	5.83	6.48	7.78
58	3.19	3.82	4.78	5.73	6.37	7.64
59	3.13	3.76	4.70	5.64	6.26	7.52
60	3.08	3.70	4.62	5.54	6.16	7.39
Constants	184.75	221.70	277.12	332.55	369.50	443.40

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE—(Continued)

36" AND 39" TWISTERS

CYLINDER 8 INCHES DIAM. WHIRL 1¼ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 5.83

FRONT ROLL 1½ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 30 T. Jack 112 T.	Cyl. 27 T. Jack 112 T.	Cyl. 24 T. Jack 112 T.	Cyl. 24 T. Jack 120 T.	Cyl. 21 T. Jack 120 T.	Cyl. 18 T. Jack 120 T.
16	32.33	35.92	40.41	43.30	49.49	57.73
17	30.43	33.81	38.04	40.75	46.58	54.34
18	28.74	31.93	35.92	38.49	43.99	51.32
19	27.23	30.25	34.03	36.46	41.67	48.62
20	25.87	28.74	32.33	34.64	39.59	46.19
21	24.63	27.37	30.79	32.99	37.70	43.99
22	23.51	26.13	29.39	31.49	35.99	41.99
23	22.49	24.99	28.11	30.12	34.43	40.16
24	21.55	23.95	26.94	28.87	32.99	38.49
25	20.69	22.99	25.86	27.71	31.67	36.95
26	19.90	22.11	24.87	26.65	30.45	35.53
27	19.16	21.29	23.95	25.66	29.33	34.21
28	18.48	20.53	23.09	24.74	28.28	32.99
29	17.84	19.82	22.30	23.89	27.30	31.85
30	17.24	19.16	21.55	23.09	26.39	30.79
31	16.69	18.54	20.86	22.35	25.54	29.80
32	16.17	17.96	20.21	21.65	24.74	28.87
33	15.68	17.42	19.59	20.99	23.99	27.99
34	15.21	16.91	19.02	20.38	23.29	27.17
35	14.78	16.42	18.47	19.79	22.62	26.39
36	14.37	15.97	17.96	19.24	21.99	25.66
37	13.98	15.53	17.48	18.72	21.40	24.97
38	13.61	15.13	17.02	18.23	20.84	24.31
39	13.26	14.74	16.58	17.76	20.30	23.69
40	12.93	14.37	16.17	17.32	19.79	23.09
41	12.62	14.02	15.77	16.90	19.31	22.53
42	12.32	13.69	15.40	16.50	18.85	21.99
43	12.03	13.37	15.04	16.11	18.41	21.48
44	11.76	13.06	14.70	15.75	18.00	20.99
45	11.50	12.77	14.37	15.40	17.60	20.53
46	11.25	12.50	14.06	15.06	17.21	20.08
47	11.01	12.23	13.76	14.74	16.85	19.65
48	10.78	11.97	13.47	14.43	16.50	19.24
49	10.56	11.73	13.20	14.14	16.16	18.85
50	10.35	11.50	12.93	13.86	15.84	18.48
51	10.14	11.27	12.68	13.58	15.52	18.11
52	9.95	11.05	12.44	13.32	15.23	17.76
53	9.76	10.84	12.20	13.07	14.94	17.43
54	9.58	10.64	11.97	12.83	14.66	17.11
55	9.41	10.45	11.76	12.60	14.40	16.80
56	9.24	10.26	11.55	12.37	14.14	16.50
57	9.08	10.08	11.34	12.15	13.89	16.21
58	8.92	9.91	11.15	11.95	13.65	15.93
59	8.77	9.74	10.96	11.74	13.42	15.66
60	8.62	9.58	10.78	11.55	13.20	15.40
Constants	517.30	574.78	646.62	692.81	791.78	923.75

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE

36" AND 39" TWISTERS

CYLINDER 8 INCHES DIAM. WHIRL $1\frac{3}{8}$ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 5.35

FRONT ROLL $1\frac{1}{2}$ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 60 T. Jack 80 T.	Cyl. 50 T. Jack 80 T.	Cyl. 40 T. Jack 80 T.	Cyl. 40 T. Jack 96 T.	Cyl. 36 T. Jack 96 T.	Cyl. 30 T. Jack 96 T.
16	10.60	12.72	15.89	19.07	21.23	25.43
17	9.97	11.97	14.96	17.95	19.98	23.93
18	9.42	11.30	14.13	16.95	18.87	22.61
19	8.92	10.71	13.38	16.06	17.88	21.42
20	8.48	10.17	12.72	15.26	16.99	20.34
21	8.07	9.69	12.11	14.53	16.18	19.38
22	7.71	9.25	11.56	13.87	15.44	18.50
23	7.37	8.85	11.06	13.27	14.77	17.69
24	7.06	8.48	10.60	12.72	14.15	16.95
25	6.78	8.14	10.17	12.21	13.59	16.28
26	6.52	7.83	9.78	11.74	13.07	15.65
27	6.28	7.54	9.42	11.30	12.58	15.07
28	6.06	7.27	9.08	10.90	12.13	14.53
29	5.85	7.02	8.77	10.52	11.71	14.03
30	5.65	6.78	8.48	10.17	11.32	13.56
31	5.47	6.56	8.20	9.84	10.96	13.13
32	5.30	6.36	7.95	9.54	10.62	12.72
33	5.14	6.17	7.71	9.25	10.29	12.33
34	4.99	5.98	7.48	8.98	9.99	11.97
35	4.84	5.81	7.27	8.72	9.71	11.63
36	4.71	5.65	7.06	8.48	9.44	11.30
37	4.58	5.50	6.87	8.25	9.18	11.00
38	4.46	5.35	6.69	8.03	8.94	10.71
39	4.35	5.22	6.52	7.82	8.71	10.43
40	4.24	5.09	6.36	7.63	8.49	10.17
41	4.14	4.96	6.20	7.44	8.29	9.92
42	4.04	4.84	6.06	7.27	8.09	9.69
43	3.94	4.73	5.91	7.10	7.90	9.46
44	3.85	4.62	5.78	6.94	7.72	9.25
45	3.77	4.52	5.65	6.78	7.55	9.04
46	3.69	4.42	5.53	6.63	7.39	8.85
47	3.61	4.33	5.41	6.49	7.23	8.66
48	3.53	4.24	5.30	6.36	7.08	8.48
49	3.46	4.15	5.19	6.23	6.93	8.30
50	3.39	4.07	5.09	6.10	6.79	8.14
51	3.32	3.99	4.99	5.98	6.66	7.98
52	3.26	3.91	4.89	5.87	6.53	7.82
53	3.20	3.84	4.80	5.76	6.41	7.68
54	3.14	3.77	4.71	5.65	6.29	7.54
55	3.08	3.70	4.62	5.55	6.18	7.40
56	3.03	3.63	4.54	5.45	6.07	7.27
57	2.97	3.57	4.46	5.35	5.96	7.14
58	2.92	3.51	4.38	5.26	5.86	7.02
59	2.87	3.45	4.31	5.17	5.76	6.90
60	2.83	3.39	4.24	5.09	5.66	6.78
Constants	169.54	203.45	254.31	305.17	339.71	406.89

TWIST GEARING TABLE —(Continued)

36" AND 39" TWISTERS

CYLINDER 8 INCHES DIAM. WHIRL $1\frac{3}{8}$ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 5.35

FRONT ROLL $1\frac{1}{2}$ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

TWIST PER INCH

Change Gears	TWIST PER INCH					
	Cyl. 30 T.	Cyl. 27 T.	Cyl. 24 T.	Cyl. 24 T.	Cyl. 21 T.	Cyl. 18 T.
	Jack 112 T.	Jack 112 T.	Jack 112 T.	Jack 120 T.	Jack 120 T.	Jack 120 T.
16	29.67	32.97	37.09	39.61	45.41	52.98
17	27.92	31.03	34.90	37.28	42.74	49.86
18	26.37	29.30	32.97	35.21	40.37	47.09
19	24.98	27.76	31.23	33.36	38.24	44.62
20	23.74	26.37	29.67	31.69	36.33	42.38
21	22.61	25.12	28.26	30.18	34.60	40.37
22	21.58	23.98	26.97	28.81	33.03	38.53
23	20.64	22.93	25.80	27.56	31.59	36.86
24	19.78	21.98	24.72	26.41	30.27	35.32
25	18.99	21.10	23.74	25.35	29.06	33.91
26	18.26	20.29	22.82	24.38	27.95	32.60
27	17.58	19.54	21.98	23.47	26.91	31.40
28	16.95	18.84	21.19	22.63	25.95	30.27
29	16.37	18.19	20.46	21.85	25.05	29.23
30	15.82	17.58	19.78	21.13	24.22	28.26
31	15.31	17.01	19.14	20.44	23.44	27.34
32	14.83	16.48	18.54	19.81	22.71	26.49
33	14.39	15.98	17.98	19.21	22.02	25.69
34	13.96	15.51	17.45	18.64	21.37	24.93
35	13.56	15.07	16.95	18.11	20.76	24.22
36	13.19	14.65	16.48	17.60	20.18	23.55
37	12.83	14.26	16.04	17.13	19.64	22.91
38	12.49	13.88	15.62	16.68	19.12	22.31
39	12.17	13.52	15.21	16.25	18.63	21.74
40	11.87	13.19	14.83	15.84	18.16	21.19
41	11.58	12.87	14.47	15.46	17.72	20.68
42	11.30	12.56	14.13	15.09	17.30	20.18
43	11.04	12.27	13.80	14.74	16.90	19.71
44	10.79	11.99	13.49	14.40	16.51	19.27
45	10.55	11.72	13.19	14.08	16.15	18.84
46	10.32	11.47	12.90	13.78	15.80	18.43
47	10.10	11.22	12.63	13.48	15.46	18.04
48	9.89	10.99	12.36	13.20	15.14	17.66
49	9.69	10.76	12.11	12.93	14.83	17.30
50	9.49	10.55	11.87	12.68	14.53	16.95
51	9.31	10.34	11.63	12.43	14.25	16.62
52	9.13	10.14	11.41	12.19	13.97	16.30
53	8.96	9.95	11.20	11.96	13.71	15.99
54	8.79	9.77	10.99	11.74	13.46	15.70
55	8.63	9.59	10.79	11.52	13.21	15.41
56	8.48	9.42	10.60	11.32	12.98	15.14
57	8.33	9.25	10.41	11.12	12.75	14.87
58	8.18	9.09	10.23	10.93	12.53	14.62
59	8.05	8.94	10.06	10.74	12.32	14.37
60	7.91	8.79	9.89	10.56	12.11	14.13
Constants	474.71	527.45	593.38	633.77	726.59	847.69

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE

36" AND 39" TWISTERS

CYLINDER 8 INCHES DIAM. WHIRL 1½ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 4.95

FRONT ROLL 1½ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 60 T. Jack 80 T.	Cyl. 50 T. Jack 80 T.	Cyl. 40 T. Jack 80 T.	Cyl. 40 T. Jack 96 T.	Cyl. 36 T. Jack 96 T.	Cyl. 30 T. Jack 96 T.
16	9.80	11.77	14.71	17.65	19.61	23.53
17	9.23	11.07	13.84	16.61	18.45	22.15
18	8.71	10.46	13.07	15.69	17.43	20.92
19	8.26	9.91	12.38	14.86	16.51	19.81
20	7.84	9.41	11.76	14.12	15.69	18.82
21	7.47	8.96	11.20	13.45	14.94	17.93
22	7.13	8.56	10.70	12.83	14.26	17.11
23	6.82	8.19	10.23	12.28	13.64	16.37
24	6.54	7.84	9.80	11.76	13.07	15.69
25	6.27	7.53	9.41	11.29	12.55	15.06
26	6.03	7.24	9.05	10.86	12.07	14.48
27	5.81	6.97	8.71	10.46	12.62	13.94
28	5.60	6.72	8.40	10.08	11.20	13.45
29	5.41	6.49	8.11	9.74	10.82	12.98
30	5.23	6.27	7.84	9.41	10.46	12.55
31	5.06	6.07	7.59	9.11	10.12	12.14
32	4.90	5.88	7.35	8.82	9.80	11.76
33	4.75	5.70	7.13	8.56	9.51	11.41
34	4.61	5.54	6.92	8.30	9.23	11.07
35	4.48	5.38	6.72	8.07	8.96	10.76
36	4.36	5.23	6.54	7.84	8.71	10.46
37	4.24	5.09	6.36	7.63	8.48	10.17
38	4.13	4.95	6.19	7.43	8.26	9.91
39	4.02	4.83	6.03	7.24	8.04	9.65
40	3.92	4.71	5.88	7.06	7.84	9.41
41	3.83	4.59	5.74	6.89	7.65	9.18
42	3.73	4.48	5.60	6.72	7.47	8.96
43	3.65	4.38	5.47	6.57	7.30	8.76
44	3.57	4.28	5.35	6.42	7.13	8.56
45	3.49	4.18	5.23	6.27	6.97	8.37
46	3.41	4.09	5.12	6.14	6.82	8.18
47	3.34	4.01	5.01	6.01	6.68	8.01
48	3.27	3.92	4.90	5.88	6.54	7.84
49	3.20	3.84	4.80	5.76	6.40	7.68
50	3.14	3.76	4.71	5.65	6.27	7.53
51	3.08	3.69	4.61	5.54	6.15	7.38
52	3.02	3.62	4.52	5.43	6.03	7.25
53	2.96	3.55	4.44	5.33	5.92	7.10
54	2.90	3.49	4.36	5.23	5.81	6.97
55	2.85	3.42	4.28	5.13	5.70	6.84
56	2.80	3.36	4.20	5.04	5.60	6.72
57	2.75	3.30	4.13	4.95	5.50	6.60
58	2.70	3.25	4.06	4.87	5.41	6.50
59	2.66	3.19	3.99	4.79	5.32	6.38
60	2.61	3.14	3.92	4.71	5.23	6.27
Constants	156.86	188.24	235.29	282.35	313.73	376.47

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE—(Continued)

36" AND 39" TWISTERS

CYLINDER 8 INCHES DIAM. WHIRL 1½ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 4.95

FRONT ROLL 1½ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 30 T. Jack 112 T.	Cyl. 27 T. Jack 112 T.	Cyl. 24 T. Jack 112 T.	Cyl. 24 T. Jack 120 T.	Cyl. 21 T. Jack 120 T.	Cyl. 18 T. Jack 120 T.
16	27.45	30.50	34.31	36.77	42.02	49.02
17	25.84	28.71	32.29	34.60	39.55	46.14
18	24.40	27.11	30.50	32.68	37.35	43.57
19	23.12	25.69	28.90	30.96	35.38	41.28
20	21.96	24.40	27.45	29.41	33.61	39.22
21	20.92	23.24	26.14	28.01	32.01	37.35
22	19.96	22.18	24.96	26.74	30.56	35.65
23	19.10	21.22	23.87	25.58	29.23	34.10
24	18.30	20.33	22.88	24.51	28.01	32.68
25	17.57	19.52	21.96	23.53	26.89	31.37
26	16.89	18.77	21.12	22.62	25.86	30.17
27	16.27	18.07	20.33	21.79	24.90	29.05
28	15.69	17.43	19.61	21.01	24.01	28.01
29	15.15	16.83	18.93	20.28	23.18	27.05
30	14.64	16.27	18.30	19.61	22.41	26.14
31	14.17	15.74	17.71	18.98	21.69	25.30
32	13.73	15.25	17.16	18.38	21.01	24.51
33	13.31	14.79	16.64	17.83	20.37	23.77
34	12.92	14.35	16.15	17.30	19.77	23.07
35	12.55	13.94	15.69	16.81	19.21	22.41
36	12.20	13.56	15.25	16.34	18.67	21.79
37	11.87	13.19	14.84	15.90	18.17	21.20
38	11.56	12.84	14.45	15.48	17.69	20.64
39	11.26	12.51	14.08	15.08	17.24	20.11
40	10.98	12.20	13.73	14.71	16.81	19.61
41	10.71	11.90	13.39	14.35	16.40	19.13
42	10.46	11.62	13.08	14.01	16.01	18.67
43	10.21	11.35	12.77	13.68	15.63	18.24
44	9.98	11.09	12.48	13.37	15.28	17.83
45	9.76	10.84	12.20	13.07	14.94	17.43
46	9.55	10.61	11.94	12.79	14.61	17.05
47	9.35	10.38	11.68	12.52	14.30	16.69
48	9.15	10.17	11.44	12.26	14.01	16.34
49	8.96	9.96	11.20	12.00	13.72	16.01
50	8.78	9.76	10.98	11.76	13.45	15.69
51	8.61	9.57	10.77	11.53	13.18	15.38
52	8.45	9.39	10.56	11.31	12.93	15.08
53	8.29	9.21	10.36	11.10	12.68	14.80
54	8.13	9.04	10.17	10.89	12.45	14.52
55	7.99	8.87	9.98	10.70	12.22	14.26
56	7.84	8.71	9.80	10.50	12.00	14.01
57	7.71	8.56	9.63	10.32	11.79	13.76
58	7.57	8.41	9.47	10.14	11.59	13.52
59	7.44	8.27	9.31	9.97	11.39	13.29
60	7.32	8.13	9.15	9.80	11.20	13.07
Constants	439.22	488.02	549.02	588.24	672.27	784.31

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE

36" AND 39" TWISTERS

CYLINDER 8 INCHES DIAM. WHIRL $1\frac{5}{8}$ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 4.60

FRONT ROLL $1\frac{1}{2}$ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 60 T. Jack 80 T.	Cyl. 50 T. Jack 80 T.	Cyl. 40 T. Jack 80 T.	Cyl. 40 T. Jack 96 T.	Cyl. 36 T. Jack 96 T.	Cyl. 30 T. Jack 96 T.
16	9.11	10.93	13.67	16.40	18.22	21.87
17	8.57	10.29	12.86	15.43	17.15	20.58
18	8.10	9.72	12.15	14.58	16.20	19.44
19	7.67	9.21	11.51	13.81	15.34	18.41
20	7.29	8.75	10.93	13.12	14.58	17.49
21	6.94	8.33	10.41	12.49	13.88	16.66
22	6.63	7.95	9.94	11.93	13.25	15.90
23	6.34	7.61	9.51	11.41	12.68	15.21
24	6.07	7.29	9.11	10.93	12.15	14.58
25	5.83	7.00	8.75	10.50	11.66	13.99
26	5.61	6.73	8.41	10.09	11.21	13.46
27	5.40	6.48	8.10	9.72	10.80	12.96
28	5.21	6.25	7.81	9.37	10.41	12.49
29	5.03	6.03	7.54	9.05	10.05	12.06
30	4.86	5.83	7.29	8.75	9.72	11.66
31	4.70	5.64	7.05	8.46	9.40	11.29
32	4.56	5.47	6.83	8.20	9.11	10.93
33	4.42	5.30	6.63	7.95	8.83	10.60
34	4.29	5.15	6.43	7.72	8.57	10.29
35	4.16	5.00	6.25	7.50	8.33	10.00
36	4.05	4.86	6.07	7.29	8.10	9.72
37	3.94	4.73	5.91	7.09	7.88	9.46
38	3.84	4.60	5.75	6.91	7.67	9.21
39	3.74	4.49	5.61	6.73	7.48	8.97
40	3.64	4.37	5.47	6.56	7.29	8.75
41	3.56	4.27	5.33	6.40	7.11	8.53
42	3.47	4.17	5.21	6.25	6.94	8.33
43	3.39	4.07	5.09	6.10	6.78	8.14
44	3.31	3.97	4.97	5.96	6.63	7.95
45	3.24	3.89	4.86	5.83	6.48	7.77
46	3.17	3.80	4.75	5.70	6.34	7.61
47	3.10	3.72	4.65	5.58	6.20	7.44
48	3.04	3.64	4.56	5.47	6.07	7.29
49	2.97	3.57	4.46	5.35	5.95	7.14
50	2.92	3.50	4.37	5.25	5.83	7.00
51	2.86	3.44	4.29	5.14	5.72	6.86
52	2.80	3.36	4.21	5.05	5.61	6.73
53	2.75	3.30	4.13	4.95	5.50	6.60
54	2.70	3.24	4.05	4.86	5.40	6.48
55	2.65	3.18	3.98	4.77	5.30	6.36
56	2.60	3.12	3.90	4.69	5.21	6.25
57	2.56	3.07	3.84	4.60	5.11	6.14
58	2.51	3.01	3.77	4.52	5.03	6.03
59	2.47	2.97	3.71	4.45	4.94	5.93
60	2.43	2.92	3.64	4.37	4.86	5.83
Constants	145.77	174.93	218.66	262.39	291.54	349.85

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE—(Continued)

36" AND 39" TWISTERS

CYLINDER 8 INCHES DIAM. WHIRL $1\frac{5}{8}$ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 4.60

FRONT ROLL $1\frac{1}{2}$ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 30 T. Jack 112 T.	Cyl. 27 T. Jack 112 T.	Cyl. 24 T. Jack 112 T.	Cyl. 24 T. Jack 120 T.	Cyl. 21 T. Jack 120 T.	Cyl. 18 T. Jack 120 T.
16	25.51	28.34	31.89	34.17	39.05	45.55
17	24.01	26.68	30.01	32.16	36.75	42.87
18	22.68	25.20	28.34	30.37	34.71	40.49
19	21.48	23.87	26.85	28.77	32.88	38.36
20	20.41	22.68	25.51	27.33	31.24	36.44
21	19.44	21.60	24.30	26.03	29.75	34.71
22	18.55	20.61	23.19	24.85	28.40	33.13
23	17.75	19.72	22.18	23.77	27.16	31.69
24	17.01	18.90	21.26	22.78	26.03	30.37
25	16.33	18.14	20.41	21.87	24.99	29.15
26	15.70	17.44	19.62	21.02	24.03	28.03
27	15.12	16.80	18.90	20.25	23.14	26.99
28	14.58	16.20	18.22	19.52	22.31	26.03
29	14.07	15.64	17.59	18.85	21.54	25.13
30	13.61	15.12	17.01	18.22	20.82	24.30
31	13.17	14.63	16.46	17.63	20.15	23.51
32	12.76	14.17	15.94	17.08	19.52	22.78
33	12.37	13.74	15.46	16.56	18.93	22.09
34	12.01	13.34	15.01	16.08	18.37	21.44
35	11.66	12.96	14.58	15.62	17.85	20.82
36	11.34	12.60	14.17	15.18	17.35	20.25
37	11.03	12.26	13.79	14.77	16.88	19.70
38	10.74	11.93	13.43	14.39	16.44	19.18
39	10.47	11.63	13.08	14.02	16.02	18.69
40	10.20	11.34	12.76	13.67	15.62	18.22
41	9.96	11.06	12.44	13.33	15.24	17.78
42	9.72	10.80	12.15	13.02	14.87	17.35
43	9.49	10.55	11.87	12.71	14.53	16.95
44	9.28	10.31	11.60	12.42	14.20	16.57
45	9.07	10.08	11.34	12.15	13.88	16.20
46	8.87	9.86	11.09	11.88	13.58	15.84
47	8.68	9.65	10.86	11.63	13.29	15.51
48	8.50	9.45	10.63	11.39	13.02	15.19
49	8.33	9.26	10.41	11.16	12.75	14.87
50	8.16	9.07	10.20	10.93	12.49	14.58
51	8.00	8.89	10.00	10.72	12.25	14.29
52	7.85	8.72	9.81	10.51	12.01	14.02
53	7.70	8.56	9.63	10.31	11.79	13.75
54	7.56	8.40	9.45	10.12	11.57	13.50
55	7.42	8.25	9.28	9.94	11.36	13.25
56	7.29	8.10	9.11	9.76	11.16	13.02
57	7.16	7.96	8.95	9.59	10.96	12.79
58	7.04	7.82	8.80	9.43	10.77	12.57
59	6.92	7.69	8.65	9.27	10.59	12.36
60	6.80	7.56	8.50	9.11	10.41	12.15
Constants	408.16	453.51	510.20	546.64	624.73	728.86

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE

36" AND 39" TWISTERS

CYLINDER 8 INCHES DIAM. WHIRL $1\frac{3}{4}$ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 4.29

FRONT ROLL $1\frac{1}{2}$ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

TWIST PER INCH

Change Gears	TWIST PER INCH					
	Cyl. 60 T. Jack 80 T.	Cyl. 50 T. Jack 80 T.	Cyl. 40 T. Jack 80 T.	Cyl. 40 T. Jack 96 T.	Cyl. 36 T. Jack 96 T.	Cyl. 30 T. Jack 96 T.
16	8.50	10.20	12.75	15.29	16.99	20.39
17	8.00	9.60	12.00	14.39	15.99	19.19
18	7.55	9.06	11.33	13.60	15.11	18.13
19	7.16	8.59	10.73	12.88	14.31	17.17
20	6.80	8.16	10.20	12.24	13.60	16.31
21	6.47	7.77	9.71	11.65	12.95	15.54
22	6.18	7.42	9.27	11.12	12.36	14.83
23	5.91	7.09	8.87	10.64	11.82	14.19
24	5.66	6.80	8.50	10.20	11.33	13.59
25	5.44	6.53	8.16	9.79	10.88	13.05
26	5.23	6.27	7.84	9.41	10.46	12.55
27	5.04	6.04	7.55	9.06	10.07	12.08
28	4.86	5.83	7.28	8.74	9.71	11.65
29	4.69	5.63	7.03	8.44	9.38	11.25
30	4.53	5.44	6.80	8.16	9.06	10.88
31	4.39	5.26	6.58	7.89	8.77	10.52
32	4.25	5.10	6.37	7.65	8.50	10.20
33	4.12	4.94	6.18	7.42	8.24	9.89
34	4.00	4.80	6.00	7.20	8.00	9.60
35	3.88	4.66	5.83	6.99	7.77	9.32
36	3.78	4.53	5.66	6.80	7.55	9.06
37	3.67	4.41	5.51	6.61	7.35	8.82
38	3.58	4.29	5.37	6.44	7.16	8.59
39	3.49	4.18	5.23	6.27	6.97	8.37
40	3.40	4.08	5.10	6.12	6.80	8.16
41	3.32	3.98	4.97	5.97	6.63	7.96
42	3.24	3.88	4.86	5.83	6.47	7.77
43	3.16	3.79	4.74	5.69	6.32	7.59
44	3.09	3.71	4.63	5.56	6.18	7.42
45	3.02	3.63	4.53	5.44	6.04	7.25
46	2.96	3.55	4.43	5.32	5.91	7.09
47	2.89	3.47	4.34	5.21	5.79	6.94
48	2.83	3.40	4.25	5.10	5.66	6.80
49	2.77	3.33	4.16	4.99	5.55	6.66
50	2.72	3.26	4.08	4.89	5.44	6.53
51	2.67	3.20	4.00	4.80	5.33	6.40
52	2.61	3.14	3.92	4.71	5.23	6.27
53	2.57	3.08	3.85	4.62	5.13	6.16
54	2.52	3.02	3.78	4.53	5.04	6.04
55	2.47	2.97	3.71	4.45	4.94	5.93
56	2.43	2.91	2.64	4.37	4.86	5.83
57	2.39	2.86	3.58	4.29	4.77	5.72
58	2.34	2.81	3.52	4.22	4.69	5.63
59	2.30	2.77	3.46	4.15	4.61	5.53
60	2.27	2.72	3.40	4.08	4.53	5.44
Constants	135.95	163.14	203.92	244.71	271.90	326.27

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE—(Continued)

36" AND 39" TWISTERS

CYLINDER 8 INCHES DIAM. WHIRL 1 $\frac{3}{4}$ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 4.29

FRONT ROLL 1 $\frac{1}{2}$ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 30 T. Jack 112 T.	Cyl. 27 T. Jack 112 T.	Cyl. 24 T. Jack 112 T.	Cyl. 24 T. Jack 120 T.	Cyl. 21 T. Jack 120 T.	Cyl. 18 T. Jack 120 T.
16	23.79	26.43	29.74	31.86	36.41	42.48
17	22.39	24.88	27.99	29.99	34.27	39.98
18	21.15	23.50	26.43	28.32	32.37	37.76
19	20.03	22.26	25.04	26.83	30.66	35.78
20	19.03	21.15	23.79	25.49	29.13	33.99
21	18.13	20.14	22.66	24.28	27.74	32.37
22	17.30	19.23	21.63	23.17	26.48	30.90
23	16.55	18.39	20.69	22.17	25.33	29.55
24	15.86	17.62	19.83	21.24	24.28	28.32
25	15.23	16.92	19.03	20.39	23.31	27.19
26	14.64	16.27	18.30	19.61	22.41	26.14
27	14.10	15.66	17.62	18.88	21.58	25.18
28	13.59	15.11	16.99	18.21	20.81	24.28
29	13.13	14.58	16.41	17.58	20.09	23.44
30	12.69	14.10	15.86	16.99	19.42	22.66
31	12.28	13.64	15.35	16.45	18.79	21.93
32	11.90	13.22	14.87	15.93	18.21	21.24
33	11.53	12.82	14.42	15.45	17.66	20.60
34	11.20	12.44	13.99	14.99	17.14	19.99
35	10.88	12.08	13.59	14.57	16.65	19.42
36	10.57	11.75	13.22	14.16	16.18	18.88
37	10.29	11.43	12.86	13.78	15.75	18.37
38	10.02	11.13	12.52	13.42	15.33	17.89
39	9.76	10.84	12.20	13.07	14.94	17.43
40	9.52	10.57	11.90	12.75	14.57	16.99
41	9.28	10.32	11.61	12.43	14.21	16.58
42	9.06	10.07	11.33	12.14	13.87	16.18
43	8.85	9.84	11.07	11.86	13.55	15.81
44	8.65	9.61	10.81	11.59	13.24	15.45
45	8.46	9.40	10.57	11.33	12.95	15.11
46	8.28	9.19	10.35	11.08	12.67	14.78
47	8.10	9.00	10.12	10.85	12.40	14.46
48	7.93	8.81	9.92	10.62	12.14	14.16
49	7.77	8.63	9.71	10.40	11.89	13.87
50	7.61	8.46	9.52	10.20	11.65	13.59
51	7.46	8.29	9.33	10.00	11.42	13.33
52	7.32	8.13	9.15	9.80	11.20	13.07
53	7.18	7.98	8.98	9.62	10.99	12.83
54	7.05	7.83	8.81	9.44	10.79	12.59
55	6.92	7.69	8.65	9.27	10.59	12.36
56	6.80	7.56	8.50	9.10	10.40	12.14
57	6.68	7.42	8.35	8.94	10.22	11.93
58	6.56	7.29	8.21	8.79	10.05	11.72
59	6.45	7.17	8.06	8.64	9.88	11.52
60	6.34	7.05	7.93	8.50	9.71	11.33
Constants	380.65	422.95	475.82	509.80	582.63	679.74

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE

42" TWISTERS

CYLINDER 7 INCHES DIAM. WHIRL 1½ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 4.35

FRONT ROLL 1½ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 70 T. Jack 96 T.	Cyl. 60 T. Jack 96 T.	Cyl. 50 T. Jack 96 T.	Cyl. 50 T. Jack 112 T.	Cyl. 45 T. Jack 112 T.	Cyl. 40 T. Jack 112 T.
16	8.86	10.34	12.41	14.47	16.08	18.09
17	8.34	9.73	11.68	13.62	15.14	17.03
18	7.88	9.19	11.03	12.87	14.30	16.08
19	7.46	8.71	10.45	12.19	13.54	15.24
20	7.09	8.27	9.93	11.58	12.87	14.47
21	6.75	7.88	9.45	11.03	12.25	13.78
22	6.45	7.52	9.02	10.53	11.70	13.16
23	6.16	7.19	8.63	10.07	11.19	12.59
24	5.91	6.89	8.27	9.65	10.72	12.06
25	5.67	6.62	7.94	9.26	10.29	11.58
26	5.45	6.36	7.63	8.91	9.90	11.13
27	5.25	6.13	7.35	8.58	9.53	10.72
28	5.06	5.91	7.09	8.27	9.19	10.34
29	4.89	5.70	6.84	7.99	8.87	9.98
30	4.73	5.51	6.62	7.72	8.58	9.65
31	4.57	5.34	6.40	7.47	8.30	9.34
32	4.43	5.17	6.20	7.24	8.04	9.05
33	4.30	5.01	6.02	7.02	7.80	8.77
34	4.17	4.87	5.84	6.81	7.57	8.51
35	4.05	4.73	5.67	6.62	7.35	8.27
36	3.94	4.60	5.52	6.43	7.15	8.04
37	3.83	4.47	5.36	6.26	6.95	7.82
38	3.73	4.36	5.23	6.10	6.77	7.62
39	3.64	4.24	5.09	5.94	6.60	7.42
40	3.54	4.14	4.96	5.79	6.43	7.24
41	3.46	4.03	4.84	5.65	6.28	7.06
42	3.38	3.94	4.73	5.52	6.13	6.89
43	3.30	3.85	4.62	5.39	5.98	6.73
44	3.22	3.76	4.51	5.26	5.85	6.58
45	3.15	3.68	4.41	5.15	5.72	6.43
46	3.08	3.60	4.32	5.04	5.59	6.30
47	3.02	3.52	4.22	4.93	5.47	6.16
48	2.95	3.45	4.14	4.83	5.36	6.03
49	2.89	3.38	4.05	4.73	5.25	5.91
50	2.84	3.31	3.97	4.63	5.15	5.79
51	2.78	3.24	3.89	4.54	5.05	5.68
52	2.73	3.18	3.82	4.46	4.95	5.57
53	2.68	3.12	3.75	4.37	4.86	5.46
54	2.63	3.06	3.68	4.29	4.77	5.36
55	2.58	3.01	3.61	4.21	4.68	5.26
56	2.53	2.96	3.55	4.14	4.60	5.17
57	2.49	2.90	3.48	4.06	4.51	5.08
58	2.44	2.85	3.42	4.00	4.44	4.99
59	2.40	2.80	3.36	3.92	4.36	4.91
60	2.36	2.76	3.31	3.86	4.29	4.82
Constants	141.79	165.42	198.50	231.59	257.32	289.48

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE—(Continued)

42" TWISTERS

CYLINDER 7 INCHES DIAM. WHIRL 1½ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 4.35

FRONT ROLL 1½ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 40 T.	Cyl. 36 T.	Cyl. 30 T.	Cyl. 30 T.	Cyl. 27 T.	Cyl. 24 T.
	Jack 120 T.	Jack 120 T.	Jack 120 T.	Jack 132 T.	Jack 132 T.	Jack 132 T.
16	19.39	21.54	25.85	28.43	31.59	35.54
17	18.24	20.27	24.33	26.76	29.73	33.45
18	17.23	19.15	22.98	25.27	28.08	31.59
19	16.32	18.14	21.77	23.94	26.60	29.93
20	15.51	17.23	20.68	22.75	25.27	28.43
21	14.77	16.41	19.69	21.66	24.07	27.08
22	14.10	15.66	18.80	20.68	22.98	25.85
23	13.49	14.98	17.98	19.78	21.98	24.72
24	12.92	14.36	17.23	18.95	21.06	23.69
25	12.41	13.78	16.54	18.20	20.22	22.74
26	11.93	13.25	15.91	17.50	19.44	21.87
27	11.49	12.76	15.32	16.85	18.72	21.06
28	11.08	12.31	14.77	16.25	18.05	20.31
29	10.70	11.88	14.26	15.69	17.43	19.61
30	10.34	11.49	13.79	15.16	16.85	18.95
31	10.01	11.12	13.34	14.67	16.30	18.34
32	9.69	10.77	12.92	14.22	15.80	17.77
33	9.40	10.44	12.53	13.78	15.32	17.23
34	9.12	10.14	12.16	13.38	14.87	16.72
35	8.86	9.85	11.82	13.00	14.44	16.25
36	8.62	9.58	11.49	12.64	14.04	15.80
37	8.38	9.31	11.18	12.29	13.66	15.37
38	8.16	9.07	10.89	11.97	13.30	14.97
39	7.95	8.84	10.60	11.66	12.96	14.58
40	7.75	8.62	10.34	11.37	12.64	14.22
41	7.56	8.41	10.09	11.10	12.33	13.87
42	7.38	8.21	9.85	10.83	12.04	13.54
43	7.21	8.01	9.62	10.58	11.75	13.22
44	7.05	7.83	9.40	10.34	11.49	12.92
45	6.89	7.66	9.19	10.11	11.23	12.64
46	6.74	7.49	8.99	9.89	10.99	12.36
47	6.60	7.33	8.80	9.68	10.75	12.10
48	6.46	7.18	8.62	9.48	10.53	11.85
49	6.33	7.03	8.44	9.28	10.32	11.60
50	6.20	6.89	8.27	9.10	10.11	11.37
51	6.08	6.76	8.11	8.92	9.91	11.15
52	5.96	6.63	7.96	8.75	9.72	10.94
53	5.85	6.50	7.80	8.58	9.54	10.73
54	5.74	6.38	7.66	8.42	9.36	10.53
55	5.64	6.27	7.52	8.27	9.19	10.34
56	5.54	6.16	7.39	8.13	9.03	10.16
57	5.44	6.05	7.26	7.98	8.87	9.98
58	5.35	5.94	7.13	7.85	8.72	9.81
59	5.26	5.84	7.01	7.71	8.57	9.65
60	5.17	5.74	6.89	7.58	8.42	9.48
Constants	310.16	344.62	413.55	454.90	505.45	568.63

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE

42" TWISTERS

CYLINDER 7 INCHES DIAM. WHIRL $1\frac{5}{8}$ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 4.04

FRONT ROLL $1\frac{1}{2}$ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 70 T. Jack 96 T.	Cyl. 60 T. Jack 96 T.	Cyl. 50 T. Jack 96 T.	Cyl. 50 T. Jack 112 T.	Cyl. 45 T. Jack 112 T.	Cyl. 40 T. Jack 112 T.
16	8.23	9.60	11.52	13.44	14.94	16.80
17	7.75	9.04	10.84	12.65	14.06	15.81
18	7.32	8.54	10.24	11.95	13.28	14.94
19	6.93	8.09	9.70	11.32	12.58	14.15
20	6.58	7.68	9.22	10.75	11.95	13.44
21	6.27	7.32	8.78	10.24	11.38	12.80
22	5.99	6.98	8.38	9.78	10.86	12.22
23	5.73	6.68	8.02	9.35	10.39	11.69
24	5.49	6.40	7.68	8.96	9.96	11.20
25	5.27	6.15	7.37	8.60	9.56	10.75
26	5.06	5.91	7.09	8.27	9.19	10.34
27	4.88	5.69	6.83	7.97	8.85	9.96
28	4.70	5.49	6.58	7.68	8.54	9.60
29	4.54	5.30	6.36	7.42	8.24	9.27
30	4.39	5.12	6.15	7.17	7.97	8.96
31	4.25	4.96	5.95	6.94	7.71	8.67
32	4.12	4.80	5.76	6.72	7.47	8.40
33	3.99	4.66	5.59	6.52	7.24	8.15
34	3.87	4.52	5.42	6.33	7.03	7.91
35	3.76	4.39	5.27	6.15	6.83	7.68
36	3.66	4.27	5.12	5.98	6.64	7.47
37	3.56	4.15	4.98	5.81	6.46	7.27
38	3.47	4.05	4.85	5.66	6.29	7.08
39	3.38	3.94	4.73	5.51	6.13	6.89
40	3.29	3.84	4.61	5.38	5.97	6.72
41	3.21	3.75	4.50	5.25	5.83	6.56
42	3.14	3.66	4.39	5.12	5.69	6.40
43	3.06	3.57	4.29	5.00	5.56	6.25
44	2.99	3.49	4.19	4.89	5.43	6.11
45	2.93	3.41	4.10	4.78	5.31	5.97
46	2.86	3.34	4.01	4.68	5.20	5.85
47	2.80	3.27	3.92	4.58	5.08	5.72
48	2.74	3.20	3.84	4.48	4.98	5.60
49	2.69	3.14	3.76	4.39	4.88	5.49
50	2.63	3.07	3.69	4.30	4.78	5.38
51	2.58	3.01	3.62	4.22	4.69	5.27
52	2.53	2.96	3.55	4.14	4.60	5.17
53	2.48	2.90	3.48	4.06	4.51	5.07
54	2.44	2.85	3.41	3.98	4.43	4.98
55	2.39	2.79	3.35	3.91	4.35	4.89
56	2.35	2.75	3.29	3.84	4.27	4.80
57	2.31	2.70	3.23	3.77	4.19	4.72
58	2.27	2.65	3.18	3.71	4.12	4.64
59	2.23	2.60	3.12	3.65	4.05	4.56
60	2.19	2.56	3.07	3.58	3.98	4.48
Constants	131.68	153.63	184.36	215.08	238.98	268.85

TWIST GEARING TABLE —(Continued)

42" TWISTERS

CYLINDER 7 INCHES DIAM. WHIRL $1\frac{5}{8}$ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 4.04

FRONT ROLL $1\frac{1}{2}$ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 40 T. Jack 120 T.	Cyl. 36 T. Jack 120 T.	Cyl. 30 T. Jack 120 T.	Cyl. 30 T. Jack 132 T.	Cyl. 27 T. Jack 132 T.	Cyl. 24 T. Jack 132 T.
16	18.00	20.00	24.01	26.41	29.34	33.01
17	16.94	18.83	22.59	24.85	27.61	31.06
18	16.00	17.78	21.34	23.47	26.08	29.34
19	15.16	16.85	20.21	22.24	24.71	27.79
20	14.40	16.00	19.20	21.12	23.47	26.41
21	13.72	15.24	18.29	20.12	22.35	25.15
22	13.09	14.55	17.46	19.20	21.34	24.00
23	12.52	13.92	16.70	18.37	20.41	22.96
24	12.00	13.34	16.00	17.60	19.56	22.00
25	11.52	12.80	15.36	16.90	18.78	21.12
26	11.08	12.31	14.77	16.25	18.06	20.31
27	10.67	11.85	14.23	15.65	17.39	19.56
28	10.29	11.43	13.72	15.09	16.77	18.86
29	9.93	11.04	13.24	14.57	16.19	18.21
30	9.60	10.67	12.80	14.08	15.65	17.60
31	9.29	10.33	12.39	13.63	15.14	17.04
32	9.00	10.00	12.00	13.20	14.67	16.50
33	8.73	9.70	11.64	12.80	14.23	16.00
34	8.47	9.41	11.30	12.43	13.81	15.53
35	8.23	9.14	10.97	12.07	13.41	15.09
36	8.00	8.89	10.67	11.74	13.04	14.67
37	7.79	8.65	10.38	11.42	12.69	14.27
38	7.58	8.43	10.11	11.12	12.36	13.90
39	7.39	8.21	9.85	10.83	12.04	13.54
40	7.20	8.00	9.60	10.56	11.74	13.20
41	7.03	7.81	9.37	10.30	11.45	12.88
42	6.86	7.62	9.15	10.06	11.18	12.58
43	6.70	7.44	8.93	9.82	10.92	12.28
44	6.55	7.27	8.73	9.60	10.67	12.00
45	6.40	7.11	8.54	9.39	10.43	11.74
46	6.26	6.96	8.35	9.19	10.21	11.48
47	6.13	6.81	8.17	8.99	9.99	11.24
48	6.00	6.67	8.00	8.80	9.78	11.00
49	5.88	6.53	7.84	8.62	9.58	10.78
50	5.76	6.40	7.68	8.45	9.39	10.56
51	5.65	6.28	7.53	8.28	9.20	10.35
52	5.54	6.16	7.39	8.13	9.03	10.16
53	5.44	6.04	7.25	7.97	8.86	9.96
54	5.33	5.93	7.11	7.82	8.69	9.78
55	5.24	5.82	6.98	7.68	8.54	9.60
56	5.14	5.72	6.86	7.55	8.39	9.43
57	5.05	5.62	6.74	7.41	8.24	9.26
58	4.97	5.52	6.62	7.29	8.10	9.10
59	4.88	5.42	6.51	7.16	7.96	8.95
60	4.80	5.33	6.40	7.04	7.82	8.80
Constants	288.06	320.06	384.08	422.48	469.43	528.10

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE

42" TWISTERS

CYLINDER 7 INCHES DIAM. WHIRL $1\frac{3}{4}$ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 3.77

FRONT ROLL $1\frac{1}{2}$ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 70 T. Jack 96 T.	Cyl. 60 T. Jack 96 T.	Cyl. 50 T. Jack 96 T.	Cyl. 50 T. Jack 112 T.	Cyl. 45 T. Jack 112 T.	Cyl. 40 T. Jack 112 T.
16	7.68	8.96	10.75	12.54	13.94	15.68
17	7.23	8.43	10.12	11.81	13.12	14.76
18	6.83	7.96	9.56	11.15	12.39	13.94
19	6.47	7.55	9.05	10.56	11.74	13.20
20	6.14	7.17	8.60	10.04	11.15	12.54
21	5.85	6.83	8.19	9.56	10.62	11.95
22	5.59	6.52	7.82	9.12	10.14	11.40
23	5.34	6.23	7.48	8.73	9.70	10.91
24	5.12	5.97	7.17	8.36	9.29	10.45
25	4.92	5.73	6.88	8.03	8.92	10.04
26	4.73	5.51	6.62	7.72	8.58	9.65
27	4.55	5.31	6.37	7.43	8.26	9.29
28	4.39	5.12	6.14	7.17	7.96	8.96
29	4.24	4.94	5.93	6.92	7.69	8.65
30	4.10	4.78	5.73	6.69	7.43	8.36
31	3.96	4.62	5.55	6.47	7.19	8.09
32	3.84	4.48	5.38	6.27	6.97	7.84
33	3.72	4.34	5.21	6.08	6.76	7.60
34	3.61	4.22	5.06	5.90	6.56	7.38
35	3.51	4.10	4.92	5.73	6.37	7.17
36	3.41	3.98	4.78	5.58	6.19	6.97
37	3.32	3.87	4.65	5.42	6.03	6.78
38	3.23	3.78	4.53	5.28	5.87	6.60
39	3.15	3.68	4.41	5.14	5.72	6.43
40	3.07	3.58	4.30	5.02	5.58	6.27
41	3.00	3.50	4.20	4.90	5.44	6.12
42	2.93	3.42	4.10	4.78	5.31	5.98
43	2.86	3.33	4.00	4.67	5.19	5.83
44	2.79	3.26	3.91	4.56	5.07	5.70
45	2.73	3.19	3.82	4.46	4.96	5.58
46	2.67	3.12	3.74	4.37	4.85	5.46
47	2.61	3.05	3.66	4.27	4.74	5.34
48	2.56	2.99	3.59	4.18	4.65	5.23
49	2.51	2.93	3.51	4.10	4.55	5.12
50	2.46	2.87	3.44	4.01	4.46	5.02
51	2.41	2.81	3.37	3.94	4.37	4.92
52	2.36	2.76	3.31	3.86	4.29	4.83
53	2.32	2.70	3.25	3.79	4.21	4.73
54	2.28	2.65	3.19	3.72	4.13	4.65
55	2.23	2.61	3.13	3.65	4.05	4.56
56	2.19	2.56	3.07	3.59	3.98	4.48
57	2.16	2.52	3.02	3.52	3.91	4.40
58	2.12	2.47	2.97	3.46	3.85	4.33
59	2.08	2.43	2.92	3.40	3.78	4.25
60	2.05	2.39	2.87	3.35	3.72	4.18
Constants	122.88	143.36	172.04	200.71	223.01	250.89

TWIST GEARING TABLE—(Continued)

42" TWISTERS

CYLINDER 7 INCHES DIAM. WHIRL $1\frac{3}{4}$ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 3.77

FRONT ROLL $1\frac{1}{2}$ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 40 T. Jack 120 T.	Cyl. 36 T. Jack 120 T.	Cyl. 30 T. Jack 120 T.	Cyl. 30 T. Jack 132 T.	Cyl. 27 T. Jack 132 T.	Cyl. 24 T. Jack 132 T.
16	16.80	18.67	22.40	24.64	27.38	30.80
17	15.81	17.57	21.08	23.19	25.77	28.99
18	14.93	16.59	19.91	21.90	24.34	27.38
19	14.15	15.72	18.86	20.75	23.06	25.94
20	13.44	14.93	17.92	19.71	21.90	24.64
21	12.80	14.22	17.07	18.77	20.86	23.47
22	12.22	13.58	16.29	17.92	19.91	22.40
23	11.69	12.99	15.58	17.14	19.05	21.43
24	11.20	12.44	14.93	16.43	18.25	20.53
25	10.75	11.95	14.34	15.77	17.52	19.71
26	10.34	11.49	13.79	15.16	16.85	18.95
27	9.96	11.06	13.27	14.60	16.22	18.25
28	9.60	10.67	12.80	14.08	15.65	17.60
29	9.27	10.30	12.36	13.59	15.11	16.99
30	8.96	9.96	11.95	13.14	14.60	16.43
31	8.67	9.63	11.56	12.72	14.13	15.90
32	8.40	9.33	11.20	12.32	13.69	15.40
33	8.15	9.05	10.86	11.95	13.27	14.93
34	7.91	8.78	10.54	11.60	12.88	14.49
35	7.68	8.53	10.24	11.26	12.52	14.08
36	7.47	8.30	9.96	10.95	12.17	13.69
37	7.27	8.07	9.69	10.66	11.84	13.32
38	7.07	7.86	9.43	10.38	11.53	12.97
39	6.89	7.66	9.19	10.11	11.23	12.64
40	6.72	7.47	8.96	9.86	10.95	12.32
41	6.56	7.28	8.74	9.62	10.68	12.02
42	6.40	7.11	8.54	9.39	10.43	11.74
43	6.25	6.95	8.34	9.17	10.19	11.46
44	6.11	6.79	8.15	8.96	9.96	11.20
45	5.97	6.64	7.96	8.76	9.73	10.95
46	5.84	6.50	7.79	8.57	9.52	10.72
47	5.72	6.35	7.63	8.39	9.32	10.49
48	5.60	6.22	7.47	8.22	9.13	10.27
49	5.49	6.10	7.31	8.05	8.94	10.06
50	5.38	5.97	7.17	7.89	8.76	9.86
51	5.27	5.86	7.03	7.73	8.59	9.66
52	5.17	5.75	6.90	7.58	8.43	9.48
53	5.07	5.64	6.76	7.44	8.27	9.30
54	4.98	5.53	6.64	7.30	8.11	9.13
55	4.89	5.43	6.52	7.17	7.96	8.96
56	4.80	5.34	6.40	7.04	7.83	8.80
57	4.72	5.24	6.29	6.92	7.69	8.65
58	4.63	5.15	6.18	6.80	7.56	8.50
59	4.56	5.06	6.07	6.68	7.42	8.35
60	4.48	4.98	5.97	6.57	7.30	8.21
Constants	268.81	298.67	358.41	394.25	438.05	492.81

TWIST GEARING TABLE

42" TWISTERS

CYLINDER 7 INCHES DIAM. WHIRL 2 INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 3.35

FRONT ROLL $1\frac{1}{2}$ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 70 T. Jack 96 T.	Cyl. 60 T. Jack 96 T.	Cyl. 50 T. Jack 96 T.	Cyl. 50 T. Jack 112 T.	Cyl. 45 T. Jack 112 T.	Cyl. 40 T. Jack 112 T.
16	6.82	7.96	9.55	11.15	12.39	13.93
17	6.42	7.49	8.99	10.49	11.66	13.11
18	6.07	7.08	8.50	9.91	11.01	12.38
19	5.75	6.70	8.05	9.39	10.43	11.73
20	5.46	6.37	7.64	8.92	9.91	11.15
21	5.20	6.07	7.28	8.49	9.44	10.62
22	4.96	5.79	6.95	8.11	9.01	10.13
23	4.75	5.54	6.65	7.75	8.62	9.69
24	4.55	5.31	6.37	7.43	8.26	9.29
25	4.37	5.10	6.11	7.13	7.93	8.92
26	4.20	4.90	5.87	6.86	7.62	8.57
27	4.04	4.72	5.66	6.61	7.34	8.26
28	3.90	4.55	5.46	6.37	7.08	7.96
29	3.77	4.39	5.27	6.15	6.83	7.69
30	3.64	4.25	5.10	5.95	6.61	7.43
31	3.52	4.11	4.93	5.75	6.39	7.19
32	3.41	3.98	4.77	5.57	6.19	6.96
33	3.31	3.86	4.63	5.40	6.00	6.75
34	3.21	3.75	4.50	5.25	5.83	6.56
35	3.12	3.64	4.37	5.10	5.66	6.37
36	3.03	3.54	4.25	4.96	5.50	6.19
37	2.95	3.44	4.13	4.82	5.36	6.02
38	2.87	3.35	4.02	4.70	5.21	5.87
39	2.80	3.27	3.92	4.57	5.08	5.72
40	2.73	3.18	3.82	4.46	4.95	5.57
41	2.66	3.11	3.73	4.35	4.83	5.44
42	2.60	3.04	3.64	4.25	4.72	5.31
43	2.54	2.96	3.56	4.15	4.61	5.18
44	2.48	2.90	3.47	4.05	4.50	5.07
45	2.43	2.83	3.40	3.96	4.40	4.95
46	2.37	2.77	3.32	3.88	4.31	4.84
47	2.32	2.71	3.25	3.79	4.22	4.74
48	2.27	2.66	3.18	3.72	4.13	4.65
49	2.23	2.60	3.12	3.64	4.04	4.55
50	2.18	2.55	3.06	3.57	3.96	4.46
51	2.14	2.49	3.00	3.50	3.89	4.37
52	2.10	2.45	2.94	3.43	3.81	4.29
53	2.06	2.40	2.88	3.37	3.74	4.21
54	2.02	2.36	2.83	3.30	3.67	4.13
55	1.99	2.32	2.78	3.24	3.60	4.05
56	1.95	2.27	2.73	3.19	3.54	3.98
57	1.92	2.23	2.68	3.13	3.48	3.91
58	1.88	2.20	2.64	3.08	3.42	3.84
59	1.85	2.16	2.59	3.02	3.36	3.77
60	1.82	2.12	2.55	2.97	3.30	3.72
Constants	109.19	127.39	152.87	178.35	198.16	222.94

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE—(Continued)

42" TWISTERS

CYLINDER 7 INCHES DIAM. WHIRL 2 INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 3.35

FRONT ROLL 1½ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

TWIST PER INCH

Change Gears	Cyl. 40 T.	Cyl. 36 T.	Cyl. 30 T.	Cyl. 30 T.	Cyl. 27 T.	Cyl. 24 T.
	Jack 120 T.	Jack 120 T.	Jack 120 T.	Jack 132 T.	Jack 132 T.	Jack 132 T.
16	14.93	16.59	19.91	21.90	24.33	27.37
17	14.05	15.61	18.73	20.61	22.90	25.76
18	13.27	14.74	17.69	19.46	21.63	24.33
19	12.57	13.97	16.76	18.44	20.49	23.05
20	11.94	13.27	15.92	17.52	19.46	21.90
21	11.37	12.64	15.17	16.68	18.54	20.85
22	10.86	12.06	14.48	15.92	17.69	19.91
23	10.39	11.54	13.85	15.23	16.92	19.04
24	9.95	11.06	13.27	14.60	16.22	18.25
25	9.55	10.62	12.74	14.01	15.57	17.52
26	9.19	10.21	12.25	13.47	14.97	16.84
27	8.85	9.83	11.80	12.98	14.42	16.22
28	8.53	9.48	11.37	12.51	13.90	15.64
29	8.24	9.15	10.98	12.08	13.42	15.10
30	7.96	8.85	10.62	11.68	12.98	14.60
31	7.71	8.56	10.27	11.30	12.56	14.13
32	7.47	8.29	9.95	10.95	12.16	13.68
33	7.24	8.04	9.65	10.62	11.80	13.27
34	7.03	7.81	9.37	10.30	11.45	12.88
35	6.82	7.58	9.10	10.01	11.12	12.51
36	6.64	7.37	8.85	9.73	10.82	12.17
37	6.46	7.17	8.61	9.47	10.52	11.84
38	6.29	6.98	8.38	9.22	10.25	11.53
39	6.12	6.81	8.17	8.98	9.98	11.23
40	5.97	6.64	7.96	8.76	9.73	10.95
41	5.83	6.47	7.77	8.54	9.49	10.68
42	5.69	6.32	7.59	8.34	9.27	10.43
43	5.56	6.17	7.41	8.15	9.05	10.18
44	5.43	6.03	7.24	7.96	8.85	9.95
45	5.31	5.90	7.08	7.79	8.65	9.73
46	5.20	5.77	6.93	7.62	8.46	9.52
47	5.08	5.65	6.78	7.45	8.28	9.32
48	4.98	5.53	6.64	7.30	8.11	9.13
49	4.87	5.42	6.50	7.15	7.94	8.94
50	4.78	5.31	6.37	7.01	7.79	8.76
51	4.68	5.20	6.24	6.87	7.64	8.59
52	4.60	5.11	6.13	6.74	7.49	8.42
53	4.51	5.01	6.01	6.61	7.34	8.26
54	4.43	4.91	5.90	6.49	7.21	8.11
55	4.34	4.83	5.79	6.37	7.08	7.96
56	4.27	4.74	5.69	6.26	6.95	7.82
57	4.19	4.66	5.59	6.15	6.83	7.68
58	4.12	4.58	5.49	6.04	6.71	7.55
59	4.05	4.50	5.40	5.94	6.59	7.42
60	3.98	4.42	5.31	5.84	6.49	7.30
Constants	238.86	265.40	318.48	350.33	389.25	437.91

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE

42" TWISTERS

CYLINDER 7 INCHES DIAM. WHIRL 2½ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 2.96

FRONT ROLL 1½ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 70 T. Jack 96 T.	Cyl. 60 T. Jack 96 T.	Cyl. 50 T. Jack 96 T.	Cyl. 50 T. Jack 112 T.	Cyl. 45 T. Jack 112 T.	Cyl. 40 T. Jack 112 T.
16	6.06	7.04	8.44	9.85	10.94	12.31
17	5.71	6.62	7.94	9.27	10.30	11.59
18	5.39	6.25	7.50	8.76	9.73	10.94
19	5.10	5.92	7.11	8.29	9.22	10.37
20	4.85	5.63	6.75	7.88	8.75	9.85
21	4.62	5.36	6.43	7.50	8.34	9.38
22	4.41	5.12	6.14	7.16	7.96	8.95
23	4.22	4.89	5.87	6.85	7.61	8.56
24	4.04	4.69	5.63	6.57	7.30	8.21
25	3.88	4.50	5.40	6.30	7.00	7.88
26	3.73	4.33	5.20	6.06	6.73	7.58
27	3.59	4.17	5.00	5.83	6.48	7.30
28	3.46	4.02	4.82	5.63	6.25	7.04
29	3.34	3.88	4.66	5.43	6.04	6.79
30	3.23	3.75	4.50	5.25	5.84	6.57
31	3.13	3.63	4.36	5.08	5.65	6.35
32	3.03	3.52	4.22	4.93	5.47	6.16
33	2.94	3.41	4.09	4.78	5.31	5.97
34	2.86	3.31	3.97	4.64	5.15	5.80
35	2.77	3.22	3.86	4.50	5.00	5.63
36	2.69	3.13	3.75	4.38	4.86	5.47
37	2.62	3.04	3.65	4.26	4.73	5.32
38	2.55	2.96	3.56	4.15	4.61	5.19
39	2.48	2.89	3.46	4.04	4.49	5.05
40	2.42	2.82	3.38	3.94	4.38	4.93
41	2.37	2.75	3.29	3.84	4.27	4.80
42	2.31	2.68	3.22	3.75	4.17	4.69
43	2.26	2.62	3.14	3.66	4.07	4.58
44	2.20	2.56	3.07	3.58	3.98	4.48
45	2.16	2.50	3.00	3.50	3.89	4.38
46	2.11	2.45	2.94	3.43	3.81	4.28
47	2.06	2.39	2.87	3.35	3.73	4.19
48	2.02	2.35	2.82	3.28	3.65	4.11
49	1.98	2.30	2.76	3.22	3.57	4.02
50	1.94	2.25	2.70	3.15	3.50	3.94
51	1.90	2.21	2.65	3.09	3.43	3.86
52	1.87	2.17	2.60	3.03	3.37	3.79
53	1.83	2.12	2.55	2.97	3.30	3.72
54	1.80	2.09	2.50	2.92	3.24	3.65
55	1.76	2.05	2.46	2.87	3.18	3.58
56	1.73	2.01	2.41	2.82	3.13	3.52
57	1.70	1.98	2.37	2.76	3.07	3.46
58	1.67	1.94	2.33	2.72	3.02	3.40
59	1.64	1.91	2.29	2.67	2.97	3.34
60	1.62	1.88	2.25	2.63	2.92	3.29
Constants	96.99	112.56	135.07	157.59	175.09	196.98

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE—(Continued)

42" TWISTERS

CYLINDER 7 INCHES DIAM. WHIRL 2½ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 2.96

FRONT ROLL 1½ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 40 T. Jack 120 T.	Cyl. 36 T. Jack 120 T.	Cyl. 30 T. Jack 120 T.	Cyl. 30 T. Jack 132 T.	Cyl. 27 T. Jack 132 T.	Cyl. 24 T. Jack 132 T.
16	13.19	14.66	17.59	19.35	21.50	24.18
17	12.41	13.79	16.55	18.21	20.23	22.76
18	11.73	13.03	15.63	17.20	19.11	21.50
19	11.11	12.34	14.81	16.29	18.10	20.36
20	10.55	11.73	14.07	15.48	17.20	19.35
21	10.05	11.17	13.40	14.74	16.38	18.43
22	9.59	10.66	12.79	14.07	15.63	17.59
23	9.18	10.20	12.23	13.46	14.95	16.82
24	8.79	9.77	11.73	12.90	14.33	16.12
25	8.44	9.38	11.26	12.38	13.76	15.48
26	8.12	9.02	10.82	11.91	13.23	14.88
27	7.82	8.69	10.42	11.47	12.74	14.33
28	7.54	8.38	10.05	11.06	12.28	13.82
29	7.28	8.09	9.70	10.67	11.86	13.34
30	7.04	7.82	9.38	10.32	11.46	12.90
31	6.81	7.56	9.08	9.99	11.09	12.48
32	6.60	7.33	8.80	9.67	10.75	12.09
33	6.40	7.11	8.53	9.38	10.42	11.73
34	6.21	6.90	8.28	9.11	10.12	11.38
35	6.03	6.70	8.04	8.84	9.83	11.06
36	5.87	6.52	7.82	8.60	9.56	10.75
37	5.70	6.34	7.61	8.37	9.30	10.45
38	5.55	6.17	7.41	8.15	9.05	10.18
39	5.41	6.01	7.22	7.94	8.82	9.92
40	5.28	5.87	7.04	7.74	8.60	9.68
41	5.15	5.72	6.86	7.55	8.39	9.44
42	5.03	5.59	6.70	7.37	8.19	9.22
43	4.91	5.45	6.54	7.20	8.00	9.00
44	4.80	5.33	6.40	7.04	7.82	8.80
45	4.69	5.21	6.25	6.88	7.64	8.60
46	4.59	5.10	6.12	6.73	7.48	8.41
47	4.49	4.99	5.99	6.59	7.32	8.23
48	4.40	4.89	5.87	6.45	7.17	8.06
49	4.31	4.79	5.74	6.32	7.02	7.90
50	4.22	4.69	5.63	6.19	6.88	7.74
51	4.14	4.60	5.52	6.07	6.74	7.59
52	4.06	4.51	5.41	5.96	6.62	7.44
53	3.98	4.42	5.31	5.84	6.49	7.30
54	3.91	4.34	5.21	5.74	6.37	7.17
55	3.84	4.26	5.12	5.63	6.25	7.04
56	3.77	4.19	5.03	5.53	6.14	6.91
57	3.70	4.11	4.94	5.43	6.03	6.79
58	3.64	4.04	4.85	5.34	5.93	6.67
59	3.58	3.97	4.77	5.25	5.83	6.56
60	3.52	3.91	4.69	5.16	5.73	6.45
Constants	211.05	234.50	281.40	309.56	343.94	386.93

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE

42" TWISTERS

CYLINDER 7 INCHES DIAM. WHIRL 2½ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 2.64

FRONT ROLL 1½ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 70 T.	Cyl. 60 T.	Cyl. 50 T.	Cyl. 50 T.	Cyl. 45 T.	Cyl. 40 T.
	Jack 96 T.	Jack 96 T.	Jack 96 T.	Jack 112 T.	Jack 112 T.	Jack 112 T.
16	5.38	6.27	7.53	8.78	9.76	10.98
17	5.06	5.91	7.09	8.27	9.19	10.33
18	4.78	5.58	6.69	7.81	8.68	9.76
19	4.52	5.28	6.34	7.40	8.22	9.25
20	4.30	5.02	6.02	7.03	7.81	8.78
21	4.10	4.78	5.74	6.69	7.44	8.37
22	3.91	4.56	5.48	6.39	7.10	7.99
23	3.74	4.36	5.24	6.11	6.79	7.64
24	3.59	4.18	5.02	5.86	6.51	7.32
25	3.44	4.02	4.81	5.62	6.25	7.03
26	3.31	3.86	4.63	5.41	6.01	6.76
27	3.19	3.72	4.46	5.21	5.78	6.51
28	3.07	3.58	4.30	5.02	5.58	6.27
29	2.97	3.46	4.15	4.85	5.39	6.06
30	2.87	3.35	4.02	4.69	5.21	5.86
31	2.78	3.24	3.89	4.53	5.04	5.67
32	2.69	3.14	3.76	4.39	4.88	5.49
33	2.61	3.04	3.65	4.26	4.73	5.32
34	2.53	2.95	3.54	4.13	4.59	5.17
35	2.46	2.87	3.44	4.02	4.46	5.02
36	2.39	2.79	3.35	3.90	4.34	4.88
37	2.33	2.71	3.26	3.80	4.22	4.75
38	2.26	2.64	3.17	3.70	4.11	4.62
39	2.21	2.57	3.09	3.60	4.00	4.50
40	2.15	2.51	3.01	3.51	3.90	4.39
41	2.10	2.45	2.94	3.43	3.81	4.29
42	2.05	2.39	2.87	3.35	3.72	4.18
43	2.01	2.33	2.80	3.27	3.63	4.09
44	1.96	2.28	2.74	3.19	3.55	3.99
45	1.91	2.23	2.68	3.12	3.47	3.90
46	1.87	2.18	2.62	3.06	3.40	3.82
47	1.83	2.14	2.56	2.99	3.32	3.74
48	1.79	2.09	2.51	2.93	3.25	3.66
49	1.76	2.05	2.46	2.87	3.19	3.59
50	1.72	2.01	2.41	2.81	3.12	3.51
51	1.69	1.97	2.36	2.76	3.06	3.44
52	1.65	1.93	2.32	2.70	3.00	3.38
53	1.62	1.89	2.27	2.65	2.95	3.32
54	1.59	1.86	2.23	2.60	2.89	3.25
55	1.56	1.83	2.19	2.56	2.84	3.19
56	1.54	1.79	2.15	2.51	2.79	3.14
57	1.51	1.76	2.11	2.47	2.74	3.08
58	1.48	1.73	2.08	2.42	2.69	3.03
59	1.46	1.70	2.04	2.38	2.65	2.98
60	1.43	1.67	2.01	2.34	2.60	2.93
Constants	86.05	100.39	120.47	140.55	156.17	175.69

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE—(Continued)

42" TWISTERS

CYLINDER 7 INCHES DIAM. WHIRL 2½ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 2.64

FRONT ROLL 1½ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 40 T. Jack 120 T.	Cyl. 36 T. Jack 120 T.	Cyl. 30 T. Jack 120 T.	Cyl. 30 T. Jack 132 T.	Cyl. 27 T. Jack 132 T.	Cyl. 24 T. Jack 132 T.
16	11.77	13.07	15.69	17.26	19.17	21.57
17	11.07	12.30	14.76	16.24	18.04	20.30
18	10.46	11.62	13.94	15.34	17.04	19.17
19	9.91	11.01	13.21	14.53	16.14	18.16
20	9.41	10.46	12.55	13.80	15.34	17.26
21	8.96	9.96	11.95	13.15	14.61	16.43
22	8.56	9.51	11.41	12.55	13.94	15.69
23	8.18	9.09	10.91	12.00	13.34	15.00
24	7.84	8.71	10.46	11.50	12.78	14.38
25	7.53	8.37	10.04	11.04	12.27	13.80
26	7.24	8.04	9.65	10.62	11.80	13.27
27	6.97	7.75	9.30	10.23	11.36	12.78
28	6.72	7.47	8.96	9.86	10.96	12.33
29	6.49	7.21	8.65	9.52	10.58	11.90
30	6.27	6.97	8.37	9.20	10.23	11.50
31	6.07	6.75	8.10	8.91	9.90	11.13
32	5.88	6.54	7.84	8.63	9.59	10.78
33	5.70	6.34	7.61	8.37	9.30	10.46
34	5.54	6.15	7.38	8.12	9.02	10.15
35	5.38	5.98	7.17	7.89	8.76	9.86
36	5.23	5.81	6.97	7.67	8.52	9.58
37	5.09	5.65	6.78	7.46	8.29	9.33
38	4.95	5.50	6.60	7.27	8.07	9.08
39	4.83	5.36	6.44	7.08	7.87	8.85
40	4.71	5.23	6.27	6.90	7.67	8.63
41	4.59	5.10	6.12	6.73	7.48	8.42
42	4.48	4.98	5.98	6.57	7.30	8.22
43	4.38	4.86	5.84	6.42	7.13	8.03
44	4.28	4.75	5.70	6.27	6.97	7.84
45	4.18	4.65	5.58	6.14	6.82	7.67
46	4.09	4.55	5.46	6.00	6.67	7.50
47	4.01	4.45	5.34	5.87	6.53	7.34
48	3.92	4.36	5.23	5.75	6.39	7.19
49	3.84	4.27	5.12	5.63	6.26	7.04
50	3.76	4.18	5.02	5.52	6.14	6.90
51	3.69	4.10	4.92	5.41	6.01	6.76
52	3.62	4.02	4.83	5.31	5.90	6.64
53	3.55	3.95	4.74	5.21	5.79	6.51
54	3.48	3.87	4.65	5.11	5.68	6.39
55	3.42	3.80	4.56	5.02	5.58	6.27
56	3.36	3.73	4.48	4.93	5.48	6.16
57	3.30	3.67	4.40	4.84	5.38	6.05
58	3.25	3.61	4.33	4.76	5.29	5.95
59	3.19	3.54	4.25	4.68	5.20	5.85
60	3.14	3.48	4.18	4.60	5.11	5.75
Constants	188.24	209.15	250.98	276.08	306.75	345.10

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE

42" TWISTERS

CYLINDER 8 INCHES DIAM. WHIRL 1½ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 4.95

FRONT ROLL 1½ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 70 T.	Cyl. 60 T.	Cyl. 50 T.	Cyl. 50 T.	Cyl. 45 T.	Cyl. 40 T.
	Jack 96 T.	Jack 96 T.	Jack 96 T.	Jack 112 T.	Jack 112 T.	Jack 112 T.
16	10.08	11.77	14.12	16.47	18.30	20.59
17	9.49	11.07	13.29	15.50	17.22	19.38
18	8.96	10.46	12.55	14.64	16.27	18.30
19	8.49	9.91	11.89	13.87	15.41	17.34
20	8.07	9.41	11.29	13.18	14.64	16.47
21	7.68	8.96	10.76	12.55	13.94	15.69
22	7.33	8.56	10.27	11.98	13.31	14.97
23	7.01	8.18	9.82	11.46	12.73	14.32
24	6.72	7.84	9.41	10.98	12.20	13.73
25	6.45	7.53	9.04	10.54	11.71	13.18
26	6.21	7.24	8.69	10.14	11.26	12.67
27	5.98	6.97	8.37	9.76	10.84	12.20
28	5.76	6.72	8.07	9.41	10.46	11.76
29	5.56	6.49	7.79	9.09	10.10	11.36
30	5.38	6.27	7.53	8.78	9.76	10.98
31	5.20	6.07	7.29	8.50	9.45	10.63
32	5.04	5.88	7.06	8.24	9.15	10.29
33	4.89	5.70	6.84	7.99	8.87	9.98
34	4.75	5.54	6.64	7.75	8.61	9.69
35	4.61	5.38	6.45	7.53	8.37	9.41
36	4.48	5.23	6.27	7.32	8.13	9.15
37	4.36	5.09	6.10	7.12	7.91	8.90
38	4.25	4.96	5.94	6.94	7.71	8.67
39	4.14	4.83	5.79	6.76	7.51	8.45
40	4.03	4.71	5.65	6.59	7.32	8.24
41	3.94	4.59	5.51	6.43	7.14	8.03
42	3.84	4.48	5.38	6.28	6.97	7.84
43	3.75	4.38	5.25	6.13	6.81	7.66
44	3.67	4.28	5.13	5.99	6.65	7.49
45	3.59	4.18	5.02	5.86	6.51	7.32
46	3.51	4.09	4.91	5.73	6.37	7.16
47	3.43	4.00	4.81	5.61	6.23	7.01
48	3.36	3.92	4.71	5.49	6.10	6.87
49	3.29	3.84	4.61	5.38	5.98	6.72
50	3.23	3.76	4.52	5.27	5.86	6.59
51	3.16	3.69	4.43	5.17	5.74	6.46
52	3.10	3.62	4.35	5.07	5.63	6.34
53	3.04	3.55	4.26	4.97	5.52	6.22
54	2.99	3.49	4.18	4.88	5.42	6.10
55	2.93	3.42	4.11	4.79	5.32	5.99
56	2.88	3.36	4.04	4.71	5.23	5.88
57	2.83	3.30	3.96	4.62	5.14	5.78
58	2.78	3.25	3.89	4.55	5.05	5.68
59	2.73	3.19	3.83	4.47	4.96	5.58
60	2.69	3.14	3.76	4.39	4.88	5.49
Constants	161.34	188.24	225.88	263.53	292.81	329.41

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE —(Continued)

42" TWISTERS

CYLINDER 8 INCHES DIAM. WHIRL 1½ INCHES DIAM.
 RATIO OF CYLINDER TO WHIRL 1 TO 4.95

FRONT ROLL 1½ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 40 T. Jack 120 T.	Cyl. 36 T. Jack 120 T.	Cyl. 30 T. Jack 120 T.	Cyl. 30 T. Jack 132 T.	Cyl. 27 T. Jack 132 T.	Cyl. 24 T. Jack 132 T.
16	22.06	24.51	29.41	32.35	35.95	40.44
17	20.76	23.07	27.68	30.45	33.83	38.06
18	19.61	21.79	26.14	28.76	31.95	35.95
19	18.58	20.64	24.77	27.24	30.27	34.06
20	17.65	19.61	23.53	25.88	28.76	32.35
21	16.81	18.67	22.41	24.65	27.39	30.81
22	16.04	17.83	21.39	23.53	26.14	29.41
23	15.35	17.05	20.46	22.51	25.01	28.13
24	14.71	16.34	19.61	21.57	23.97	26.96
25	14.12	15.69	18.82	20.71	23.01	25.88
26	13.57	15.08	18.10	19.91	22.12	24.89
27	13.07	14.52	17.43	19.17	21.30	23.97
28	12.61	14.01	16.81	18.49	20.54	23.11
29	12.17	13.52	16.23	17.85	19.83	22.31
30	11.76	13.07	15.69	17.26	19.17	21.57
31	11.39	12.65	15.18	16.70	18.55	20.87
32	11.03	12.25	14.71	16.18	17.97	20.22
33	10.70	11.88	14.26	15.69	17.43	19.61
34	10.38	11.53	13.84	15.23	16.92	19.03
35	10.08	11.20	13.45	14.79	16.43	18.49
36	9.80	10.89	13.07	14.38	15.98	17.98
37	9.54	10.60	12.72	13.99	15.54	17.49
38	9.29	10.32	12.39	13.62	15.14	17.03
39	9.05	10.06	12.07	13.27	14.75	16.59
40	8.82	9.80	11.76	12.94	14.38	16.18
41	8.61	9.56	11.48	12.63	14.03	15.78
42	8.40	9.34	11.21	12.33	13.70	15.41
43	8.21	9.12	10.94	12.04	13.38	15.06
44	8.02	8.91	10.70	11.76	13.07	14.71
45	7.84	8.71	10.46	11.50	12.78	14.38
46	7.67	8.52	10.23	11.25	12.51	14.07
47	7.51	8.34	10.01	11.01	12.24	13.77
48	7.35	8.17	9.81	10.78	11.99	13.48
49	7.20	8.00	9.60	10.56	11.74	13.21
50	7.06	7.84	9.41	10.35	11.50	12.94
51	6.92	7.69	9.23	10.15	11.28	12.69
52	6.79	7.54	9.05	9.96	11.06	12.45
53	6.66	7.40	8.88	9.77	10.85	12.21
54	6.54	7.26	8.71	9.59	10.65	11.98
55	6.42	7.13	8.56	9.41	10.46	11.76
56	6.30	7.00	8.41	9.24	10.27	11.55
57	6.19	6.88	8.26	9.08	10.09	11.35
58	6.09	6.76	8.12	8.93	9.92	11.16
59	5.98	6.65	7.98	8.77	9.75	10.97
60	5.88	6.54	7.84	8.63	9.59	10.78
Constants	352.94	392.16	470.59	517.65	575.16	647.06

TWIST GEARING TABLE

42" TWISTERS

CYLINDER 8 INCHES DIAM. WHIRL $1\frac{5}{8}$ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 4.60

FRONT ROLL $1\frac{1}{2}$ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 70 T. Jack 96 T.	Cyl. 60 T. Jack 96 T.	Cyl. 50 T. Jack 96 T.	Cyl. 50 T. Jack 112 T.	Cyl. 45 T. Jack 112 T.	Cyl. 40 T. Jack 112 T.
16	9.37	10.93	13.12	15.31	17.01	19.13
17	8.82	10.29	12.35	14.41	16.01	18.01
18	8.33	9.72	11.66	13.61	15.12	17.01
19	7.89	9.21	11.05	12.89	14.32	16.11
20	7.50	8.75	10.50	12.25	13.61	15.31
21	7.14	8.33	10.00	11.66	12.96	14.58
22	6.82	7.95	9.54	11.13	12.37	13.91
23	6.52	7.61	9.13	10.65	11.83	13.31
24	6.25	7.29	8.75	10.20	11.34	12.76
25	6.00	7.00	8.40	9.80	10.88	12.24
26	5.77	6.73	8.07	9.42	10.47	11.77
27	5.55	6.48	7.77	9.07	10.08	11.34
28	5.35	6.25	7.50	8.75	9.72	10.93
29	5.17	6.03	7.24	8.44	9.38	10.56
30	5.00	5.83	7.00	8.16	9.07	10.20
31	4.84	5.64	6.77	7.90	8.78	9.87
32	4.69	5.47	6.56	7.65	8.50	9.57
33	4.54	5.30	6.36	7.42	8.25	9.28
34	4.41	5.15	6.17	7.20	8.00	9.00
35	4.28	5.00	6.00	7.00	7.77	8.75
36	4.17	4.86	5.83	6.81	7.56	8.50
37	4.05	4.73	5.67	6.62	7.35	8.27
38	3.95	4.61	5.52	6.45	7.16	8.06
39	3.84	4.49	5.38	6.28	6.98	7.85
40	3.75	4.37	5.25	6.12	6.80	7.65
41	3.66	4.27	5.12	5.97	6.64	7.47
42	3.57	4.16	5.00	5.83	6.48	7.29
43	3.49	4.07	4.88	5.70	6.33	7.12
44	3.41	3.98	4.77	5.57	6.18	6.96
45	3.33	3.89	4.66	5.44	6.05	6.80
46	3.26	3.81	4.56	5.32	5.92	6.65
47	3.19	3.72	4.47	5.21	5.79	6.51
48	3.12	3.64	4.37	5.10	5.67	6.38
49	3.06	3.57	4.28	5.00	5.55	6.25
50	3.00	3.50	4.20	4.90	5.44	6.12
51	2.94	3.43	4.12	4.80	5.34	6.00
52	2.88	3.37	4.04	4.71	5.23	5.89
53	2.83	3.30	3.96	4.62	5.13	5.78
54	2.78	3.24	3.89	4.54	5.04	5.67
55	2.73	3.18	3.82	4.45	4.95	5.57
56	2.68	3.13	3.75	4.37	4.86	5.47
57	2.63	3.07	3.68	4.30	4.77	5.37
58	2.59	3.02	3.62	4.22	4.69	5.28
59	2.54	2.96	3.56	4.15	4.61	5.19
60	2.50	2.92	3.50	4.08	4.54	5.10
Constants	149.94	174.93	209.91	244.90	272.11	306.12

TWIST GEARING TABLE —(Continued)

42" TWISTERS

CYLINDER 8 INCHES DIAM. WHIRL 1 $\frac{5}{8}$ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 4.60

FRONT ROLL 1 $\frac{1}{2}$ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 40 T.	Cyl. 36 T.	Cyl. 30 T.	Cyl. 30 T.	Cyl. 27 T.	Cyl. 24 T.
	Jack 120 T.	Jack 120 T.	Jack 120 T.	Jack 132 T.	Jack 132 T.	Jack 132 T.
16	20.50	22.78	27.33	30.07	33.41	37.58
17	19.29	21.44	25.72	28.30	31.44	35.37
18	18.22	20.25	24.30	26.73	29.69	33.41
19	17.26	19.18	23.02	25.32	28.13	31.65
20	16.40	18.22	21.87	24.05	26.73	30.07
21	15.62	17.35	20.82	22.91	25.45	28.63
22	14.91	16.57	19.88	21.87	24.30	27.33
23	14.26	15.84	19.01	20.92	23.24	26.14
24	13.67	15.18	18.22	20.04	22.27	25.05
25	13.12	14.58	17.49	19.24	21.38	24.05
26	12.62	14.02	16.82	18.50	20.56	23.13
27	12.15	13.50	16.20	17.82	19.80	22.27
28	11.71	13.02	15.62	17.18	19.09	21.48
29	11.31	12.57	15.08	16.59	18.43	20.73
30	10.93	12.15	14.58	16.04	17.82	20.04
31	10.58	11.76	14.11	15.52	17.24	19.40
32	10.25	11.39	13.67	15.03	16.70	18.79
33	9.94	11.04	13.25	14.58	16.20	18.22
34	9.65	10.72	12.86	14.15	15.72	17.69
35	9.37	10.41	12.49	13.74	15.27	17.18
36	9.11	10.13	12.15	13.36	14.85	16.70
37	8.86	9.85	11.82	13.00	14.45	16.25
38	8.63	9.59	11.51	12.66	14.07	15.83
39	8.41	9.34	11.21	12.33	13.71	15.42
40	8.20	9.11	10.93	12.03	13.36	15.03
41	8.00	8.89	10.67	11.73	13.04	14.67
42	7.81	8.68	10.41	11.46	12.73	14.32
43	7.63	8.48	10.17	11.19	12.43	13.98
44	7.45	8.28	9.94	10.93	12.15	13.67
45	7.29	8.10	9.72	10.69	11.88	13.36
46	7.13	7.92	9.51	10.46	11.62	13.07
47	6.98	7.75	9.30	10.24	11.37	12.79
48	6.83	7.59	9.11	10.02	11.14	12.53
49	6.69	7.44	8.92	9.82	10.91	12.27
50	6.56	7.29	8.75	9.62	10.69	12.03
51	6.43	7.15	8.57	9.43	10.48	11.79
52	6.31	7.01	8.41	9.25	10.28	11.57
53	6.19	6.88	8.25	9.08	10.08	11.35
54	6.07	6.75	8.10	8.91	9.90	11.14
55	5.96	6.63	7.95	8.75	9.72	10.93
56	5.86	6.51	7.81	8.59	9.55	10.74
57	5.75	6.39	7.67	8.44	9.38	10.55
58	5.66	6.29	7.54	8.29	9.22	10.37
59	5.56	6.18	7.41	8.15	9.06	10.19
60	5.47	6.07	7.29	8.02	8.91	10.02
Constants	327.99	364.43	437.31	481.05	534.50	601.31

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE

42" TWISTERS

CYLINDER 8 INCHES DIAM. WHIRL $1\frac{3}{4}$ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 4.29

FRONT ROLL $1\frac{1}{2}$ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 70 T. Jack 96 T.	Cyl. 60 T. Jack 96 T.	Cyl. 50 T. Jack 96 T.	Cyl. 50 T. Jack 112 T.	Cyl. 45 T. Jack 112 T.	Cyl. 40 T. Jack 112 T.
16	8.74	10.20	12.24	14.27	15.86	17.84
17	8.23	9.60	11.52	13.43	14.93	16.79
18	7.77	9.06	10.88	12.69	14.10	15.86
19	7.36	8.59	10.30	12.02	13.36	15.03
20	6.99	8.16	9.79	11.42	12.69	14.27
21	6.66	7.77	9.32	10.88	12.08	13.59
22	6.36	7.42	8.90	10.38	11.54	12.98
23	6.08	7.09	8.51	9.93	11.03	12.41
24	5.83	6.80	8.16	9.52	10.57	11.90
25	5.59	6.53	7.83	9.14	10.15	11.42
26	5.38	6.27	7.53	8.78	9.76	10.98
27	5.18	6.04	7.25	8.46	9.40	10.57
28	4.99	5.83	6.99	8.16	9.06	10.20
29	4.82	5.63	6.75	7.88	8.75	9.84
30	4.66	5.44	6.53	7.61	8.46	9.52
31	4.51	5.26	6.31	7.37	8.19	9.21
32	4.37	5.10	6.12	7.14	7.93	8.92
33	4.24	4.94	5.93	6.92	7.69	8.65
34	4.11	4.80	5.76	6.72	7.46	8.40
35	4.00	4.66	5.59	6.53	7.25	8.16
36	3.88	4.53	5.44	6.35	7.05	7.93
37	3.78	4.41	5.29	6.17	6.86	7.72
38	3.68	4.29	5.15	6.01	6.68	7.52
39	3.59	4.18	5.02	5.86	6.51	7.32
40	3.50	4.08	4.89	5.71	6.34	7.14
41	3.41	3.98	4.78	5.57	6.19	6.96
42	3.33	3.89	4.66	5.44	6.04	6.80
43	3.25	3.80	4.55	5.31	5.90	6.64
44	3.18	3.71	4.45	5.19	5.77	6.49
45	3.11	3.63	4.35	5.08	5.64	6.34
46	3.04	3.55	4.26	4.97	5.52	6.21
47	2.98	3.47	4.17	4.86	5.40	6.07
48	2.91	3.40	4.08	4.76	5.29	5.95
49	2.85	3.33	4.00	4.66	5.18	5.83
50	2.80	3.26	3.92	4.57	5.08	5.71
51	2.74	3.20	3.84	4.48	4.98	5.60
52	2.69	3.14	3.76	4.39	4.88	5.49
53	2.64	3.08	3.69	4.31	4.79	5.39
54	2.59	3.02	3.63	4.23	4.70	5.29
55	2.54	2.97	3.56	4.15	4.61	5.19
56	2.50	2.92	3.50	4.08	4.53	5.10
57	2.45	2.86	3.43	4.01	4.45	5.01
58	2.41	2.81	3.38	3.94	4.38	4.92
59	2.37	2.77	3.32	3.87	4.30	4.84
60	2.33	2.72	3.26	3.81	4.23	4.76
Constants	139.83	163.14	195.76	228.39	253.77	285.49

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE—(Continued)

42" TWISTERS

CYLINDER 8 INCHES DIAM. WHIRL 1 $\frac{3}{4}$ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 4.29

FRONT ROLL 1 $\frac{1}{2}$ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 40 T. Jack 120 T.	Cyl. 36 T. Jack 120 T.	Cyl. 30 T. Jack 120 T.	Cyl. 30 T. Jack 132 T.	Cyl. 27 T. Jack 132 T.	Cyl. 24 T. Jack 132 T.
16	19.12	21.24	25.49	28.04	31.15	35.05
17	17.99	19.99	23.99	26.39	29.32	32.99
18	16.99	18.88	22.66	24.92	27.69	31.15
19	16.10	17.89	21.47	23.61	26.24	29.51
20	15.29	16.99	20.39	22.43	24.92	28.04
21	14.57	16.18	19.42	21.36	23.74	26.70
22	13.90	15.45	18.54	20.39	22.66	25.49
23	13.30	14.78	17.73	19.51	21.67	24.38
24	12.75	14.16	16.99	18.69	20.77	23.37
25	12.24	13.59	16.31	17.95	19.94	22.43
26	11.76	13.07	15.69	17.26	19.17	21.57
27	11.33	12.59	15.11	16.62	18.46	20.77
28	10.92	12.14	14.57	16.02	17.80	20.03
29	10.55	11.72	14.06	15.47	17.19	19.34
30	10.20	11.33	13.59	14.95	16.62	18.69
31	9.87	10.96	13.16	14.47	16.08	18.09
32	9.56	10.62	12.75	14.02	15.58	17.52
33	9.27	10.30	12.36	13.60	15.11	16.99
34	9.00	10.00	12.00	13.20	14.66	16.49
35	8.74	9.71	11.65	12.82	14.24	16.02
36	8.50	9.44	11.33	12.46	13.85	15.58
37	8.27	9.19	11.02	12.12	13.47	15.16
38	8.05	8.94	10.73	11.81	13.12	14.76
39	7.84	8.71	10.46	11.50	12.78	14.38
40	7.65	8.50	10.20	11.22	12.46	14.02
41	7.46	8.29	9.95	10.94	12.16	13.68
42	7.28	8.09	9.71	10.68	11.87	13.35
43	7.11	7.90	9.48	10.43	11.60	13.04
44	6.95	7.72	9.27	10.20	11.33	12.75
45	6.80	7.55	9.06	9.97	11.08	12.46
46	6.65	7.39	8.87	9.76	10.84	12.19
47	6.51	7.23	8.68	9.55	10.61	11.93
48	6.37	7.08	8.50	9.35	10.39	11.68
49	6.24	6.94	8.32	9.16	10.17	11.44
50	6.12	6.80	8.16	8.97	9.97	11.22
51	6.00	6.66	8.00	8.80	9.77	11.00
52	5.88	6.54	7.85	8.63	9.59	10.79
53	5.77	6.41	7.70	8.46	9.41	10.58
54	5.66	6.29	7.55	8.31	9.23	10.39
55	5.56	6.18	7.42	8.16	9.06	10.20
56	5.46	6.07	7.29	8.01	8.90	10.02
57	5.37	5.96	7.16	7.87	8.75	9.84
58	5.27	5.86	7.03	7.74	8.60	9.67
59	5.18	5.76	6.91	7.60	8.45	9.50
60	5.10	5.66	6.80	7.48	8.31	9.35
Constants	305.88	339.87	407.84	448.63	498.47	560.78

TWIST GEARING TABLE

42" TWISTERS

CYLINDER 8 INCHES DIAM. WHIRL 2 INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 3.81

FRONT ROLL 1½ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 70 T. Jack 96 T.	Cyl. 60 T. Jack 96 T.	Cyl. 50 T. Jack 96 T.	Cyl. 50 T. Jack 112 T.	Cyl. 45 T. Jack 112 T.	Cyl. 40 T. Jack 112 T.
16	7.76	9.06	10.87	12.68	14.09	15.85
17	7.31	8.52	10.23	11.93	13.26	14.91
18	6.90	8.05	9.66	11.27	12.52	14.09
19	6.54	7.63	9.15	10.68	11.86	13.34
20	6.21	7.24	8.69	10.14	11.27	12.68
21	5.91	6.90	8.28	9.66	10.73	12.07
22	5.65	6.59	7.90	9.22	10.24	11.52
23	5.40	6.30	7.56	8.82	9.80	11.02
24	5.17	6.04	7.24	8.45	9.39	10.56
25	4.97	5.80	6.95	8.11	9.02	10.14
26	4.78	5.57	6.69	7.80	8.67	9.75
27	4.60	5.37	6.44	7.51	8.35	9.39
28	4.44	5.17	6.21	7.24	8.05	9.06
29	4.28	5.00	6.00	6.99	7.77	8.74
30	4.14	4.83	5.80	6.76	7.51	8.45
31	4.01	4.67	5.61	6.54	7.27	8.18
32	3.88	4.53	5.43	6.34	7.04	7.92
33	3.76	4.39	5.27	6.15	6.83	7.68
34	3.65	4.26	5.11	5.97	6.63	7.46
35	3.55	4.14	4.97	5.80	6.44	7.24
36	3.45	4.03	4.83	5.64	6.26	7.04
37	3.36	3.92	4.70	5.48	6.09	6.85
38	3.27	3.81	4.58	5.34	5.93	6.67
39	3.18	3.71	4.46	5.20	5.78	6.50
40	3.10	3.62	4.35	5.07	5.63	6.34
41	3.03	3.53	4.24	4.95	5.50	6.19
42	2.96	3.45	4.14	4.83	5.37	6.04
43	2.89	3.37	4.04	4.72	5.24	5.90
44	2.82	3.29	3.95	4.61	5.12	5.76
45	2.76	3.22	3.86	4.51	5.01	5.63
46	2.70	3.15	3.78	4.41	4.90	5.51
47	2.64	3.08	3.70	4.32	4.80	5.39
48	2.59	3.02	3.62	4.23	4.70	5.28
49	2.53	2.96	3.55	4.14	4.60	5.17
50	2.48	2.90	3.48	4.06	4.51	5.07
51	2.44	2.84	3.41	3.98	4.42	4.97
52	2.39	2.79	3.34	3.90	4.33	4.88
53	2.34	2.73	3.28	3.83	4.25	4.79
54	2.30	2.68	3.22	3.76	4.17	4.70
55	2.26	2.63	3.16	3.69	4.10	4.61
56	2.22	2.59	3.10	3.62	4.02	4.53
57	2.18	2.54	3.05	3.56	3.95	4.45
58	2.14	2.50	3.00	3.50	3.89	4.37
59	2.10	2.46	2.95	3.44	3.82	4.30
60	2.07	2.41	2.90	3.38	3.76	4.23
Constants	124.19	144.88	173.86	202.84	225.38	253.53

TWIST GEARING TABLE —(Continued)

42" TWISTERS

CYLINDER 8 INCHES DIAM. WHIRL 2 INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 3.81

FRONT ROLL $1\frac{1}{2}$ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

TWIST PER INCH

Change Gears	TWIST PER INCH					
	Cyl. 40 T. Jack 120 T.	Cyl. 36 T. Jack 120 T.	Cyl. 30 T. Jack 120 T.	Cyl. 30 T. Jack 132 T.	Cyl. 27 T. Jack 132 T.	Cyl. 24 T. Jack 132 T.
16	16.98	18.87	22.64	24.90	27.67	31.13
17	15.98	17.76	21.31	23.44	26.04	29.30
18	15.09	16.77	20.12	22.14	24.59	27.67
19	14.30	15.89	19.06	20.97	23.30	26.21
20	13.58	15.09	18.11	19.92	22.14	24.90
21	12.94	14.37	17.25	18.97	21.08	23.72
22	12.35	13.72	16.46	18.11	20.12	22.64
23	11.81	13.12	15.75	17.32	19.25	21.65
24	11.32	12.58	15.09	16.60	18.45	20.75
25	10.87	12.07	14.49	15.94	17.71	19.92
26	10.45	11.61	13.93	15.32	17.03	19.16
27	10.06	11.18	13.42	14.76	16.40	18.45
28	9.70	10.78	12.94	14.23	15.81	17.79
29	9.37	10.41	12.49	13.74	15.27	17.17
30	9.06	10.06	12.07	13.28	14.76	16.60
31	8.76	9.74	11.68	12.85	14.28	16.07
32	8.49	9.43	11.32	12.45	13.83	15.56
33	8.23	9.15	10.98	12.07	13.42	15.09
34	7.99	8.88	10.65	11.72	13.02	14.65
35	7.76	8.62	10.35	11.38	12.65	14.23
36	7.55	8.39	10.06	11.07	12.30	13.83
37	7.34	8.16	9.79	10.77	11.96	13.46
38	7.15	7.95	9.53	10.49	11.65	13.11
39	6.97	7.74	9.29	10.22	11.35	12.77
40	6.79	7.55	9.06	9.96	11.07	12.45
41	6.63	7.36	8.83	9.72	10.80	12.15
42	6.47	7.19	8.62	9.49	10.54	11.86
43	6.32	7.02	8.42	9.27	10.30	11.58
44	6.17	6.86	8.23	9.06	10.06	11.32
45	6.04	6.71	8.05	8.85	9.84	11.07
46	5.91	6.56	7.88	8.66	9.63	10.83
47	5.78	6.42	7.71	8.48	9.42	10.60
48	5.66	6.29	7.55	8.30	9.22	10.38
49	5.54	6.16	7.39	8.13	9.03	10.16
50	5.43	6.04	7.24	7.97	8.85	9.96
51	5.33	5.92	7.10	7.81	8.68	9.77
52	5.22	5.81	6.96	7.66	8.51	9.58
53	5.13	5.70	6.83	7.52	8.35	9.40
54	5.03	5.59	6.71	7.38	8.20	9.22
55	4.94	5.49	6.59	7.24	8.05	9.06
56	4.85	5.39	6.47	7.11	7.91	8.90
57	4.77	5.30	6.35	6.99	7.77	8.74
58	4.68	5.21	6.25	6.87	7.63	8.59
59	4.60	5.12	6.14	6.75	7.50	8.44
60	4.53	5.03	6.04	6.64	7.38	8.30
Constants	271.66	301.84	362.21	398.43	442.70	498.04

TWIST GEARING TABLE

42" TWISTERS

CYLINDER 8 INCHES DIAM. WHIRL $2\frac{1}{4}$ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 3.39

FRONT ROLL $1\frac{1}{2}$ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 70 T.	Cyl. 60 T.	Cyl. 50 T.	Cyl. 50 T.	Cyl. 45 T.	Cyl. 40 T.
	Jack 96 T.	Jack 96 T.	Jack 96 T.	Jack 112 T.	Jack 112 T.	Jack 112 T.
16	6.91	8.06	9.67	11.28	12.53	14.10
17	6.50	7.58	9.10	10.62	11.80	13.27
18	6.14	7.16	8.59	10.03	11.14	12.53
19	5.82	6.78	8.14	9.50	10.55	11.87
20	5.53	6.45	7.74	9.02	10.03	11.28
21	5.26	6.14	7.37	8.59	9.55	10.74
22	5.02	5.86	7.03	8.20	9.12	10.25
23	4.80	5.60	6.73	7.85	8.72	9.81
24	4.60	5.37	6.45	7.52	8.36	9.40
25	4.42	5.16	6.19	7.22	8.02	9.02
26	4.25	4.96	5.95	6.94	7.71	8.68
27	4.09	4.77	5.73	6.68	7.43	8.36
28	3.95	4.60	5.53	6.45	7.16	8.06
29	3.81	4.45	5.33	6.22	6.91	7.78
30	3.68	4.30	5.16	6.02	6.68	7.52
31	3.56	4.16	4.99	5.82	6.47	7.28
32	3.45	4.03	4.84	5.64	6.27	7.05
33	3.34	3.91	4.69	5.47	6.08	6.84
34	3.25	3.79	4.55	5.31	5.90	6.64
35	3.16	3.68	4.42	5.16	5.73	6.45
36	3.07	3.58	4.30	5.02	5.57	6.27
37	2.99	3.48	4.18	4.88	5.42	6.10
38	2.91	3.39	4.07	4.75	5.28	5.94
39	2.83	3.31	3.97	4.63	5.14	5.78
40	2.76	3.23	3.87	4.51	5.01	5.64
41	2.70	3.14	3.77	4.40	4.89	5.50
42	2.63	3.07	3.68	4.30	4.77	5.37
43	2.57	3.00	3.60	4.20	4.66	5.25
44	2.51	2.93	3.52	4.10	4.56	5.13
45	2.46	2.86	3.44	4.01	4.46	5.01
46	2.40	2.80	3.37	3.93	4.36	4.90
47	2.35	2.74	3.29	3.84	4.27	4.80
48	2.30	2.69	3.22	3.76	4.18	4.70
49	2.26	2.63	3.16	3.68	4.09	4.60
50	2.21	2.58	3.10	3.61	4.01	4.51
51	2.17	2.53	3.03	3.54	3.93	4.42
52	2.13	2.48	2.98	3.47	3.86	4.34
53	2.08	2.43	2.92	3.41	3.78	4.26
54	2.05	2.39	2.87	3.34	3.71	4.18
55	2.01	2.34	2.81	3.28	3.65	4.10
56	1.98	2.30	2.77	3.23	3.58	4.03
57	1.94	2.26	2.72	3.17	3.52	3.96
58	1.91	2.23	2.67	3.11	3.46	3.89
59	1.87	2.19	2.62	3.06	3.40	3.82
60	1.84	2.15	2.58	3.01	3.34	3.76
Constants	110.50	128.91	154.70	180.48	200.53	225.60

TWIST GEARING TABLE —(Continued)

42" TWISTERS

CYLINDER 8 INCHES DIAM. WHIRL 2¼ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 3.39

FRONT ROLL 1½ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 40 T. Jack 120 T.	Cyl. 36 T. Jack 120 T.	Cyl. 30 T. Jack 120 T.	Cyl. 30 T. Jack 132 T.	Cyl. 27 T. Jack 132 T.	Cyl. 24 T. Jack 132 T.
16	15.11	16.79	20.14	22.16	24.62	27.70
17	14.22	15.80	18.96	20.85	23.17	26.07
18	13.43	14.92	17.91	19.70	21.88	24.62
19	12.72	14.14	16.96	18.66	20.73	23.32
20	12.09	13.43	16.11	17.73	19.70	22.16
21	11.51	12.79	15.35	16.88	18.76	21.10
22	10.99	12.21	14.65	16.11	17.90	20.14
23	10.51	11.68	14.01	15.41	17.13	19.27
24	10.07	11.19	13.43	14.77	16.41	18.46
25	9.67	10.74	12.89	14.18	15.76	17.73
26	9.30	10.33	12.40	13.64	15.15	17.04
27	8.95	9.95	11.94	13.13	14.59	16.41
28	8.63	9.59	11.51	12.66	14.07	15.83
29	8.33	9.26	11.11	12.22	13.58	15.28
30	8.06	8.95	10.74	11.82	13.13	14.77
31	7.80	8.66	10.40	11.44	12.71	14.29
32	7.56	8.40	10.07	11.08	12.31	13.85
33	7.32	8.14	9.77	10.74	11.94	13.43
34	7.11	7.90	9.48	10.43	11.59	13.04
35	6.91	7.67	9.21	10.13	11.25	12.66
36	6.72	7.46	8.95	9.85	10.94	12.31
37	6.53	7.26	8.71	9.58	10.65	11.98
38	6.36	7.07	8.48	9.33	10.37	11.66
39	6.20	6.89	8.26	9.09	10.10	11.36
40	6.05	6.72	8.06	8.87	9.85	11.08
41	5.90	6.55	7.86	8.65	9.61	10.81
42	5.76	6.40	7.68	8.44	9.38	10.55
43	5.62	6.25	7.50	8.24	9.16	10.31
44	5.49	6.10	7.33	8.06	8.95	10.07
45	5.37	5.97	7.16	7.88	8.75	9.85
46	5.25	5.84	7.01	7.71	8.56	9.64
47	5.14	5.71	6.86	7.54	8.38	9.43
48	5.04	5.60	6.72	7.39	8.21	9.23
49	4.93	5.48	6.58	7.24	8.04	9.04
50	4.84	5.37	6.45	7.09	7.88	8.87
51	4.74	5.27	6.32	6.95	7.72	8.69
52	4.65	5.17	6.20	6.82	7.58	8.52
53	4.56	5.07	6.08	6.69	7.43	8.36
54	4.48	4.98	5.97	6.57	7.29	8.21
55	4.39	4.88	5.86	6.45	7.16	8.06
56	4.32	4.80	5.76	6.33	7.04	7.92
57	4.24	4.71	5.65	6.22	6.91	7.77
58	4.17	4.63	5.56	6.11	6.79	7.64
59	4.10	4.55	5.46	6.01	6.68	7.51
60	4.03	4.48	5.37	5.91	6.57	7.39
Constants	241.71	268.57	322.29	354.51	393.90	443.14

TWIST GEARING TABLE

42" TWISTERS

CYLINDER 8 INCHES DIAM. WHIRL 2½ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 3.02

FRONT ROLL 1½ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 70 T.	Cyl. 60 T.	Cyl. 50 T.	Cyl. 50 T.	Cyl. 45 T.	Cyl. 40 T.
	Jack 96 T.	Jack 96 T.	Jack 96 T.	Jack 112 T.	Jack 112 T.	Jack 112 T.
16	6.15	7.18	8.61	10.05	11.17	12.56
17	5.79	6.76	8.11	9.46	10.51	11.82
18	5.47	6.38	7.66	8.93	9.92	11.17
19	5.18	6.04	7.25	8.46	9.40	10.58
20	4.92	5.74	6.89	8.04	8.93	10.05
21	4.69	5.47	6.56	7.66	8.51	9.57
22	4.47	5.22	6.26	7.31	8.12	9.14
23	4.28	4.99	5.99	6.99	7.77	8.74
24	4.10	4.79	5.74	6.70	7.44	8.37
25	3.94	4.59	5.51	6.43	7.15	8.04
26	3.79	4.42	5.30	6.18	6.87	7.73
27	3.65	4.25	5.10	5.95	6.62	7.44
28	3.52	4.10	4.92	5.74	6.38	7.18
29	3.39	3.96	4.75	5.54	6.16	6.93
30	3.28	3.83	4.59	5.36	5.95	6.70
31	3.18	3.70	4.45	5.19	5.76	6.48
32	3.08	3.59	4.31	5.02	5.58	6.28
33	2.98	3.48	4.18	4.87	5.41	6.09
34	2.90	3.38	4.05	4.73	5.25	5.91
35	2.81	3.28	3.94	4.59	5.10	5.74
36	2.73	3.19	3.84	4.47	4.96	5.58
37	2.66	3.10	3.73	4.35	4.83	5.43
38	2.59	3.02	3.63	4.23	4.70	5.29
39	2.53	2.94	3.53	4.12	4.58	5.15
40	2.46	2.87	3.45	4.02	4.47	5.02
41	2.40	2.80	3.36	3.92	4.36	4.90
42	2.34	2.73	3.28	3.83	4.25	4.79
43	2.29	2.67	3.20	3.74	4.15	4.67
44	2.24	2.61	3.13	3.65	4.06	4.57
45	2.19	2.55	3.06	3.57	3.97	4.47
46	2.14	2.50	3.00	3.49	3.88	4.37
47	2.09	2.44	2.93	3.42	3.80	4.28
48	2.05	2.39	2.87	3.35	3.72	4.19
49	2.01	2.34	2.81	3.28	3.65	4.10
50	1.97	2.30	2.76	3.22	3.57	4.02
51	1.93	2.25	2.70	3.15	3.50	3.94
52	1.89	2.21	2.65	3.09	3.44	3.86
53	1.86	2.17	2.60	3.03	3.37	3.79
54	1.82	2.13	2.55	2.98	3.31	3.72
55	1.79	2.09	2.50	2.92	3.25	3.65
56	1.76	2.05	2.46	2.87	3.19	3.59
57	1.73	2.01	2.42	2.82	3.13	3.53
58	1.70	1.98	2.38	2.77	3.08	3.47
59	1.67	1.95	2.34	2.73	3.03	3.41
60	1.64	1.91	2.30	2.68	2.98	3.35
Constants	98.44	114.84	137.81	160.78	178.64	200.97

TWIST GEARING TABLE—(Continued)

42" TWISTERS

CYLINDER 8 INCHES DIAM. WHIRL 2½ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 3.02

FRONT ROLL 1½ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 40 T.	Cyl. 36 T.	Cyl. 30 T.	Cyl. 30 T.	Cyl. 27 T.	Cyl. 24 T.
	Jack 120 T.	Jack 120 T.	Jack 120 T.	Jack 132 T.	Jack 132 T.	Jack 132 T.
16	13.46	14.95	17.94	19.74	21.93	24.67
17	12.67	14.07	16.89	18.58	20.64	23.22
18	11.96	13.29	15.95	17.55	19.50	21.93
19	11.33	12.59	15.11	16.62	18.47	20.78
20	10.77	11.96	14.36	15.79	17.55	19.74
21	10.25	11.39	13.67	15.04	16.71	18.80
22	9.79	10.88	13.05	14.36	15.95	17.94
23	9.36	10.40	12.48	13.73	15.26	17.16
24	8.97	9.97	11.96	13.16	14.62	16.45
25	8.61	9.57	11.48	12.63	14.04	15.79
26	8.28	9.20	11.04	12.15	13.50	15.18
27	7.98	8.86	10.63	11.70	13.00	14.62
28	7.69	8.55	10.25	11.28	12.53	14.10
29	7.43	8.25	9.90	10.89	12.10	13.61
30	7.18	7.98	9.57	10.53	11.70	13.16
31	6.95	7.72	9.26	10.19	11.32	12.73
32	6.73	7.48	8.97	9.87	10.97	12.34
33	6.53	7.25	8.70	9.57	10.63	11.96
34	6.34	7.04	8.45	9.29	10.32	11.61
35	6.15	6.84	8.20	9.02	10.03	11.28
36	5.98	6.65	7.98	8.78	9.75	10.97
37	5.82	6.47	7.76	8.54	9.48	10.67
38	5.67	6.30	7.56	8.31	9.24	10.39
39	5.52	6.13	7.36	8.10	9.00	10.12
40	5.39	5.98	7.18	7.90	8.78	9.87
41	5.25	5.84	7.00	7.70	8.56	9.62
42	5.13	5.70	6.84	7.52	8.36	9.40
43	5.01	5.56	6.68	7.34	8.16	9.18
44	4.90	5.44	6.53	7.18	7.98	8.97
45	4.79	5.32	6.38	7.02	7.80	8.77
46	4.68	5.20	6.24	6.87	7.63	8.58
47	4.58	5.09	6.11	6.72	7.47	8.40
48	4.49	4.99	5.98	6.58	7.31	8.23
49	4.39	4.88	5.86	6.45	7.16	8.06
50	4.31	4.79	5.74	6.32	7.02	7.90
51	4.22	4.69	5.63	6.19	6.88	7.74
52	4.14	4.60	5.52	6.08	6.75	7.59
53	4.06	4.52	5.42	5.96	6.62	7.45
54	3.99	4.43	5.32	5.85	6.50	7.31
55	3.92	4.35	5.22	5.74	6.38	7.18
56	3.85	4.28	5.13	5.64	6.27	7.05
57	3.78	4.20	5.04	5.54	6.16	6.93
58	3.72	4.13	4.95	5.45	6.05	6.81
59	3.65	4.06	4.87	5.35	5.95	6.69
60	3.59	3.99	4.79	5.26	5.85	6.58
Constants	215.33	239.26	287.11	315.82	350.91	394.77

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE

42" TWISTERS

GROOVED PULLEY 6 IN. DIAM. WHIRL 1½ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 3.57

FRONT ROLL 1½ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 70 T.	Cyl. 60 T.	Cyl. 50 T.	Cyl. 50 T.	Cyl. 45 T.	Cyl. 40 T.
	Jack 96 T.	Jack 96 T.	Jack 96 T.	Jack 112 T.	Jack 112 T.	Jack 112 T.
16	7.27	8.49	10.18	11.88	13.20	14.85
17	6.84	7.99	9.58	11.18	12.42	13.98
18	6.46	7.54	9.05	10.56	11.73	13.20
19	6.12	7.15	8.57	10.00	11.11	12.50
20	5.82	6.79	8.15	9.50	10.56	11.88
21	5.54	6.46	7.76	9.05	10.06	11.31
22	5.29	6.17	7.41	8.64	9.60	10.80
23	5.06	5.90	7.08	8.26	9.18	10.33
24	4.85	5.66	6.79	7.92	8.80	9.90
25	4.65	5.43	6.52	7.60	8.45	9.50
26	4.48	5.22	6.27	7.31	8.12	9.14
27	4.31	5.03	6.03	7.04	7.82	8.80
28	4.16	4.85	5.82	6.79	7.54	8.49
29	4.01	4.68	5.62	6.55	7.28	8.19
30	3.88	4.53	5.43	6.34	7.04	7.92
31	3.75	4.38	5.26	6.13	6.81	7.66
32	3.64	4.24	5.09	5.94	6.60	7.42
33	3.53	4.11	4.94	5.76	6.40	7.20
34	3.42	3.99	4.79	5.59	6.21	6.99
35	3.32	3.88	4.65	5.43	6.03	6.79
36	3.23	3.77	4.53	5.28	5.87	6.60
37	3.14	3.67	4.40	5.14	5.71	6.42
38	3.06	3.57	4.29	5.00	5.56	6.25
39	2.98	3.48	4.18	4.87	5.41	6.09
40	2.91	3.39	4.07	4.75	5.28	5.94
41	2.84	3.31	3.97	4.64	5.15	5.79
42	2.77	3.23	3.88	4.53	5.03	5.65
43	2.71	3.16	3.79	4.42	4.91	5.53
44	2.64	3.09	3.70	4.32	4.80	5.40
45	2.59	3.02	3.62	4.22	4.69	5.28
46	2.53	2.95	3.54	4.13	4.59	5.16
47	2.48	2.89	3.47	4.04	4.49	5.05
48	2.42	2.83	3.39	3.96	4.40	4.95
49	2.37	2.77	3.32	3.88	4.31	4.85
50	2.33	2.72	3.26	3.80	4.22	4.75
51	2.28	2.66	3.19	3.73	4.14	4.66
52	2.24	2.61	3.13	3.66	4.06	4.57
53	2.20	2.56	3.07	3.59	3.98	4.48
54	2.15	2.51	3.02	3.52	3.91	4.40
55	2.12	2.47	2.96	3.46	3.84	4.32
56	2.08	2.43	2.91	3.39	3.77	4.24
57	2.04	2.38	2.86	3.33	3.70	4.17
58	2.01	2.34	2.81	3.28	3.64	4.10
59	1.97	2.30	2.76	3.22	3.58	4.03
60	1.94	2.26	2.72	3.17	3.52	3.96
Constants	116.36	135.76	162.91	190.06	211.18	237.58

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE—(Continued)

42" TWISTERS

GROOVED PULLEY 6 IN. DIAM. WHIRL 1½ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 3.57

FRONT ROLL 1½ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 40 T. Jack 120 T.	Cyl. 36 T. Jack 120 T.	Cyl. 30 T. Jack 120 T.	Cyl. 30 T. Jack 132 T.	Cyl. 27 T. Jack 132 T.	Cyl. 24 T. Jack 132 T.
16	15.91	17.68	21.21	23.33	25.93	29.17
17	14.97	16.64	19.96	21.96	24.40	27.45
18	14.14	15.71	18.86	20.74	23.05	25.93
19	13.40	14.89	17.86	19.65	21.83	24.56
20	12.73	14.14	16.97	18.67	20.74	23.33
21	12.12	13.47	16.16	17.78	19.76	22.22
22	11.57	12.86	15.43	16.97	18.86	21.21
23	11.07	12.30	14.76	16.23	18.04	20.29
24	10.61	11.78	14.14	15.56	17.28	19.44
25	10.18	11.31	13.58	14.93	16.59	18.67
26	9.79	10.88	13.05	14.36	15.95	17.95
27	9.43	10.48	12.57	13.83	15.36	17.28
28	9.09	10.10	12.12	13.33	14.81	16.67
29	8.78	9.75	11.70	12.87	14.30	16.09
30	8.49	9.43	11.31	12.44	13.83	15.56
31	8.21	9.12	10.95	12.04	13.38	15.05
32	7.95	8.84	10.61	11.67	12.96	14.58
33	7.71	8.57	10.28	11.31	12.57	14.14
34	7.49	8.32	9.98	10.98	12.20	13.73
35	7.27	8.08	9.70	10.67	11.85	13.33
36	7.07	7.86	9.43	10.37	11.53	12.96
37	6.88	7.64	9.17	10.09	11.21	12.61
38	6.70	7.44	8.93	9.82	10.92	12.28
39	6.53	7.25	8.70	9.57	10.64	11.97
40	6.36	7.07	8.48	9.33	10.37	11.67
41	6.21	6.90	8.28	9.11	10.12	11.38
42	6.06	6.73	8.08	8.89	9.88	11.11
43	5.92	6.58	7.89	8.68	9.65	10.85
44	5.79	6.43	7.71	8.48	9.43	10.61
45	5.66	6.29	7.54	8.30	9.22	10.37
46	5.53	6.15	7.38	8.12	9.02	10.14
47	5.42	6.02	7.22	7.94	8.83	9.93
48	5.30	5.89	7.07	7.78	8.64	9.72
49	5.19	5.77	6.93	7.62	8.47	9.52
50	5.09	5.66	6.79	7.47	8.30	9.33
51	4.99	5.55	6.65	7.32	8.13	9.15
52	4.89	5.44	6.53	7.18	7.98	8.97
53	4.80	5.34	6.40	7.04	7.83	8.81
54	4.71	5.24	6.29	6.91	7.68	8.64
55	4.63	5.14	6.17	6.79	7.54	8.48
56	4.55	5.05	6.06	6.67	7.41	8.33
57	4.47	4.96	5.95	6.55	7.28	8.19
58	4.39	4.88	5.85	6.44	7.15	8.05
59	4.31	4.79	5.75	6.33	7.03	7.91
60	4.24	4.71	5.66	6.22	6.91	7.78
Constants	254.55	282.83	339.39	373.33	414.81	466.67

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE

42" TWISTERS

GROOVED PULLEY 6 IN. DIAM. WHIRL $1\frac{5}{8}$ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 3.32

FRONT ROLL $1\frac{1}{2}$ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 70 T. Jack 96 T.	Cyl. 60 T. Jack 96 T.	Cyl. 50 T. Jack 96 T.	Cyl. 50 T. Jack 112 T.	Cyl. 45 T. Jack 112 T.	Cyl. 40 T. Jack 112 T.
16	6.76	7.89	9.47	11.05	12.27	13.81
17	6.37	7.43	8.91	10.40	11.55	13.00
18	6.01	7.01	8.42	9.82	10.91	12.27
19	5.70	6.64	7.97	9.30	10.34	11.63
20	5.41	6.31	7.58	8.84	9.82	11.05
21	5.15	6.01	7.21	8.42	9.35	10.52
22	4.92	5.74	6.89	8.03	8.93	10.04
23	4.70	5.49	6.59	7.68	8.54	9.61
24	4.51	5.26	6.31	7.36	8.18	9.21
25	4.33	5.05	6.06	7.07	7.86	8.84
26	4.16	4.86	5.83	6.80	7.55	8.50
27	4.01	4.68	5.61	6.55	7.27	8.18
28	3.86	4.51	5.41	6.31	7.01	7.89
29	3.73	4.35	5.22	6.09	6.77	7.62
30	3.61	4.21	5.05	5.89	6.55	7.36
31	3.49	4.07	4.89	5.70	6.34	7.13
32	3.38	3.95	4.73	5.52	6.14	6.90
33	3.28	3.83	4.59	5.36	5.95	6.70
34	3.18	3.71	4.46	5.20	5.78	6.50
35	3.09	3.61	4.33	5.05	5.61	6.31
36	3.01	3.51	4.21	4.91	5.46	6.14
37	2.92	3.41	4.10	4.78	5.31	5.97
38	2.85	3.32	3.99	4.65	5.17	5.81
39	2.77	3.24	3.88	4.53	5.04	5.67
40	2.71	3.16	3.79	4.42	4.91	5.52
41	2.64	3.08	3.70	4.31	4.79	5.39
42	2.58	3.01	3.61	4.21	4.68	5.26
43	2.52	2.94	3.52	4.11	4.57	5.14
44	2.46	2.87	3.44	4.02	4.46	5.02
45	2.40	2.81	3.37	3.93	4.36	4.91
46	2.35	2.75	3.30	3.84	4.27	4.80
47	2.30	2.69	3.22	3.76	4.18	4.70
48	2.25	2.63	3.16	3.68	4.09	4.60
49	2.21	2.58	3.09	3.61	4.01	4.51
50	2.16	2.53	3.03	3.54	3.93	4.42
51	2.12	2.48	2.97	3.47	3.85	4.33
52	2.08	2.43	2.92	3.40	3.78	4.25
53	2.04	2.38	2.86	3.33	3.71	4.17
54	2.00	2.34	2.81	3.27	3.64	4.09
55	1.97	2.30	2.75	3.21	3.57	4.02
56	1.93	2.25	2.71	3.16	3.51	3.95
57	1.90	2.21	2.66	3.10	3.45	3.88
58	1.87	2.18	2.61	3.05	3.39	3.81
59	1.83	2.14	2.57	3.00	3.33	3.74
60	1.80	2.10	2.53	2.95	3.27	3.68
Constants	108.21	126.25	151.50	176.75	196.39	220.94

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE —(Continued)

42" TWISTERS

GROOVED PULLEY 6 IN. DIAM. WHIRL $1\frac{5}{8}$ INCHES DIAM.
 RATIO OF CYLINDER TO WHIRL 1 TO 3.32

FRONT ROLL $1\frac{1}{2}$ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 40 T. Jack 120 T.	Cyl. 36 T. Jack 120 T.	Cyl. 30 T. Jack 120 T.	Cyl. 30 T. Jack 132 T.	Cyl. 27 T. Jack 132 T.	Cyl. 24 T. Jack 132 T.
16	14.80	16.44	19.73	21.70	24.11	27.12
17	13.92	15.47	18.57	20.42	22.69	25.53
18	13.15	14.61	17.54	19.29	21.43	24.11
19	12.46	13.84	16.61	18.27	20.30	22.84
20	11.84	13.15	15.78	17.36	19.29	21.70
21	11.27	12.52	15.03	16.53	18.37	20.67
22	10.76	11.96	14.35	15.78	17.53	19.73
23	10.29	11.44	13.72	15.10	16.77	18.87
24	9.86	10.96	13.15	14.47	16.07	18.08
25	9.47	10.52	12.63	13.89	15.43	17.36
26	9.10	10.12	12.14	13.35	14.84	16.69
27	8.77	9.74	11.69	12.86	14.29	16.07
28	8.45	9.39	11.27	12.40	13.78	15.50
29	8.16	9.07	10.88	11.97	13.30	14.97
30	7.89	8.77	10.52	11.57	12.86	14.47
31	7.64	8.48	10.18	11.20	12.44	14.00
32	7.40	8.22	9.86	10.85	12.06	13.56
33	7.17	7.97	9.56	10.52	11.69	13.15
34	6.96	7.74	9.28	10.21	11.35	12.76
35	6.76	7.51	9.02	9.92	11.02	12.40
36	6.58	7.31	8.77	9.65	10.72	12.06
37	6.40	7.11	8.53	9.38	10.43	11.73
38	6.23	6.92	8.31	9.14	10.15	11.42
39	6.07	6.74	8.09	8.90	9.89	11.13
40	5.92	6.58	7.89	8.68	9.64	10.85
41	5.77	6.42	7.70	8.47	9.41	10.59
42	5.64	6.26	7.52	8.27	9.19	10.33
43	5.51	6.12	7.34	8.07	8.97	10.09
44	5.38	5.98	7.17	7.89	8.77	9.86
45	5.26	5.84	7.01	7.72	8.57	9.64
46	5.15	5.72	6.86	7.55	8.39	9.43
47	5.04	5.60	6.72	7.39	8.21	9.23
48	4.93	5.48	6.58	7.24	8.04	9.04
49	4.83	5.37	6.44	7.09	7.87	8.86
50	4.73	5.26	6.31	6.94	7.72	8.68
51	4.64	5.16	6.19	6.81	7.56	8.51
52	4.55	5.06	6.07	6.68	7.42	8.35
53	4.47	4.96	5.96	6.55	7.28	8.19
54	4.38	4.87	5.85	6.43	7.14	8.04
55	4.30	4.78	5.74	6.31	7.01	7.89
56	4.23	4.70	5.64	6.20	6.89	7.75
57	4.15	4.61	5.54	6.09	6.77	7.61
58	4.08	4.53	5.44	5.99	6.65	7.48
59	4.01	4.46	5.35	5.88	6.54	7.36
60	3.95	4.38	5.26	5.79	6.43	7.23
Constants	236.72	263.02	315.63	347.19	385.77	433.99

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE

42" TWISTERS

GROOVED PULLEY 6 IN. DIAM. WHIRL $1\frac{3}{4}$ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 3.12

FRONT ROLL $1\frac{1}{2}$ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 70 T. Jack 96 T.	Cyl. 60 T. Jack 96 T.	Cyl. 50 T. Jack 96 T.	Cyl. 50 T. Jack 112 T.	Cyl. 45 T. Jack 112 T.	Cyl. 40 T. Jack 112 T.
16	6.36	7.42	8.90	10.38	11.54	12.98
17	5.98	6.98	8.37	9.77	10.86	12.21
18	5.65	6.59	7.91	9.23	10.25	11.54
19	5.35	6.24	7.49	8.74	9.71	10.93
20	5.09	5.93	7.12	8.31	9.23	10.38
21	4.84	5.65	6.78	7.91	8.79	9.89
22	4.62	5.39	6.47	7.55	8.39	9.44
23	4.42	5.16	6.19	7.22	8.02	9.03
24	4.24	4.94	5.93	6.92	7.69	8.65
25	4.07	4.75	5.69	6.64	7.38	8.31
26	3.91	4.56	5.48	6.39	7.10	7.99
27	3.77	4.39	5.27	6.15	6.84	7.69
28	3.63	4.24	5.08	5.93	6.59	7.42
29	3.51	4.09	4.91	5.73	6.36	7.16
30	3.39	3.96	4.75	5.54	6.15	6.92
31	3.28	3.83	4.59	5.36	5.95	6.70
32	3.18	3.71	4.45	5.19	5.77	6.49
33	3.08	3.60	4.31	5.03	5.59	6.29
34	2.99	3.49	4.19	4.89	5.43	6.11
35	2.91	3.39	4.07	4.75	5.27	5.93
36	2.83	3.30	3.96	4.62	5.13	5.77
37	2.75	3.21	3.85	4.49	4.99	5.61
38	2.68	3.12	3.75	4.37	4.86	5.46
39	2.61	3.04	3.65	4.26	4.73	5.32
40	2.54	2.97	3.56	4.15	4.61	5.19
41	2.48	2.89	3.47	4.05	4.50	5.06
42	2.42	2.82	3.39	3.95	4.39	4.94
43	2.37	2.76	3.31	3.86	4.29	4.83
44	2.31	2.70	3.24	3.78	4.19	4.72
45	2.26	2.64	3.16	3.69	4.10	4.61
46	2.21	2.58	3.10	3.61	4.01	4.51
47	2.16	2.52	3.03	3.53	3.93	4.42
48	2.12	2.47	2.97	3.46	3.85	4.33
49	2.08	2.42	2.91	3.39	3.77	4.24
50	2.03	2.37	2.85	3.32	3.69	4.15
51	1.99	2.33	2.79	3.26	3.62	4.07
52	1.96	2.28	2.74	3.20	3.55	3.99
53	1.92	2.24	2.69	3.13	3.48	3.92
54	1.88	2.20	2.64	3.08	3.42	3.85
55	1.85	2.16	2.59	3.02	3.36	3.78
56	1.82	2.12	2.54	2.97	3.30	3.71
57	1.78	2.08	2.50	2.91	3.24	3.64
58	1.75	2.05	2.46	2.86	3.18	3.58
59	1.72	2.01	2.41	2.82	3.13	3.52
60	1.70	1.98	2.37	2.77	3.08	3.46
Constants	101.70	118.65	142.37	166.10	184.56	207.63

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE—(Continued)

42" TWISTERS

GROOVED PULLEY 6 IN. DIAM. WHIRL 1 $\frac{3}{4}$ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 3.12

FRONT ROLL 1 $\frac{1}{2}$ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 40 T. Jack 120 T.	Cyl. 36 T. Jack 120 T.	Cyl. 30 T. Jack 120 T.	Cyl. 30 T. Jack 132 T.	Cyl. 27 T. Jack 132 T.	Cyl. 24 T. Jack 132 T.
16	13.90	15.45	18.54	20.39	22.66	25.49
17	13.09	14.54	17.45	19.19	21.33	23.99
18	12.36	13.73	16.48	18.13	20.14	22.66
19	11.71	13.01	15.61	17.17	19.08	21.47
20	11.12	12.36	14.83	16.31	18.13	20.39
21	10.59	11.77	14.12	15.54	17.26	19.42
22	10.11	11.24	13.48	14.83	16.48	18.54
23	9.67	10.75	12.90	14.19	15.76	17.73
24	9.27	10.30	12.36	13.59	15.11	16.99
25	8.90	9.89	11.86	13.05	14.50	16.31
26	8.56	9.51	11.41	12.55	13.94	15.69
27	8.24	9.15	10.99	12.08	13.43	15.11
28	7.95	8.83	10.59	11.65	12.95	14.56
29	7.67	8.52	10.23	11.25	12.50	14.06
30	7.42	8.24	9.89	10.88	12.08	13.59
31	7.18	7.97	9.57	10.52	11.69	13.16
32	6.95	7.72	9.27	10.20	11.33	12.75
33	6.74	7.49	8.99	9.89	10.99	12.36
34	6.54	7.27	8.72	9.60	10.66	12.00
35	6.36	7.06	8.47	9.32	10.36	11.65
36	6.18	6.87	8.24	9.07	10.07	11.33
37	6.01	6.68	8.02	8.82	9.80	11.02
38	5.85	6.50	7.81	8.59	9.54	10.73
39	5.70	6.34	7.61	8.37	9.30	10.46
40	5.56	6.18	7.42	8.16	9.06	10.20
41	5.43	6.03	7.23	7.96	8.84	9.95
42	5.30	5.89	7.06	7.77	8.63	9.71
43	5.17	5.75	6.90	7.59	8.43	9.48
44	5.06	5.62	6.74	7.42	8.24	9.27
45	4.94	5.49	6.59	7.25	8.06	9.06
46	4.84	5.37	6.45	7.09	7.88	8.86
47	4.73	5.26	6.31	6.94	7.71	8.68
48	4.63	5.15	6.18	6.80	7.55	8.50
49	4.54	5.04	6.05	6.66	7.40	8.32
50	4.45	4.94	5.93	6.53	7.25	8.16
51	4.36	4.85	5.82	6.40	7.11	8.00
52	4.28	4.75	5.70	6.28	6.97	7.84
53	4.20	4.66	5.60	6.16	6.84	7.70
54	4.12	4.58	5.49	6.04	6.71	7.55
55	4.04	4.49	5.39	5.93	6.59	7.42
56	3.97	4.41	5.30	5.83	6.47	7.28
57	3.90	4.34	5.20	5.72	6.36	7.16
58	3.84	4.26	5.12	5.62	6.25	7.03
59	3.77	4.19	5.03	5.53	6.14	6.91
60	3.71	4.12	4.94	5.44	6.04	6.80
Constants	222.46	247.18	296.61	326.27	362.53	407.84

TWIST GEARING TABLE

42" TWISTERS

GROOVED PULLEY 6 IN. DIAM. WHIRL 2 INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 2.77

FRONT ROLL 1½ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 70 T.	Cyl. 60 T.	Cyl. 50 T.	Cyl. 50 T.	Cyl. 45 T.	Cyl. 40 T.
	Jack 96 T.	Jack 96 T.	Jack 96 T.	Jack 112 T.	Jack 112 T.	Jack 112 T.
16	5.64	6.58	7.90	9.22	10.24	11.52
17	5.31	6.20	7.44	8.67	9.64	10.84
18	5.02	5.85	7.02	8.19	9.10	10.24
19	4.75	5.54	6.65	7.76	8.62	9.70
20	4.51	5.27	6.32	7.37	8.19	9.22
21	4.30	5.02	6.02	7.02	7.80	8.78
22	4.10	4.79	5.75	6.70	7.45	8.38
23	3.93	4.58	5.50	6.41	7.12	8.01
24	3.76	4.39	5.27	6.14	6.83	7.68
25	3.61	4.21	5.06	5.90	6.55	7.37
26	3.47	4.05	4.86	5.67	6.30	7.09
27	3.34	3.90	4.68	5.46	6.07	6.83
28	3.22	3.76	4.51	5.27	5.85	6.58
29	3.11	3.63	4.36	5.09	5.65	6.36
30	3.01	3.51	4.21	4.92	5.46	6.14
31	2.91	3.40	4.08	4.76	5.29	5.95
32	2.82	3.29	3.95	4.61	5.12	5.76
33	2.74	3.19	3.83	4.47	4.97	5.59
34	2.66	3.10	3.72	4.34	4.82	5.42
35	2.58	3.01	3.61	4.21	4.68	5.27
36	2.51	2.93	3.51	4.10	4.55	5.12
37	2.44	2.85	3.42	3.99	4.43	4.98
38	2.38	2.77	3.33	3.88	4.31	4.85
39	2.32	2.70	3.24	3.78	4.20	4.73
40	2.26	2.63	3.16	3.69	4.10	4.61
41	2.20	2.57	3.08	3.60	4.00	4.50
42	2.15	2.51	3.01	3.51	3.90	4.39
43	2.10	2.45	2.94	3.43	3.81	4.29
44	2.05	2.39	2.87	3.35	3.72	4.19
45	2.01	2.34	2.81	3.28	3.64	4.10
46	1.96	2.29	2.75	3.21	3.56	4.01
47	1.92	2.24	2.69	3.14	3.49	3.92
48	1.88	2.19	2.63	3.07	3.41	3.84
49	1.84	2.15	2.58	3.01	3.34	3.76
50	1.81	2.11	2.53	2.95	3.28	3.69
51	1.77	2.07	2.48	2.89	3.21	3.61
52	1.74	2.03	2.43	2.84	3.15	3.55
53	1.70	1.99	2.38	2.78	3.09	3.48
54	1.67	1.95	2.34	2.73	3.03	3.41
55	1.64	1.92	2.30	2.68	2.98	3.35
56	1.61	1.88	2.26	2.63	2.93	3.29
57	1.58	1.85	2.22	2.59	2.87	3.23
58	1.56	1.82	2.18	2.54	2.83	3.18
59	1.53	1.79	2.14	2.50	2.78	3.12
60	1.50	1.76	2.11	2.46	2.73	3.07
Constants	90.29	105.34	126.40	147.47	163.86	184.34

TWIST GEARING TABLE —(Continued)

42" TWISTERS

GROOVED PULLEY 6 IN. DIAM. WHIRL 2 INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 2.77

FRONT ROLL $1\frac{1}{2}$ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 40 T.	Cyl. 36 T.	Cyl. 30 T.	Cyl. 30 T.	Cyl. 27 T.	Cyl. 24 T.
	Jack 120 T.	Jack 120 T.	Jack 120 T.	Jack 132 T.	Jack 132 T.	Jack 132 T.
16	12.34	13.72	16.46	18.10	20.12	22.63
17	11.62	12.91	15.49	17.04	18.93	21.30
18	10.97	12.19	14.63	16.09	17.88	20.12
19	10.39	11.55	13.86	15.25	16.94	19.06
20	9.88	10.97	13.17	14.48	16.09	18.10
21	9.40	10.45	12.54	13.79	15.33	17.24
22	8.98	9.98	11.97	13.17	14.63	16.46
23	8.59	9.54	11.45	12.59	13.99	15.74
24	8.23	9.14	10.97	12.07	13.41	15.09
25	7.90	8.78	10.53	11.59	12.87	14.48
26	7.60	8.44	10.13	11.14	12.38	13.93
27	7.31	8.13	9.75	10.73	11.92	13.41
28	7.05	7.84	9.41	10.35	11.50	12.93
29	6.81	7.57	9.08	9.99	11.10	12.49
30	6.58	7.32	8.78	9.66	10.73	12.07
31	6.37	7.08	8.49	9.34	10.38	11.68
32	6.17	6.86	8.23	9.05	10.06	11.32
33	5.98	6.65	7.98	8.78	9.75	10.97
34	5.81	6.45	7.75	8.52	9.47	10.65
35	5.64	6.27	7.52	8.28	9.20	10.35
36	5.49	6.10	7.32	8.05	8.94	10.06
37	5.34	5.93	7.12	7.83	8.70	9.79
38	5.20	5.78	6.93	7.63	8.47	9.53
39	5.06	5.63	6.75	7.43	8.25	9.28
40	4.94	5.49	6.58	7.24	8.05	9.05
41	4.82	5.35	6.42	7.07	7.85	8.83
42	4.70	5.23	6.27	6.90	7.67	8.62
43	4.59	5.10	6.12	6.74	7.49	8.42
44	4.49	4.99	5.98	6.58	7.32	8.23
45	4.39	4.88	5.85	6.44	7.15	8.05
46	4.29	4.77	5.72	6.30	7.00	7.87
47	4.20	4.67	5.60	6.16	6.85	7.70
48	4.11	4.57	5.49	6.03	6.71	7.54
49	4.03	4.48	5.37	5.91	6.57	7.39
50	3.95	4.39	5.27	5.79	6.44	7.24
51	3.87	4.31	5.17	5.68	6.31	7.10
52	3.80	4.22	5.06	5.57	6.19	6.96
53	3.73	4.14	4.97	5.47	6.07	6.83
54	3.66	4.06	4.88	5.36	5.96	6.71
55	3.59	3.99	4.79	5.27	5.85	6.58
56	3.53	3.92	4.71	5.18	5.75	6.47
57	3.46	3.85	4.62	5.08	5.65	6.35
58	3.41	3.79	4.54	4.99	5.55	6.24
59	3.35	3.72	4.46	4.91	5.46	6.14
60	3.29	3.66	4.39	4.83	5.36	6.03
Constants	197.50	219.45	263.33	289.67	321.86	362.09

TWIST GEARING TABLE

42" TWISTERS

CROOVED PULLEY 6 IN. DIAM. WHIRL 2¼ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 2.49

FRONT ROLL 1½ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 70 T. Jack 96 T.	Cyl. 60 T. Jack 96 T.	Cyl. 50 T. Jack 96 T.	Cyl. 50 T. Jack 112 T.	Cyl. 45 T. Jack 112 T.	Cyl. 40 T. Jack 112 T.
16	5.07	5.92	7.10	8.29	9.21	10.36
17	4.77	5.57	6.68	7.80	8.66	9.75
18	4.51	5.26	6.31	7.36	8.18	9.21
19	4.27	4.98	5.98	6.98	7.75	8.72
20	4.06	4.73	5.68	6.63	7.36	8.29
21	3.86	4.51	5.41	6.31	7.01	7.89
22	3.69	4.30	5.17	6.03	6.70	7.53
23	3.53	4.11	4.94	5.76	6.40	7.20
24	3.38	3.95	4.73	5.52	6.14	6.90
25	3.25	3.79	4.55	5.30	5.89	6.63
26	3.12	3.64	4.37	5.10	5.67	6.37
27	3.01	3.51	4.21	4.91	5.46	6.14
28	2.90	3.38	4.06	4.73	5.26	5.92
29	2.80	3.27	3.92	4.57	5.08	5.71
30	2.71	3.15	3.79	4.42	4.91	5.52
31	2.62	3.05	3.66	4.28	4.75	5.35
32	2.54	2.96	3.55	4.15	4.61	5.18
33	2.46	2.87	3.44	4.02	4.46	5.02
34	2.39	2.79	3.34	3.90	4.33	4.87
35	2.32	2.71	3.25	3.79	4.21	4.73
36	2.26	2.63	3.16	3.68	4.09	4.60
37	2.19	2.56	3.07	3.58	3.98	4.48
38	2.14	2.49	2.99	3.49	3.88	4.36
39	2.08	2.43	2.91	3.40	3.78	4.25
40	2.03	2.37	2.84	3.31	3.68	4.14
41	1.98	2.31	2.77	3.23	3.59	4.04
42	1.93	2.26	2.71	3.16	3.51	3.95
43	1.89	2.20	2.64	3.08	3.43	3.85
44	1.85	2.15	2.59	3.01	3.35	3.77
45	1.80	2.10	2.53	2.95	3.27	3.68
46	1.77	2.06	2.47	2.88	3.20	3.60
47	1.73	2.01	2.42	2.82	3.13	3.53
48	1.69	1.98	2.37	2.76	3.07	3.45
49	1.66	1.93	2.32	2.71	3.01	3.38
50	1.63	1.90	2.27	2.65	2.95	3.32
51	1.59	1.86	2.23	2.60	2.89	3.25
52	1.56	1.82	2.19	2.55	2.84	3.19
53	1.53	1.79	2.14	2.50	2.78	3.13
54	1.51	1.76	2.11	2.46	2.73	3.07
55	1.48	1.72	2.07	2.41	2.68	3.01
56	1.45	1.69	2.03	2.37	2.63	2.96
57	1.42	1.66	1.99	2.33	2.58	2.91
58	1.40	1.64	1.96	2.29	2.54	2.86
59	1.38	1.61	1.93	2.25	2.50	2.81
60	1.36	1.58	1.90	2.21	2.46	2.76
Constants	81.16	94.69	113.63	132.56	147.29	165.70

TWIST GEARING TABLE FOR TWISTING

TWIST GEARING TABLE—(Continued)

42" TWISTERS

GROOVED PULLEY 6 IN. DIAM. WHIRL 2½ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 2.49

FRONT ROLL 1½ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 40 T. Jack 120 T.	Cyl. 36 T. Jack 120 T.	Cyl. 30 T. Jack 120 T.	Cyl. 30 T. Jack 132 T.	Cyl. 27 T. Jack 132 T.	Cyl. 24 T. Jack 132 T.
16	11.10	12.33	14.80	16.27	18.08	20.34
17	10.44	11.60	13.92	15.32	17.02	19.15
18	9.86	10.96	13.15	14.47	16.07	18.08
19	9.34	10.38	12.46	13.70	15.23	17.13
20	8.88	9.86	11.84	13.02	14.47	16.27
21	8.45	9.39	11.27	12.40	13.78	15.50
22	8.07	8.97	10.76	11.84	13.15	14.80
23	7.72	8.58	10.29	11.32	12.58	14.15
24	7.40	8.22	9.86	10.85	12.06	13.56
25	7.10	7.89	9.47	10.42	11.57	13.01
26	6.83	7.59	9.10	10.02	11.13	12.52
27	6.58	7.31	8.77	9.64	10.72	12.06
28	6.34	7.05	8.45	9.30	10.33	11.62
29	6.12	6.80	8.16	8.98	9.98	11.22
30	5.92	6.57	7.89	8.68	9.64	10.85
31	5.73	6.36	7.64	8.40	9.33	10.50
32	5.55	6.16	7.40	8.14	9.04	10.17
33	5.38	5.98	7.17	7.89	8.77	9.86
34	5.22	5.80	6.96	7.66	8.51	9.58
35	5.07	5.64	6.76	7.44	8.27	9.30
36	4.93	5.48	6.58	7.24	8.04	9.04
37	4.80	5.33	6.40	7.04	7.82	8.80
38	4.67	5.19	6.23	6.85	7.62	8.57
39	4.55	5.06	6.07	6.68	7.42	8.35
40	4.44	4.93	5.92	6.51	7.24	8.14
41	4.33	4.81	5.77	6.35	7.06	7.94
42	4.23	4.70	5.64	6.20	6.89	7.75
43	4.13	4.59	5.51	6.06	6.73	7.57
44	4.04	4.48	5.38	5.92	6.58	7.40
45	3.95	4.38	5.26	5.79	6.43	7.23
46	3.86	4.29	5.15	5.66	6.29	7.08
47	3.78	4.20	5.04	5.54	6.16	6.93
48	3.70	4.11	4.93	5.42	6.03	6.78
49	3.62	4.03	4.83	5.31	5.90	6.64
50	3.55	3.95	4.73	5.21	5.79	6.51
51	3.48	3.87	4.64	5.11	5.67	6.38
52	3.42	3.79	4.55	5.01	5.56	6.26
53	3.35	3.72	4.47	4.91	5.46	6.14
54	3.29	3.65	4.38	4.82	5.36	6.03
55	3.23	3.59	4.30	4.73	5.26	5.92
56	3.17	3.52	4.23	4.65	5.17	5.81
57	3.11	3.46	4.15	4.57	5.08	5.71
58	3.06	3.40	4.08	4.49	4.99	5.61
59	3.01	3.34	4.01	4.41	4.90	5.52
60	2.96	3.29	3.95	4.34	4.82	5.43
Constants	177.54	197.27	236.72	260.39	289.32	325.49

TWIST GEARING TABLE

42" TWISTERS

CROOVED PULLEY 6 IN. DIAM. WHIRL 2½ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 2.26

FRONT ROLL 1½ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 70 T.	Cyl. 60 T.	Cyl. 50 T.	Cyl. 50 T.	Cyl. 45 T.	Cyl. 40 T.
	Jack 96 T.	Jack 96 T.	Jack 96 T.	Jack 112 T.	Jack 112 T.	Jack 112 T.
16	4.60	5.37	6.45	7.52	8.36	9.40
17	4.33	5.06	6.07	7.08	7.86	8.85
18	4.09	4.77	5.73	6.68	7.43	8.36
19	3.89	4.52	5.43	6.33	7.04	7.92
20	3.68	4.30	5.16	6.02	6.68	7.52
21	3.51	4.09	4.91	5.73	6.37	7.16
22	3.35	3.91	4.69	5.47	6.08	6.84
23	3.20	3.74	4.48	5.23	5.81	6.54
24	3.07	3.58	4.30	5.01	5.57	6.27
25	2.95	3.44	4.13	4.81	5.35	6.02
26	2.83	3.31	3.97	4.63	5.14	5.78
27	2.73	3.18	3.82	4.46	4.95	5.57
28	2.63	3.07	3.68	4.30	4.77	5.37
29	2.54	2.96	3.56	4.15	4.61	5.19
30	2.46	2.86	3.44	4.01	4.46	5.01
31	2.38	2.77	3.33	3.88	4.31	4.85
32	2.30	2.69	3.23	3.76	4.18	4.70
33	2.23	2.60	3.13	3.65	4.05	4.56
34	2.17	2.53	3.04	3.54	3.93	4.43
35	2.10	2.46	2.95	3.44	3.82	4.30
36	2.05	2.39	2.87	3.34	3.72	4.18
37	1.99	2.32	2.79	3.25	3.61	4.06
38	1.94	2.26	2.72	3.17	3.52	3.96
39	1.89	2.20	2.64	3.08	3.43	3.86
40	1.84	2.15	2.58	3.01	3.34	3.76
41	1.80	2.10	2.52	2.93	3.26	3.67
42	1.76	2.05	2.46	2.86	3.19	3.58
43	1.71	2.00	2.40	2.80	3.11	3.50
44	1.67	1.96	2.35	2.74	3.04	3.42
45	1.64	1.91	2.29	2.67	2.97	3.34
46	1.60	1.87	2.24	2.62	2.91	3.27
47	1.57	1.83	2.19	2.56	2.84	3.20
48	1.54	1.79	2.15	2.51	2.79	3.14
49	1.50	1.75	2.10	2.46	2.73	3.07
50	1.47	1.72	2.06	2.41	2.68	3.01
51	1.44	1.69	2.02	2.36	2.62	2.95
52	1.42	1.66	1.99	2.32	2.57	2.89
53	1.39	1.62	1.95	2.27	2.52	2.84
54	1.37	1.59	1.91	2.23	2.48	2.79
55	1.34	1.56	1.88	2.19	2.43	2.73
56	1.32	1.54	1.84	2.15	2.39	2.69
57	1.29	1.51	1.81	2.11	2.35	2.64
58	1.27	1.48	1.78	2.08	2.31	2.60
59	1.25	1.46	1.75	2.04	2.27	2.55
60	1.23	1.43	1.72	2.01	2.23	2.52
Constants	73.66	85.94	103.13	120.31	133.69	150.40

TWIST GEARING TABLE —(Continued)

42" TWISTERS

CRCOVERED PULLEY 6 IN. DIAM. WHIRL 2½ INCHES DIAM.

RATIO OF CYLINDER TO WHIRL 1 TO 2.26

FRONT ROLL 1½ INCHES DIAM. FRONT ROLL GEAR 112 TEETH

Change Gears	TWIST PER INCH					
	Cyl. 40 T. Jack 120 T.	Cyl. 36 T. Jack 120 T.	Cyl. 30 T. Jack 120 T.	Cyl. 30 T. Jack 132 T.	Cyl. 27 T. Jack 132 T.	Cyl. 24 T. Jack 132 T.
16	10.07	11.19	13.43	14.77	16.41	18.46
17	9.48	10.53	12.64	13.90	15.45	17.38
18	8.95	9.95	11.94	13.13	14.59	16.41
19	8.48	9.42	11.31	12.44	13.82	15.55
20	8.06	8.95	10.74	11.82	13.13	14.77
21	7.67	8.53	10.23	11.25	12.50	14.07
22	7.32	8.14	9.77	10.74	11.94	13.43
23	7.01	7.78	9.34	10.28	11.42	12.84
24	6.71	7.46	8.95	9.85	10.94	12.31
25	6.45	7.16	8.59	9.45	10.50	11.82
26	6.20	6.89	8.26	9.09	10.10	11.36
27	5.97	6.63	7.96	8.75	9.73	10.94
28	5.76	6.39	7.67	8.44	9.38	10.55
29	5.56	6.17	7.41	8.15	9.06	10.19
30	5.37	5.97	7.16	7.88	8.75	9.85
31	5.20	5.78	6.93	7.62	8.47	9.53
32	5.04	5.60	6.72	7.39	8.21	9.23
33	4.88	5.43	6.51	7.16	7.96	8.95
34	4.74	5.27	6.32	6.95	7.73	8.69
35	4.60	5.12	6.14	6.75	7.50	8.44
36	4.48	4.98	5.97	6.57	7.30	8.21
37	4.36	4.84	5.81	6.39	7.10	7.98
38	4.24	4.71	5.66	6.22	6.91	7.78
39	4.13	4.59	5.51	6.06	6.73	7.57
40	4.03	4.48	5.37	5.91	6.57	7.39
41	3.93	4.37	5.24	5.76	6.41	7.21
42	3.84	4.27	5.12	5.63	6.25	7.04
43	3.75	4.16	5.00	5.50	6.11	6.87
44	3.66	4.07	4.89	5.37	5.97	6.72
45	3.58	3.98	4.77	5.25	5.84	6.57
46	3.51	3.89	4.67	5.14	5.71	6.42
47	3.43	3.81	4.57	5.03	5.59	6.29
48	3.36	3.73	4.48	4.92	5.47	6.16
49	3.29	3.65	4.38	4.82	5.36	6.03
50	3.23	3.58	4.30	4.73	5.25	5.91
51	3.16	3.51	4.21	4.63	5.15	5.79
52	3.10	3.45	4.13	4.55	5.05	5.68
53	3.04	3.38	4.05	4.46	4.95	5.57
54	2.99	3.32	3.98	4.38	4.86	5.47
55	2.93	3.26	3.91	4.30	4.77	5.37
56	2.88	3.20	3.84	4.22	4.69	5.28
57	2.83	3.14	3.77	4.15	4.61	5.18
58	2.78	3.09	3.71	4.08	4.53	5.10
59	2.73	3.03	3.64	4.01	4.45	5.01
60	2.69	2.98	3.58	3.94	4.38	4.93
Constants	161.14	179.05	214.85	236.34	262.60	295.42

TWO PLY TWIST TABLE

No. of Yarn to be Twisted	No. of Twisted Yarn	Sq. Root of No. of Twisted Yarn	TWIST PER INCH						
			Square Root Multiplied by						
			1½	2	2½	3	3½	4	4½
1	.5	.707	1.06	1.41	1.77	2.12	2.47	2.83	3.18
2	1.0	1.000	1.50	2.00	2.50	3.00	3.50	4.00	4.50
3	1.5	1.225	1.84	2.45	3.06	3.68	4.29	4.90	5.51
4	2.0	1.414	2.12	2.83	3.54	4.24	4.95	5.66	6.36
5	2.5	1.581	2.37	3.16	3.95	4.74	5.53	6.32	7.11
6	3.0	1.732	2.60	3.46	4.33	5.20	6.06	6.93	7.79
7	3.5	1.871	2.81	3.74	4.68	5.61	6.55	7.48	8.42
8	4.0	2.000	3.00	4.00	5.00	6.00	7.00	8.00	9.00
9	4.5	2.121	3.18	4.24	5.30	6.36	7.42	8.48	9.54
10	5.0	2.236	3.35	4.47	5.59	6.71	7.83	8.94	10.06
11	5.5	2.345	3.52	4.69	5.86	7.04	8.21	9.38	10.55
12	6.0	2.450	3.68	4.90	6.13	7.35	8.58	9.80	11.03
13	6.5	2.550	3.83	5.10	6.38	7.65	8.93	10.20	11.48
14	7.0	2.646	3.97	5.29	6.62	7.94	9.26	10.58	11.91
15	7.5	2.739	4.11	5.48	6.85	8.22	9.59	10.95	12.33
16	8.0	2.828	4.24	5.66	7.07	8.48	9.90	11.31	12.73
17	8.5	2.916	4.37	5.83	7.29	8.75	10.21	11.66	13.12
18	9.0	3.000	4.50	6.00	7.50	9.00	10.50	12.00	13.50
19	9.5	3.082	4.62	6.16	7.71	9.25	10.79	12.33	13.87
20	10.0	3.162	4.74	6.32	7.91	9.49	11.07	12.65	14.23
21	10.5	3.240	4.86	6.48	8.10	9.72	11.34	12.96	14.58
22	11.0	3.317	4.98	6.63	8.29	9.95	11.61	13.27	14.93
23	11.5	3.391	5.09	6.78	8.48	10.17	11.87	13.56	15.26
24	12.0	3.464	5.20	6.93	8.66	10.39	12.12	13.86	15.59
25	12.5	3.536	5.30	7.07	8.84	10.61	12.38	14.14	15.91
26	13.0	3.606	5.41	7.21	9.02	10.82	12.62	14.42	16.23
27	13.5	3.674	5.51	7.35	9.19	11.02	12.86	14.70	16.53
28	14.0	3.742	5.61	7.48	9.36	11.23	13.10	14.97	16.84
29	14.5	3.808	5.71	7.62	9.52	11.42	13.33	15.23	17.14
30	15.0	3.873	5.81	7.75	9.68	11.62	13.56	15.49	17.43
31	15.5	3.937	5.91	7.87	9.84	11.81	13.78	15.75	17.72
32	16.0	4.000	6.00	8.00	10.00	12.00	14.00	16.00	18.00
33	16.5	4.062	6.09	8.12	10.16	12.19	14.22	16.25	18.28
34	17.0	4.123	6.18	8.25	10.31	12.37	14.43	16.49	18.55
35	17.5	4.183	6.27	8.37	10.46	12.55	14.64	16.73	18.82
36	18.0	4.243	6.36	8.49	10.61	12.73	14.85	16.97	19.09
37	18.5	4.301	6.45	8.60	10.75	12.90	15.05	17.20	19.35
38	19.0	4.359	6.54	8.72	10.90	13.08	15.26	17.44	19.62
39	19.5	4.416	6.62	8.83	11.04	13.25	15.46	17.66	19.87
40	20.0	4.472	6.71	8.94	11.18	13.42	15.65	17.89	20.12
41	20.5	4.528	6.79	9.06	11.32	13.58	15.85	18.11	20.37
42	21.0	4.583	6.87	9.17	11.46	13.75	16.04	18.33	20.62
43	21.5	4.637	6.96	9.27	11.59	13.91	16.23	18.55	20.87
44	22.0	4.690	7.04	9.38	11.73	14.07	16.42	18.76	21.11
45	22.5	4.743	7.11	9.49	11.86	14.23	16.60	18.97	21.34
46	23.0	4.796	7.19	9.59	11.99	14.39	16.79	19.18	21.58
47	23.5	4.848	7.27	9.70	12.12	14.54	16.97	19.39	21.82
48	24.0	4.899	7.35	9.80	12.25	14.70	17.15	19.60	22.05
49	24.5	4.950	7.43	9.90	12.38	14.85	17.33	19.80	22.28
50	25.0	5.000	7.50	10.00	12.50	15.00	17.50	20.00	22.50
51	25.5	5.050	7.58	10.10	12.63	15.15	17.68	20.20	22.73
52	26.0	5.099	7.65	10.20	12.75	15.30	17.85	20.40	22.95
53	26.5	5.148	7.72	10.30	12.87	15.44	18.02	20.59	23.17
54	27.0	5.196	7.79	10.39	12.99	15.59	18.19	20.78	23.38
55	27.5	5.244	7.87	10.49	13.11	15.73	18.35	20.98	23.60
56	28.0	5.292	7.94	10.58	13.23	15.88	18.52	21.17	23.81
57	28.5	5.339	8.01	10.68	13.35	16.02	18.69	21.36	24.03
58	29.0	5.385	8.08	10.77	13.46	16.16	18.85	21.54	24.23
59	29.5	5.431	8.15	10.86	13.58	16.29	19.01	21.73	24.44
60	30.0	5.477	8.22	10.95	13.69	16.43	19.17	21.91	24.65

TWO PLY TWIST TABLE —(Continued)

No. of Yarn to be Twisted	No. of Twisted Yarn	Sq. Root of No. of Twisted Yarn	TWIST PER INCH						
			Square Root Multiplied by						
			5	5½	6	6½	7	7½	8
1	.5	.707	3.54	3.89	4.24	4.60	4.95	5.30	5.66
2	1.0	1.000	5.00	5.50	6.00	6.50	7.00	7.50	8.00
3	1.5	1.225	6.13	6.74	7.35	7.96	8.58	9.19	9.80
4	2.0	1.414	7.07	7.78	8.49	9.19	9.90	10.61	11.31
5	2.5	1.581	7.91	8.70	9.49	10.28	11.07	11.86	12.65
6	3.0	1.732	8.66	9.53	10.39	11.26	12.12	12.99	13.86
7	3.5	1.871	9.36	10.29	11.22	12.16	13.10	14.03	14.97
8	4.0	2.000	10.00	11.00	12.00	13.00	14.00	15.00	16.00
9	4.5	2.121	10.61	11.67	12.73	13.79	14.85	15.91	16.97
10	5.0	2.236	11.18	12.30	13.42	14.53	15.65	16.77	17.89
11	5.5	2.345	11.73	12.90	14.07	15.24	16.42	17.59	18.76
12	6.0	2.450	12.25	13.48	14.70	15.93	17.15	18.38	19.60
13	6.5	2.550	12.75	14.03	15.30	16.58	17.85	19.13	20.40
14	7.0	2.646	13.23	14.55	15.87	17.20	18.52	19.85	21.17
15	7.5	2.739	13.69	15.06	16.43	17.80	19.17	20.54	21.91
16	8.0	2.828	14.14	15.55	16.97	18.38	19.80	21.21	22.62
17	8.5	2.916	14.58	16.04	17.49	18.95	20.41	21.87	23.33
18	9.0	3.000	15.00	16.50	18.00	19.50	21.00	22.50	24.00
19	9.5	3.082	15.41	16.95	18.49	20.03	21.57	23.12	24.66
20	10.0	3.162	15.81	17.39	18.97	20.55	22.13	23.72	25.30
21	10.5	3.240	16.20	17.82	19.44	21.06	22.68	24.30	25.92
22	11.0	3.317	16.58	18.24	19.90	21.56	23.22	24.88	26.54
23	11.5	3.391	16.96	18.65	20.35	22.04	23.74	25.43	27.13
24	12.0	3.464	17.32	19.05	20.78	22.52	24.25	25.98	27.71
25	12.5	3.536	17.68	19.45	21.21	22.98	24.75	26.52	28.29
26	13.0	3.606	18.03	19.83	21.63	23.44	25.24	27.05	28.85
27	13.5	3.674	18.37	20.21	22.05	23.88	25.72	27.56	29.39
28	14.0	3.742	18.71	20.58	22.45	24.32	26.19	28.07	29.94
29	14.5	3.808	19.04	20.94	22.85	24.75	26.66	28.56	30.46
30	15.0	3.873	19.37	21.30	23.24	25.17	27.11	29.05	30.98
31	15.5	3.937	19.69	21.65	23.62	25.59	27.56	29.53	31.50
32	16.0	4.000	20.00	22.00	24.00	26.00	28.00	30.00	32.00
33	16.5	4.062	20.31	22.34	24.37	26.40	28.43	30.47	32.50
34	17.0	4.123	20.62	22.68	24.74	26.80	28.86	30.92	32.98
35	17.5	4.183	20.92	23.01	25.10	27.19	29.28	31.37	33.46
36	18.0	4.243	21.21	23.34	25.46	27.58	29.70	31.82	33.94
37	18.5	4.301	21.51	23.66	25.81	27.96	30.11	32.26	34.41
38	19.0	4.359	21.80	23.97	26.15	28.33	30.51	32.69	34.87
39	19.5	4.416	22.08	24.29	26.50	28.70	30.91	33.12	35.33
40	20.0	4.472	22.36	24.60	26.83	29.07	31.30	33.54	35.78
41	20.5	4.528	22.64	24.90	27.17	29.43	31.70	33.96	36.22
42	21.0	4.583	22.91	25.21	27.50	29.79	32.08	34.37	36.66
43	21.5	4.637	23.19	25.50	27.82	30.14	32.46	34.78	37.10
44	22.0	4.690	23.45	25.80	28.14	30.49	32.83	35.18	37.52
45	22.5	4.743	23.72	26.09	28.46	30.83	33.20	35.57	37.94
46	23.0	4.796	23.98	26.38	28.77	31.17	33.57	35.97	38.37
47	23.5	4.848	24.24	26.66	29.09	31.51	33.94	36.36	38.78
48	24.0	4.899	24.49	26.94	29.39	31.84	34.29	36.74	39.19
49	24.5	4.950	24.75	27.23	29.70	32.18	34.65	37.13	39.60
50	25.0	5.000	25.00	27.50	30.00	32.50	35.00	37.50	40.00
51	25.5	5.050	25.25	27.78	30.30	32.83	35.35	37.88	40.40
52	26.0	5.099	25.50	28.04	30.59	33.14	35.69	38.24	40.79
53	26.5	5.148	25.74	28.31	30.89	33.46	36.04	38.61	41.18
54	27.0	5.196	25.98	28.58	31.18	33.77	36.37	38.97	41.57
55	27.5	5.244	26.22	28.84	31.46	34.09	36.71	39.33	41.95
56	28.0	5.292	26.46	29.11	31.75	34.40	37.04	39.69	42.34
57	28.5	5.339	26.69	29.36	32.03	34.70	37.37	40.04	42.71
58	29.0	5.385	26.93	29.62	32.31	35.00	37.70	40.39	43.08
59	29.5	5.431	27.16	29.87	32.59	35.30	38.02	40.73	43.45
60	30.0	5.477	27.39	30.12	32.86	35.60	38.34	41.08	43.82

TWO PLY TWIST TABLE—(Continued)

No. of Yarn to be Twisted	No. of Twisted Yarn	Sq. Root of No. of Twisted Yarn	TWIST PER INCH						
			Square Root Multiplied by						
			4	4½	5	5½	6	6½	7
61	30.5	5.523	22.09	24.85	27.61	30.38	33.14	35.90	38.66
62	31.0	5.568	22.27	25.06	27.84	30.62	33.41	36.19	38.98
63	31.5	5.613	22.45	25.26	28.06	30.87	33.67	36.48	39.29
64	32.0	5.657	22.63	25.46	28.28	31.11	33.94	36.77	39.60
65	32.5	5.701	22.80	25.65	28.50	31.36	34.21	37.06	39.91
66	33.0	5.745	22.98	25.85	28.72	31.60	34.47	37.34	40.22
67	33.5	5.788	23.15	26.05	28.94	31.83	34.73	37.62	40.52
68	34.0	5.831	23.32	26.24	29.15	32.07	34.99	37.90	40.82
69	34.5	5.874	23.50	26.43	29.37	32.31	35.24	38.18	41.12
70	35.0	5.916	23.66	26.62	29.58	32.54	35.50	38.45	41.41
71	35.5	5.958	23.83	26.81	29.79	32.77	35.75	38.73	41.71
72	36.0	6.000	24.00	27.00	30.00	33.00	36.00	39.00	42.00
73	36.5	6.042	24.17	27.19	30.21	33.23	36.25	39.27	42.29
74	37.0	6.083	24.33	27.37	30.41	33.46	36.50	39.54	42.58
75	37.5	6.124	24.50	27.56	30.62	33.68	36.74	39.81	42.87
76	38.0	6.164	24.66	27.74	30.82	33.90	36.99	40.07	43.15
77	38.5	6.205	24.82	27.92	31.02	34.13	37.23	40.33	43.44
78	39.0	6.245	24.98	28.10	31.22	34.35	37.47	40.59	43.72
79	39.5	6.285	25.14	28.28	31.42	34.57	37.71	40.85	44.00
80	40.0	6.325	25.30	28.46	31.62	34.79	37.95	41.11	44.28
81	40.5	6.364	25.46	28.64	31.82	35.00	38.18	41.37	44.55
82	41.0	6.403	25.61	28.81	32.02	35.22	38.42	41.62	44.82
83	41.5	6.442	25.77	28.99	32.21	35.43	38.65	41.87	45.09
84	42.0	6.481	25.92	29.16	32.41	35.65	38.88	42.13	45.37
85	42.5	6.519	26.08	29.34	32.60	35.85	39.11	42.37	45.63
86	43.0	6.557	26.23	29.51	32.79	36.06	39.34	42.62	45.90
87	43.5	6.596	26.38	29.68	32.98	36.28	39.57	42.87	46.17
88	44.0	6.633	26.53	29.85	33.17	36.48	39.80	43.11	46.43
89	44.5	6.671	26.68	30.02	33.35	36.69	40.02	43.36	46.70
90	45.0	6.708	26.83	30.19	33.54	36.89	40.25	43.60	46.96
91	45.5	6.745	26.98	30.35	33.73	37.10	40.47	43.84	47.22
92	46.0	6.782	27.13	30.52	33.91	37.30	40.69	44.08	47.47
93	46.5	6.819	27.28	30.69	34.10	37.50	40.91	44.32	47.73
94	47.0	6.856	27.42	30.85	34.28	37.71	41.13	44.56	47.99
95	47.5	6.892	27.57	31.01	34.46	37.91	41.35	44.80	48.24
96	48.0	6.928	27.71	31.18	34.64	38.10	41.57	45.03	48.50
97	48.5	6.964	27.86	31.34	34.82	38.30	41.79	45.27	48.75
98	49.0	7.000	28.00	31.50	35.00	38.50	42.00	45.50	49.00
99	49.5	7.036	28.14	31.66	35.18	38.70	42.21	45.73	49.25
100	50.0	7.071	28.28	31.82	35.36	38.89	42.43	45.96	49.50
101	50.5	7.106	28.42	31.98	35.53	39.08	42.64	46.19	49.74
102	51.0	7.141	28.56	32.13	35.70	39.28	42.85	46.42	49.99
103	51.5	7.176	28.70	32.29	35.88	39.47	43.06	46.64	50.23
104	52.0	7.211	28.84	32.45	36.06	39.66	43.27	46.87	50.48
105	52.5	7.246	28.98	32.61	36.23	39.85	43.47	47.10	50.72
106	53.0	7.280	29.12	32.76	36.40	40.04	43.68	47.32	50.96
107	53.5	7.314	29.26	32.91	36.57	40.23	43.89	47.54	51.20
108	54.0	7.349	29.40	33.07	36.74	40.42	44.09	47.77	51.44
109	54.5	7.382	29.53	33.22	36.91	40.60	44.29	47.98	51.67
110	55.0	7.416	29.66	33.37	37.08	40.79	44.50	48.20	51.91
111	55.5	7.450	29.80	33.53	37.25	40.98	44.70	48.43	52.15
112	56.0	7.483	29.93	33.67	37.42	41.16	44.90	48.64	52.38
113	56.5	7.517	30.07	33.83	37.58	41.34	45.10	48.86	52.62
114	57.0	7.550	30.20	33.98	37.75	41.53	45.30	49.08	52.85
115	57.5	7.583	30.33	34.12	37.91	41.71	45.50	49.29	53.08
116	58.0	7.616	30.46	34.27	38.08	41.89	45.69	49.50	53.31
117	58.5	7.649	30.60	34.42	38.24	42.07	45.89	49.72	53.54
118	59.0	7.681	30.72	34.56	38.41	42.25	46.09	49.93	53.77
119	59.5	7.714	30.86	34.71	38.57	42.43	46.28	50.14	54.00
120	60.0	7.746	30.98	34.86	38.73	42.60	46.48	50.35	54.22

TWIST TABLE FOR TWISTING

TWO PLY TWIST TABLE—(Continued)

No. of Yarn to be Twisted	No. of Twisted Yarn	Sq. Root of No. of Twisted Yarn	TWIST PER INCH						
			Square Root Multiplied by						
			4	4½	5	5½	6	6½	7
121	60.5	7.778	31.11	35.00	38.89	42.78	46.67	50.56	54.45
122	61.0	7.810	31.24	35.15	39.05	42.96	46.86	50.77	54.67
123	61.5	7.842	31.37	35.29	39.21	43.13	47.05	50.97	54.89
124	62.0	7.874	31.50	35.43	39.37	43.31	47.24	51.18	55.12
125	62.5	7.906	31.62	35.58	39.53	43.48	47.43	51.39	55.34
126	63.0	7.937	31.75	35.72	39.69	43.65	47.62	51.59	55.56
127	63.5	7.969	31.88	35.86	39.84	43.83	47.81	51.80	55.78
128	64.0	8.000	32.00	36.00	40.00	44.00	48.00	52.00	56.00
129	64.5	8.031	32.12	36.14	40.16	44.17	48.19	52.20	56.22
130	65.0	8.062	32.25	36.28	40.31	44.34	48.37	52.40	56.43
131	65.5	8.093	32.37	36.42	40.47	44.51	48.56	52.60	56.65
132	66.0	8.124	32.50	36.56	40.62	44.68	48.74	52.81	56.87
133	66.5	8.155	32.62	36.70	40.77	44.85	48.93	53.01	57.09
134	67.0	8.185	32.74	36.83	40.93	45.02	49.11	53.20	57.30
135	67.5	8.216	32.86	36.97	41.08	45.19	49.30	53.40	57.51
136	68.0	8.246	32.98	37.11	41.23	45.35	49.48	53.60	57.72
137	68.5	8.277	33.11	37.25	41.38	45.52	49.66	53.80	57.94
138	69.0	8.307	33.23	37.38	41.53	45.69	49.84	54.00	58.15
139	69.5	8.337	33.35	37.52	41.68	45.85	50.02	54.19	58.36
140	70.0	8.367	33.47	37.65	41.83	46.02	50.20	54.39	58.57
141	70.5	8.396	33.58	37.78	41.98	46.18	50.38	54.57	58.77
142	71.0	8.426	33.70	37.92	42.13	46.34	50.56	54.77	58.98
143	71.5	8.456	33.82	38.05	42.28	46.51	50.73	54.96	59.19
144	72.0	8.485	33.94	38.18	42.43	46.67	50.91	55.15	59.40
145	72.5	8.515	34.06	38.32	42.58	46.83	51.09	55.35	59.61
146	73.0	8.544	34.18	38.45	42.72	46.99	51.26	55.54	59.81
147	73.5	8.573	34.29	38.58	42.87	47.15	51.44	55.72	60.01
148	74.0	8.602	34.41	38.71	43.01	47.31	51.61	55.91	60.21
149	74.5	8.631	34.52	38.84	43.16	47.47	51.79	56.10	60.42
150	75.0	8.660	34.64	38.97	43.30	47.63	51.96	56.29	60.62
151	75.5	8.689	34.76	39.10	43.45	47.79	52.13	56.48	60.82
152	76.0	8.718	34.87	39.23	43.59	47.95	52.31	56.67	61.03
153	76.5	8.746	34.98	39.36	43.73	48.10	52.48	56.85	61.22
154	77.0	8.775	35.10	39.49	43.88	48.26	52.65	57.04	61.43
155	77.5	8.803	35.21	39.61	44.02	48.42	52.82	57.22	61.62
156	78.0	8.832	35.33	39.74	44.16	48.58	52.99	57.41	61.82
157	78.5	8.860	35.44	39.87	44.30	48.73	53.16	57.59	62.02
158	79.0	8.888	35.55	40.00	44.44	48.88	53.33	57.77	62.22
159	79.5	8.916	35.66	40.12	44.58	49.04	53.50	57.95	62.41
160	80.0	8.944	35.78	40.25	44.72	49.19	53.66	58.14	62.61
161	80.5	8.972	35.89	40.37	44.86	49.35	53.83	58.32	62.80
162	81.0	9.000	36.00	40.50	45.00	49.50	54.00	58.50	63.00
163	81.5	9.028	36.11	40.63	45.14	49.65	54.17	58.68	63.20
164	82.0	9.055	36.22	40.75	45.28	49.80	54.33	58.86	63.39
165	82.5	9.083	36.33	40.87	45.42	49.96	54.50	59.04	63.58
166	83.0	9.110	36.44	41.00	45.55	50.11	54.66	59.22	63.77
167	83.5	9.138	36.55	41.12	45.69	50.26	54.83	59.40	63.97
168	84.0	9.165	36.66	41.24	45.83	50.41	54.99	59.57	64.16
169	84.5	9.192	36.77	41.36	45.96	50.56	55.15	59.75	64.34
170	85.0	9.220	36.88	41.49	46.10	50.71	55.32	59.93	64.54
171	85.5	9.247	36.99	41.61	46.24	50.86	55.48	60.11	64.73
172	86.0	9.274	37.10	41.73	46.37	51.01	55.64	60.28	64.92
173	86.5	9.301	37.20	41.85	46.51	51.16	55.81	60.46	65.11
174	87.0	9.327	37.31	41.97	46.64	51.30	55.96	60.63	65.29
175	87.5	9.354	37.42	42.09	46.77	51.45	56.12	60.80	65.48
176	88.0	9.381	37.52	42.21	46.91	51.60	56.29	60.98	65.67
177	88.5	9.407	37.63	42.33	47.04	51.74	56.44	61.15	65.85
178	89.0	9.434	37.74	42.45	47.17	51.89	56.60	61.32	66.04
179	89.5	9.460	37.84	42.57	47.30	52.03	56.76	61.49	66.22
180	90.0	9.487	37.95	42.69	47.44	52.18	56.92	61.67	66.41

TWIST TABLE FOR TWISTING

THREE PLY TWIST TABLE

No. of Yarn to be Twisted	No. of Twisted Yarn	Sq. Root of No. of Twisted Yarn	TWIST PER INCH						
			Square Root Multiplied by						
			1½	2	2½	3	3½	4	4½
1	.33	.577	.87	1.15	1.44	1.73	2.02	2.31	2.60
2	.67	.817	1.22	1.63	2.04	2.45	2.86	3.27	3.68
3	1.00	1.000	1.50	2.00	2.50	3.00	3.50	4.00	4.50
4	1.33	1.155	1.73	2.31	2.89	3.47	4.04	4.62	5.20
5	1.67	1.291	1.94	2.58	3.23	3.87	4.52	5.16	5.81
6	2.00	1.414	2.12	2.83	3.54	4.24	4.95	5.66	6.36
7	2.33	1.528	2.29	3.06	3.82	4.58	5.35	6.11	6.88
8	2.67	1.633	2.45	3.27	4.08	4.90	5.72	6.53	7.35
9	3.00	1.732	2.60	3.46	4.33	5.20	6.06	6.93	7.79
10	3.33	1.826	2.74	3.65	4.57	5.48	6.39	7.30	8.22
11	3.67	1.915	2.87	3.83	4.79	5.75	6.70	7.66	8.62
12	4.00	2.000	3.00	4.00	5.00	6.00	7.00	8.00	9.00
13	4.33	2.082	3.12	4.16	5.21	6.25	7.29	8.33	9.37
14	4.67	2.160	3.24	4.32	5.40	6.48	7.56	8.64	9.72
15	5.00	2.236	3.35	4.47	5.59	6.71	7.83	8.94	10.06
16	5.33	2.309	3.46	4.62	5.77	6.93	8.08	9.24	10.39
17	5.67	2.380	3.57	4.76	5.95	7.14	8.33	9.52	10.71
18	6.00	2.449	3.67	4.90	6.12	7.35	8.58	9.80	11.03
19	6.33	2.517	3.78	5.03	6.29	7.55	8.81	10.07	11.33
20	6.67	2.582	3.87	5.16	6.46	7.75	9.04	10.33	11.62
21	7.00	2.646	3.97	5.29	6.62	7.94	9.26	10.58	11.91
22	7.33	2.708	4.06	5.42	6.77	8.12	9.48	10.83	12.19
23	7.67	2.769	4.15	5.54	6.92	8.31	9.69	11.08	12.46
24	8.00	2.828	4.24	5.66	7.07	8.48	9.90	11.31	12.73
25	8.33	2.887	4.33	5.77	7.22	8.66	10.10	11.55	12.99
26	8.67	2.944	4.42	5.89	7.36	8.83	10.30	11.78	13.25
27	9.00	3.000	4.50	6.00	7.50	9.00	10.50	12.00	13.50
28	9.33	3.055	4.58	6.11	7.64	9.17	10.69	12.22	13.75
29	9.67	3.109	4.66	6.22	7.77	9.33	10.88	12.44	13.99
30	10.00	3.162	4.74	6.32	7.91	9.49	11.07	12.65	14.23
31	10.33	3.215	4.82	6.43	8.04	9.65	11.25	12.86	14.47
32	10.67	3.266	4.90	6.53	8.17	9.80	11.43	13.06	14.70
33	11.00	3.317	4.98	6.63	8.29	9.95	11.61	13.27	14.93
34	11.33	3.367	5.05	6.73	8.42	10.10	11.78	13.47	15.15
35	11.67	3.416	5.12	6.83	8.54	10.25	11.96	13.66	15.37
36	12.00	3.464	5.20	6.93	8.66	10.39	12.12	13.86	15.59
37	12.33	3.512	5.27	7.02	8.78	10.54	12.29	14.05	15.80
38	12.67	3.559	5.34	7.12	8.90	10.68	12.46	14.24	16.02
39	13.00	3.606	5.41	7.21	9.02	10.82	12.62	14.42	16.23
40	13.33	3.652	5.48	7.30	9.13	10.96	12.78	14.61	16.43
41	13.67	3.697	5.55	7.39	9.24	11.09	12.94	14.79	16.64
42	14.00	3.742	5.61	7.48	9.36	11.23	13.10	14.97	16.85
43	14.33	3.786	5.68	7.57	9.47	11.36	13.25	15.14	17.04
44	14.67	3.830	5.75	7.66	9.58	11.49	13.41	15.32	17.24
45	15.00	3.873	5.81	7.75	9.68	11.62	13.56	15.49	17.43
46	15.33	3.916	5.87	7.83	9.79	11.75	13.71	15.66	17.62
47	15.67	3.958	5.94	7.92	9.90	11.87	13.85	15.83	17.81
48	16.00	4.000	6.00	8.00	10.00	12.00	14.00	16.00	18.00
49	16.33	4.042	6.06	8.08	10.11	12.13	14.15	16.17	18.19
50	16.67	4.083	6.12	8.17	10.21	12.25	14.29	16.33	18.37
51	17.00	4.123	6.18	8.25	10.31	12.37	14.43	16.49	18.55
52	17.33	4.163	6.24	8.33	10.41	12.49	14.57	16.65	18.73
53	17.67	4.203	6.30	8.41	10.51	12.61	14.71	16.81	18.91
54	18.00	4.243	6.36	8.49	10.61	12.73	14.85	16.97	19.09
55	18.33	4.282	6.42	8.56	10.71	12.85	14.99	17.13	19.27
56	18.67	4.321	6.48	8.64	10.80	12.96	15.12	17.28	19.44
57	19.00	4.359	6.54	8.72	10.90	13.08	15.26	17.44	19.62
58	19.33	4.397	6.60	8.79	10.99	13.19	15.39	17.59	19.79
59	19.67	4.435	6.65	8.87	11.09	13.31	15.52	17.74	19.96
60	20.00	4.472	6.71	8.94	11.18	13.42	15.65	17.89	20.12

THREE PLY TWIST TABLE—(Cont'd)

No. of Yarn to be Twisted	No. of Twisted Yarn	Sq. Root of No. of Twisted Yarn	TWIST PER INCH						
			Square Root Multiplied by						
			5	5½	6	6½	7	7½	8
1	.33	.577	2.89	3.17	3.46	3.75	4.04	4.33	4.62
2	.67	.817	4.08	4.49	4.90	5.31	5.72	6.13	6.54
3	1.00	1.000	5.00	5.50	6.00	6.50	7.00	7.50	8.00
4	1.33	1.155	5.77	6.35	6.93	7.51	8.09	8.66	9.24
5	1.67	1.291	6.45	7.10	7.75	8.39	9.04	9.68	10.33
6	2.00	1.414	7.07	7.78	8.49	9.19	9.90	10.61	11.31
7	2.33	1.528	7.64	8.40	9.17	9.93	10.70	11.46	12.22
8	2.67	1.633	8.16	8.98	9.80	10.61	11.43	12.25	13.06
9	3.00	1.732	8.66	9.53	10.39	11.26	12.12	12.99	13.86
10	3.33	1.826	9.13	10.04	10.95	11.87	12.78	13.70	14.61
11	3.67	1.915	9.57	10.53	11.49	12.45	13.41	14.36	15.32
12	4.00	2.000	10.00	11.00	12.00	13.00	14.00	15.00	16.00
13	4.33	2.082	10.41	11.45	12.49	13.53	14.57	15.62	16.66
14	4.67	2.160	10.80	11.88	12.96	14.04	15.12	16.20	17.28
15	5.00	2.236	11.18	12.30	13.42	14.53	15.65	16.77	17.89
16	5.33	2.309	11.55	12.70	13.86	15.01	16.16	17.32	18.47
17	5.67	2.380	11.90	13.09	14.28	15.47	16.66	17.85	19.04
18	6.00	2.449	12.25	13.47	14.70	15.92	17.14	18.37	19.59
19	6.33	2.517	12.58	13.84	15.10	16.36	17.62	18.88	20.14
20	6.67	2.582	12.91	14.20	15.49	16.78	18.07	19.37	20.66
21	7.00	2.646	13.23	14.55	15.87	17.20	18.52	19.85	21.17
22	7.33	2.708	13.54	14.89	16.25	17.60	18.96	20.31	21.66
23	7.67	2.769	13.84	15.23	16.61	18.00	19.38	20.77	22.15
24	8.00	2.828	14.14	15.55	16.97	18.38	19.80	21.21	22.62
25	8.33	2.887	14.43	15.88	17.32	18.77	20.21	21.65	23.10
26	8.67	2.944	14.72	16.19	17.66	19.14	20.61	22.08	23.55
27	9.00	3.000	15.00	16.50	18.00	19.50	21.00	22.50	24.00
28	9.33	3.055	15.28	16.80	18.33	19.86	21.39	22.91	24.44
29	9.67	3.109	15.55	17.10	18.65	20.21	21.76	23.32	24.87
30	10.00	3.162	15.81	17.39	18.97	20.55	22.13	23.72	25.30
31	10.33	3.215	16.07	17.68	19.29	20.90	22.51	24.11	25.72
32	10.67	3.266	16.33	17.96	19.60	21.23	22.86	24.50	26.13
33	11.00	3.317	16.58	18.24	19.90	21.56	23.22	24.88	26.54
34	11.33	3.367	16.83	18.52	20.20	21.89	23.57	25.25	26.94
35	11.67	3.416	17.08	18.79	20.49	22.20	23.91	25.62	27.33
36	12.00	3.464	17.32	19.05	20.78	22.52	24.25	25.98	27.71
37	12.33	3.512	17.56	19.32	21.07	22.83	24.58	26.34	28.10
38	12.67	3.559	17.80	19.57	21.35	23.13	24.91	26.69	28.47
39	13.00	3.606	18.03	19.83	21.63	23.44	25.24	27.05	28.85
40	13.33	3.652	18.26	20.09	21.91	23.74	25.56	27.39	29.22
41	13.67	3.697	18.48	20.33	22.18	24.03	25.88	27.73	29.58
42	14.00	3.742	18.71	20.58	22.45	24.32	26.19	28.07	29.94
43	14.33	3.786	18.93	20.82	22.72	24.61	26.50	28.40	30.29
44	14.67	3.830	19.15	21.07	22.98	24.90	26.81	28.73	30.64
45	15.00	3.873	19.36	21.30	23.24	25.17	27.11	29.05	30.98
46	15.33	3.916	19.58	21.54	23.49	25.45	27.41	29.37	31.33
47	15.67	3.958	19.79	21.77	23.75	25.73	27.71	29.69	31.66
48	16.00	4.000	20.00	22.00	24.00	26.00	28.00	30.00	32.00
49	16.33	4.042	20.21	22.23	24.25	26.27	28.29	30.32	32.34
50	16.67	4.083	20.41	22.46	24.50	26.54	28.58	30.62	32.66
51	17.00	4.123	20.62	22.68	24.74	26.80	28.86	30.92	32.98
52	17.33	4.163	20.82	22.90	24.98	27.06	29.14	31.22	33.30
53	17.67	4.203	21.02	23.12	25.22	27.32	29.42	31.52	33.62
54	18.00	4.243	21.21	23.33	25.46	27.58	29.70	31.82	33.94
55	18.33	4.282	21.41	23.55	25.69	27.83	29.97	32.12	34.26
56	18.67	4.321	21.60	23.77	25.93	28.09	30.25	32.41	34.57
57	19.00	4.359	21.79	23.97	26.15	28.33	30.51	32.69	34.87
58	19.33	4.397	21.98	24.18	26.38	28.58	30.78	32.98	35.18
59	19.67	4.435	22.17	24.39	26.61	28.83	31.05	33.26	35.48
60	20.00	4.472	22.36	24.60	26.83	29.07	31.30	33.54	35.78

THREE PLY TWIST TABLE —(Cont'd)

No. of Yarn to be Twisted	No. of Twisted Yarn	Sq. Root of No. of Twisted Yarn	TWIST PER INCH						
			Square Root Multiplied by						
			4	4½	5	5½	6	6½	7
61	20.33	4.509	18.04	20.29	22.55	24.80	27.05	29.31	31.56
62	20.67	4.546	18.18	20.46	22.73	25.00	27.28	29.55	31.82
63	21.00	4.583	18.33	20.62	22.91	25.21	27.50	29.79	32.08
64	21.33	4.619	18.48	20.79	23.09	25.40	27.71	30.02	32.33
65	21.67	4.655	18.62	20.95	23.27	25.60	27.93	30.26	32.59
66	22.00	4.690	18.76	21.11	23.45	25.80	28.14	30.49	32.83
67	22.33	4.726	18.90	21.27	23.63	25.99	28.35	30.72	33.08
68	22.67	4.761	19.04	21.42	23.80	26.19	28.57	30.95	33.33
69	23.00	4.796	19.18	21.58	23.98	26.38	28.78	31.17	33.57
70	23.33	4.831	19.32	21.74	24.15	26.57	28.99	31.40	33.82
71	23.67	4.865	19.46	21.89	24.32	26.76	29.19	31.62	34.06
72	24.00	4.899	19.60	22.05	24.49	26.94	29.39	31.84	34.29
73	24.33	4.933	19.73	22.20	24.66	27.13	29.60	32.06	34.53
74	24.67	4.967	19.87	22.35	24.83	27.32	29.80	32.29	34.77
75	25.00	5.000	20.00	22.50	25.00	27.50	30.00	32.50	35.00
76	25.33	5.033	20.13	22.65	25.17	27.68	30.20	32.71	35.23
77	25.67	5.066	20.26	22.80	25.33	27.86	30.40	32.93	35.46
78	26.00	5.099	20.40	22.95	25.50	28.04	30.59	33.14	35.69
79	26.33	5.132	20.53	23.09	25.66	28.23	30.79	33.36	35.92
80	26.67	5.164	20.66	23.24	25.82	28.40	30.98	33.57	36.15
81	27.00	5.196	20.78	23.38	25.98	28.58	31.18	33.77	36.37
82	27.33	5.228	20.91	23.53	26.14	28.75	31.37	33.98	36.60
83	27.67	5.260	21.04	23.67	26.30	28.93	31.56	34.19	36.82
84	28.00	5.292	21.17	23.81	26.46	29.11	31.75	34.40	37.04
85	28.33	5.323	21.29	23.95	26.61	29.28	31.94	34.60	37.26
86	28.67	5.354	21.42	24.09	26.77	29.45	32.12	34.80	37.48
87	29.00	5.385	21.54	24.23	26.93	29.62	32.31	35.00	37.70
88	29.33	5.416	21.66	24.37	27.08	29.79	32.50	35.20	37.91
89	29.67	5.447	21.79	24.51	27.23	29.96	32.68	35.41	38.13
90	30.00	5.477	21.91	24.65	27.39	30.12	32.86	35.60	38.34
91	30.33	5.508	22.03	24.79	27.54	30.29	33.05	35.80	38.56
92	30.67	5.538	22.15	24.92	27.69	30.46	33.23	36.00	38.77
93	31.00	5.568	22.27	25.06	27.84	30.62	33.41	36.19	38.98
94	31.33	5.598	22.39	25.19	27.99	30.79	33.59	36.39	39.19
95	31.67	5.627	22.51	25.32	28.14	30.95	33.76	36.58	39.39
96	32.00	5.657	22.63	25.46	28.28	31.11	33.94	36.77	39.60
97	32.33*	5.686	22.74	25.59	28.43	31.27	34.12	36.96	39.80
98	32.67	5.716	22.86	25.72	28.58	31.44	34.30	37.15	40.01
99	33.00	5.745	22.98	25.85	28.72	31.60	34.47	37.34	40.22
100	33.33	5.774	23.10	25.98	28.87	31.76	34.64	37.53	40.42
101	33.67	5.802	23.21	26.11	29.01	31.91	34.81	37.71	40.61
102	34.00	5.831	23.32	26.24	29.15	32.07	34.99	37.90	40.82
103	34.33	5.860	23.44	26.37	29.30	32.23	35.16	38.09	41.02
104	34.67	5.888	23.55	26.50	29.44	32.38	35.33	38.27	41.22
105	35.00	5.916	23.66	26.62	29.58	32.54	35.50	38.45	41.41
106	35.33	5.944	23.78	26.75	29.72	32.69	35.67	38.64	41.61
107	35.67	5.972	23.89	26.87	29.86	32.85	35.83	38.82	41.80
108	36.00	6.000	24.00	27.00	30.00	33.00	36.00	39.00	42.00
109	36.33	6.028	24.11	27.13	30.14	33.15	36.17	39.18	42.20
110	36.67	6.055	24.22	27.25	30.28	33.30	36.33	39.36	42.39
111	37.00	6.083	24.33	27.37	30.41	33.46	36.50	39.54	42.58
112	37.33	6.110	24.44	27.50	30.55	33.61	36.66	39.72	42.77
113	37.67	6.137	24.55	27.62	30.69	33.75	36.82	39.89	42.96
114	38.00	6.164	24.66	27.74	30.82	33.90	36.99	40.07	43.15
115	38.33	6.191	24.76	27.86	30.96	34.05	37.15	40.24	43.34
116	38.67	6.218	24.87	27.98	31.09	34.20	37.31	40.42	43.53
117	39.00	6.245	24.98	28.10	31.22	34.35	37.47	40.59	43.72
118	39.33	6.272	25.09	28.22	31.36	34.50	37.63	40.77	43.90
119	39.67	6.298	25.19	28.34	31.49	34.64	37.79	40.94	44.09
120	40.00	6.325	25.30	28.46	31.62	34.79	37.95	41.11	44.28

TWIST TABLE FOR TWISTING

THREE PLY TWIST TABLE—(Cont'd)

No. of Yarn to be Twisted	No. of Twisted Yarn	Sq. Root of No. of Twisted Yarn	TWIST PER INCH						
			Square Root Multiplied by						
			4	4½	5	5½	6	6½	7
121	40.33	6.351	25.40	28.58	31.76	34.93	38.11	41.28	44.46
122	40.67	6.377	25.51	28.70	31.89	35.07	38.26	41.45	44.64
123	41.00	6.403	25.61	28.81	32.02	35.22	38.42	41.62	44.82
124	41.33	6.429	25.72	28.93	32.15	35.36	38.57	41.79	45.00
125	41.67	6.455	25.82	29.05	32.28	35.50	38.73	41.96	45.19
126	42.00	6.481	25.92	29.16	32.41	35.65	38.89	42.13	45.37
127	42.33	6.506	26.02	29.28	32.53	35.78	39.04	42.29	45.54
128	42.67	6.532	26.13	29.39	32.66	35.93	39.19	42.46	45.72
129	43.00	6.557	26.23	29.51	32.79	36.06	39.34	42.62	45.90
130	43.33	6.583	26.33	29.62	32.92	36.21	39.50	42.79	46.08
131	43.67	6.608	26.43	29.74	33.04	36.34	39.65	42.95	46.26
132	44.00	6.633	26.53	29.85	33.17	36.48	39.80	43.11	46.43
133	44.33	6.658	26.63	29.96	33.29	36.62	39.95	43.28	46.61
134	44.67	6.683	26.73	30.07	33.42	36.76	40.10	43.44	46.78
135	45.00	6.708	26.83	30.19	33.54	36.89	40.25	43.60	46.96
136	45.33	6.733	26.93	30.30	33.67	37.03	40.40	43.76	47.13
137	45.67	6.758	27.03	30.41	33.79	37.17	40.55	43.93	47.31
138	46.00	6.782	27.13	30.52	33.91	37.30	40.69	44.08	47.47
139	46.33	6.807	27.23	30.63	34.04	37.44	40.84	44.25	47.65
140	46.67	6.831	27.32	30.74	34.16	37.57	40.99	44.40	47.82
141	47.00	6.856	27.42	30.85	34.28	37.71	41.14	44.56	47.99
142	47.33	6.880	27.52	30.96	34.40	37.84	41.28	44.72	48.16
143	47.67	6.904	27.62	31.07	34.52	37.97	41.42	44.88	48.33
144	48.00	6.928	27.71	31.18	34.64	38.10	41.57	45.04	48.50
145	48.33	6.952	27.81	31.28	34.76	38.24	41.71	45.19	48.66
146	48.67	6.976	27.90	31.39	34.88	38.37	41.86	45.34	48.83
147	49.00	7.000	28.00	31.50	35.00	38.50	42.00	45.50	49.00
148	49.33	7.024	28.10	31.61	35.12	38.63	42.14	45.66	49.17
149	49.67	7.048	28.19	31.72	35.24	38.76	42.29	45.81	49.34
150	50.00	7.071	28.28	31.82	35.36	38.89	42.43	45.96	49.50
151	50.33	7.095	28.38	31.93	35.48	39.02	42.57	46.12	49.67
152	50.67	7.118	28.47	32.03	35.59	39.15	42.71	46.27	49.83
153	51.00	7.142	28.57	32.14	35.71	39.28	42.85	46.42	49.99
154	51.33	7.165	28.66	32.24	35.83	39.41	42.99	46.57	50.16
155	51.67	7.188	28.75	32.35	35.94	39.53	43.13	46.72	50.32
156	52.00	7.211	28.84	32.45	36.06	39.66	43.27	46.87	50.48
157	52.33	7.234	28.94	32.55	36.17	39.79	43.40	47.02	50.64
158	52.67	7.257	29.03	32.66	36.29	39.91	43.54	47.17	50.80
159	53.00	7.280	29.12	32.76	36.40	40.04	43.68	47.32	50.96
160	53.33	7.303	29.21	32.86	36.52	40.17	43.82	47.47	51.12
161	53.67	7.326	29.30	32.97	36.63	40.29	43.96	47.62	51.28
162	54.00	7.348	29.39	33.07	36.74	40.41	44.09	47.76	51.44
163	54.33	7.371	29.48	33.17	36.86	40.54	44.23	47.91	51.60
164	54.67	7.394	29.58	33.27	36.97	40.67	44.36	48.06	51.76
165	55.00	7.417	29.67	33.38	37.09	40.79	44.50	48.21	51.92
166	55.33	7.439	29.76	33.48	37.20	40.91	44.63	48.35	52.07
167	55.67	7.461	29.84	33.57	37.31	41.04	44.77	48.50	52.23
168	56.00	7.483	29.93	33.67	37.42	41.16	44.90	48.64	52.38
169	56.33	7.506	30.02	33.78	37.53	41.28	45.04	48.79	52.54
170	56.67	7.528	30.11	33.88	37.64	41.40	45.17	48.93	52.70
171	57.00	7.550	30.20	33.98	37.75	41.53	45.30	49.08	52.85
172	57.33	7.572	30.29	34.07	37.86	41.65	45.43	49.22	53.00
173	57.67	7.594	30.38	34.17	37.97	41.77	45.56	49.36	53.16
174	58.00	7.616	30.46	34.27	38.08	41.89	45.70	49.50	53.31
175	58.33	7.638	30.55	34.37	38.19	42.01	45.83	49.65	53.47
176	58.67	7.659	30.64	34.47	38.30	42.12	45.95	49.78	53.61
177	59.00	7.681	30.72	34.56	38.41	42.25	46.09	49.93	53.77
178	59.33	7.703	30.81	34.66	38.52	42.37	46.22	50.07	53.92
179	59.67	7.724	30.90	34.76	38.62	42.48	46.34	50.21	54.07
180	60.00	7.746	30.98	34.86	38.73	42.60	46.48	50.35	54.22

FOUR PLY TWIST TABLE

No. of Yarn to be Twisted	No. of Twisted Yarn	Sq. Root of No. of Twisted Yarn	TWIST PER INCH						
			Square Root Multiplied by						
			1½	2	2½	3	3½	4	4½
1	.25	.500	.75	1.00	1.25	1.50	1.75	2.00	2.25
2	.50	.707	1.06	1.41	1.77	2.12	2.47	2.83	3.18
3	.75	.866	1.30	1.73	2.17	2.60	3.03	3.46	3.90
4	1.00	1.000	1.50	2.00	2.50	3.00	3.50	4.00	4.50
5	1.25	1.118	1.68	2.24	2.80	3.35	3.91	4.47	5.03
6	1.50	1.225	1.84	2.45	3.06	3.68	4.29	4.90	5.51
7	1.75	1.323	1.98	2.65	3.31	3.97	4.63	5.29	5.95
8	2.00	1.414	2.12	2.83	3.54	4.24	4.95	5.66	6.36
9	2.25	1.500	2.25	3.00	3.75	4.50	5.25	6.00	6.75
10	2.50	1.581	2.37	3.16	3.95	4.74	5.53	6.32	7.11
11	2.75	1.658	2.49	3.32	4.15	4.97	5.80	6.63	7.46
12	3.00	1.732	2.60	3.46	4.33	5.20	6.06	6.93	7.79
13	3.25	1.803	2.70	3.61	4.51	5.41	6.31	7.21	8.11
14	3.50	1.871	2.81	3.74	4.68	5.61	6.55	7.48	8.42
15	3.75	1.936	2.91	3.87	4.84	5.81	6.78	7.74	8.71
16	4.00	2.000	3.00	4.00	5.00	6.00	7.00	8.00	9.00
17	4.25	2.062	3.09	4.12	5.16	6.19	7.22	8.25	9.28
18	4.50	2.121	3.18	4.24	5.30	6.36	7.42	8.48	9.54
19	4.75	2.179	3.27	4.36	5.45	6.54	7.63	8.72	9.81
20	5.00	2.236	3.35	4.47	5.59	6.71	7.83	8.94	10.06
21	5.25	2.291	3.44	4.58	5.73	6.87	8.02	9.17	10.31
22	5.50	2.345	3.52	4.69	5.86	7.04	8.21	9.38	10.55
23	5.75	2.398	3.60	4.80	6.00	7.19	8.39	9.59	10.79
24	6.00	2.449	3.68	4.90	6.13	7.35	8.58	9.80	11.03
25	6.25	2.500	3.75	5.00	6.25	7.50	8.75	10.00	11.25
26	6.50	2.550	3.83	5.10	6.38	7.65	8.93	10.20	11.48
27	6.75	2.598	3.90	5.20	6.50	7.79	9.09	10.39	11.69
28	7.00	2.646	3.97	5.29	6.62	7.94	9.26	10.58	11.91
29	7.25	2.693	4.04	5.39	6.73	8.08	9.43	10.77	12.12
30	7.50	2.739	4.11	5.48	6.85	8.22	9.59	10.96	12.33
31	7.75	2.784	4.18	5.57	6.96	8.35	9.74	11.14	12.53
32	8.00	2.828	4.24	5.66	7.07	8.48	9.90	11.31	12.73
33	8.25	2.872	4.31	5.74	7.18	8.62	10.05	11.49	12.92
34	8.50	2.915	4.37	5.83	7.29	8.75	10.21	11.66	13.12
35	8.75	2.958	4.44	5.92	7.40	8.87	10.35	11.83	13.31
36	9.00	3.000	4.50	6.00	7.50	9.00	10.50	12.00	13.50
37	9.25	3.041	4.56	6.08	7.60	9.12	10.64	12.16	13.68
38	9.50	3.082	4.62	6.16	7.71	9.25	10.79	12.33	13.87
39	9.75	3.123	4.68	6.25	7.81	9.37	10.93	12.49	14.05
40	10.00	3.162	4.74	6.32	7.91	9.49	11.07	12.65	14.23
41	10.25	3.202	4.80	6.40	8.01	9.61	11.21	12.81	14.41
42	10.50	3.240	4.86	6.48	8.10	9.72	11.34	12.96	14.58
43	10.75	3.279	4.92	6.56	8.20	9.84	11.48	13.12	14.76
44	11.00	3.317	4.98	6.63	8.29	9.95	11.61	13.27	14.93
45	11.25	3.354	5.03	6.71	8.39	10.06	11.74	13.42	15.09
46	11.50	3.391	5.09	6.78	8.48	10.17	11.87	13.56	15.26
47	11.75	3.428	5.14	6.86	8.57	10.28	12.00	13.71	15.43
48	12.00	3.464	5.20	6.93	8.66	10.39	12.12	13.86	15.59
49	12.25	3.500	5.25	7.00	8.75	10.50	12.25	14.00	15.75
50	12.50	3.536	5.30	7.07	8.84	10.61	12.38	14.14	15.91
51	12.75	3.571	5.36	7.14	8.93	10.71	12.50	14.28	16.07
52	13.00	3.606	5.41	7.21	9.02	10.82	12.62	14.42	16.23
53	13.25	3.640	5.46	7.28	9.10	10.92	12.74	14.56	16.38
54	13.50	3.674	5.51	7.35	9.19	11.02	12.86	14.70	16.53
55	13.75	3.708	5.56	7.42	9.27	11.12	12.98	14.83	16.69
56	14.00	3.742	5.61	7.48	9.36	11.23	13.10	14.97	16.84
57	14.25	3.775	5.66	7.55	9.44	11.33	13.21	15.10	16.99
58	14.50	3.808	5.71	7.62	9.52	11.42	13.33	15.23	17.14
59	14.75	3.841	5.76	7.68	9.60	11.52	13.44	15.36	17.28
60	15.00	3.873	5.81	7.75	9.68	11.62	13.56	15.49	17.43

FOUR PLY TWIST TABLE — (Continued)

No. of Yarn to be Twisted	No. of Twisted Yarn	Sq. Root of No. of Twisted Yarn	TWIST PER INCH						
			Square Root Multiplied by						
			5	5½	6	6½	7	7½	8
1	.25	.500	2.50	2.75	3.00	3.25	3.50	3.75	4.00
2	.50	.707	3.54	3.89	4.24	4.60	4.95	5.30	5.66
3	.75	.866	4.33	4.76	5.20	5.63	6.06	6.50	6.93
4	1.00	1.000	5.00	5.50	6.00	6.50	7.00	7.50	8.00
5	1.25	1.118	5.59	6.15	6.71	7.27	7.83	8.39	8.94
6	1.50	1.225	6.12	6.74	7.35	7.96	8.58	9.19	9.80
7	1.75	1.323	6.61	7.28	7.94	8.60	9.26	9.92	10.58
8	2.00	1.414	7.07	7.78	8.49	9.19	9.90	10.61	11.31
9	2.25	1.500	7.50	8.25	9.00	9.75	10.50	11.25	12.00
10	2.50	1.581	7.91	8.70	9.49	10.28	11.07	11.86	12.65
11	2.75	1.658	8.29	9.12	9.95	10.78	11.61	12.44	13.26
12	3.00	1.732	8.66	9.53	10.39	11.26	12.12	12.99	13.86
13	3.25	1.803	9.01	9.92	10.82	11.72	12.62	13.52	14.42
14	3.50	1.871	9.35	10.29	11.22	12.16	13.10	14.03	14.97
15	3.75	1.936	9.68	10.65	11.62	12.59	13.55	14.52	15.49
16	4.00	2.000	10.00	11.00	12.00	13.00	14.00	15.00	16.00
17	4.25	2.062	10.31	11.34	12.37	13.40	14.43	15.47	16.50
18	4.50	2.121	10.61	11.67	12.73	13.79	14.85	15.91	16.97
19	4.75	2.179	10.90	11.98	13.07	14.16	15.25	16.34	17.43
20	5.00	2.236	11.18	12.30	13.42	14.53	15.65	16.77	17.89
21	5.25	2.291	11.46	12.60	13.75	14.89	16.04	17.18	18.33
22	5.50	2.345	11.73	12.90	14.07	15.24	16.42	17.59	18.76
23	5.75	2.398	11.99	13.19	14.39	15.59	16.79	17.99	19.18
24	6.00	2.449	12.25	13.48	14.70	15.93	17.15	18.37	19.59
25	6.25	2.500	12.50	13.75	15.00	16.25	17.50	18.75	20.00
26	6.50	2.550	12.75	14.03	15.30	16.58	17.85	19.13	20.40
27	6.75	2.598	12.99	14.29	15.59	16.89	18.19	19.49	20.78
28	7.00	2.646	13.23	14.55	15.87	17.20	18.52	19.85	21.17
29	7.25	2.693	13.46	14.81	16.16	17.50	18.85	20.20	21.54
30	7.50	2.739	13.69	15.06	16.43	17.80	19.17	20.54	21.91
31	7.75	2.784	13.92	15.31	16.70	18.10	19.49	20.88	22.27
32	8.00	2.828	14.14	15.55	16.97	18.38	19.80	21.21	22.62
33	8.25	2.872	14.36	15.80	17.23	18.67	20.10	21.54	22.98
34	8.50	2.915	14.58	16.04	17.49	18.95	20.41	21.87	23.32
35	8.75	2.958	14.79	16.27	17.75	19.23	20.71	22.19	23.66
36	9.00	3.000	15.00	16.50	18.00	19.50	21.00	22.50	24.00
37	9.25	3.041	15.21	16.73	18.25	19.77	21.29	22.81	24.33
38	9.50	3.082	15.41	16.95	18.49	20.03	21.57	23.12	24.66
39	9.75	3.123	15.62	17.18	18.74	20.30	21.86	23.42	24.98
40	10.00	3.162	15.81	17.39	18.97	20.55	22.13	23.72	25.30
41	10.25	3.202	16.01	17.61	19.21	20.81	22.41	24.02	25.62
42	10.50	3.240	16.20	17.82	19.44	21.06	22.68	24.30	25.92
43	10.75	3.279	16.39	18.03	19.67	21.31	22.95	24.59	26.23
44	11.00	3.317	16.58	18.24	19.90	21.56	23.22	24.88	26.54
45	11.25	3.354	16.77	18.45	20.12	21.80	23.48	25.16	26.83
46	11.50	3.391	16.96	18.65	20.35	22.04	23.74	25.43	27.13
47	11.75	3.428	17.14	18.85	20.57	22.28	24.00	25.71	27.42
48	12.00	3.464	17.32	19.05	20.78	22.52	24.25	25.98	27.71
49	12.25	3.500	17.50	19.25	21.00	22.75	24.50	26.25	28.00
50	12.50	3.536	17.68	19.45	21.22	22.98	24.75	26.52	28.29
51	12.75	3.571	17.85	19.64	21.42	23.21	25.00	26.78	28.57
52	13.00	3.606	18.03	19.83	21.63	23.44	25.24	27.05	28.85
53	13.25	3.640	18.20	20.02	21.84	23.66	25.48	27.30	29.12
54	13.50	3.674	18.37	20.21	22.05	23.88	25.72	27.56	29.39
55	13.75	3.708	18.54	20.39	22.25	24.10	25.96	27.81	29.66
56	14.00	3.742	18.71	20.58	22.45	24.32	26.19	28.07	29.94
57	14.25	3.775	18.87	20.76	22.65	24.54	26.43	28.31	30.20
58	14.50	3.808	19.04	20.94	22.85	24.75	26.66	28.56	30.46
59	14.75	3.841	19.20	21.13	23.05	24.97	26.89	28.81	30.73
60	15.00	3.873	19.37	21.30	23.24	25.17	27.11	29.05	30.98

FOUR PLY TWIST TABLE—(Continued)

No. of Yarn to be Twisted	No. of Twisted Yarn	Sq. Root of No. of Twisted Yarn	TWIST PER INCH						
			Square Root Multiplied by						
			4	4½	5	5½	6	6½	7
61	15.25	3.905	15.62	17.57	19.53	21.48	23.43	25.38	27.34
62	15.50	3.937	15.75	17.72	19.69	21.65	23.62	25.59	27.56
63	15.75	3.969	15.88	17.86	19.85	21.83	23.81	25.80	27.78
64	16.00	4.000	16.00	18.00	20.00	22.00	24.00	26.00	28.00
65	16.25	4.031	16.12	18.14	20.16	22.17	24.19	26.20	28.22
66	16.50	4.062	16.25	18.28	20.31	22.34	24.37	26.40	28.43
67	16.75	4.093	16.37	18.42	20.46	22.51	24.56	26.60	28.65
68	17.00	4.123	16.49	18.55	20.62	22.68	24.74	26.80	28.86
69	17.25	4.153	16.61	18.69	20.77	22.84	24.92	26.99	29.07
70	17.50	4.183	16.73	18.82	20.92	23.01	25.10	27.19	29.28
71	17.75	4.213	16.85	18.96	21.07	23.17	25.28	27.38	29.49
72	18.00	4.243	16.97	19.09	21.21	23.34	25.46	27.58	29.70
73	18.25	4.272	17.09	19.22	21.36	23.50	25.63	27.77	29.90
74	18.50	4.301	17.20	19.35	21.51	23.66	25.81	27.96	30.11
75	18.75	4.330	17.32	19.49	21.65	23.82	25.98	28.15	30.31
76	19.00	4.359	17.44	19.62	21.79	23.97	26.15	28.33	30.51
77	19.25	4.388	17.55	19.75	21.94	24.13	26.33	28.52	30.72
78	19.50	4.416	17.66	19.87	22.08	24.29	26.50	28.70	30.91
79	19.75	4.444	17.78	20.00	22.22	24.44	26.66	28.89	31.11
80	20.00	4.472	17.89	20.12	22.36	24.60	26.83	29.07	31.30
81	20.25	4.500	18.00	20.25	22.50	24.75	27.00	29.25	31.50
82	20.50	4.528	18.11	20.38	22.64	24.90	27.17	29.43	31.70
83	20.75	4.555	18.22	20.50	22.78	25.05	27.33	29.61	31.89
84	21.00	4.583	18.33	20.62	22.92	25.21	27.50	29.79	32.08
85	21.25	4.610	18.44	20.75	23.05	25.36	27.66	29.97	32.27
86	21.50	4.637	18.55	20.87	23.19	25.50	27.82	30.14	32.46
87	21.75	4.664	18.66	20.99	23.32	25.65	27.98	30.32	32.65
88	22.00	4.690	18.76	21.11	23.45	25.80	28.14	30.49	32.83
89	22.25	4.717	18.87	21.23	23.59	25.94	28.30	30.66	33.02
90	22.50	4.743	18.97	21.34	23.72	26.09	28.46	30.83	33.20
91	22.75	4.770	19.08	21.47	23.85	26.24	28.62	31.00	33.39
92	23.00	4.796	19.18	21.58	23.98	26.38	28.78	31.17	33.57
93	23.25	4.822	19.29	21.70	24.11	26.52	28.93	31.34	33.75
94	23.50	4.848	19.39	21.82	24.24	26.66	29.09	31.51	33.94
95	23.75	4.873	19.49	21.93	24.37	26.80	29.24	31.67	34.11
96	24.00	4.899	19.60	22.05	24.49	26.94	29.39	31.84	34.29
97	24.25	4.924	19.70	22.16	24.62	27.08	29.55	32.01	34.47
98	24.50	4.950	19.80	22.28	24.75	27.23	29.70	32.18	34.65
99	24.75	4.975	19.90	22.39	24.87	27.36	29.85	32.34	34.83
100	25.00	5.000	20.00	22.50	25.00	27.50	30.00	32.50	35.00
101	25.25	5.025	20.10	22.61	25.12	27.64	30.15	32.66	35.18
102	25.50	5.050	20.20	22.73	25.25	27.78	30.30	32.83	35.35
103	25.75	5.074	20.30	22.83	25.37	27.91	30.45	32.98	35.52
104	26.00	5.099	20.40	22.95	25.50	28.04	30.59	33.14	35.69
105	26.25	5.124	20.50	23.06	25.62	28.18	30.74	33.31	35.87
106	26.50	5.148	20.59	23.17	25.74	28.31	30.89	33.46	36.04
107	26.75	5.172	20.69	23.27	25.86	28.45	31.03	33.62	36.20
108	27.00	5.196	20.78	23.38	25.98	28.58	31.18	33.77	36.37
109	27.25	5.220	20.88	23.49	26.10	28.71	31.32	33.93	36.54
110	27.50	5.244	20.98	23.60	26.22	28.84	31.46	34.09	36.71
111	27.75	5.268	21.07	23.71	26.34	28.97	31.61	34.24	36.88
112	28.00	5.292	21.17	23.81	26.46	29.11	31.75	34.40	37.04
113	28.25	5.315	21.26	23.92	26.58	29.23	31.89	34.55	37.20
114	28.50	5.339	21.36	24.03	26.69	29.36	32.03	34.70	37.37
115	28.75	5.362	21.45	24.13	26.81	29.49	32.17	34.85	37.53
116	29.00	5.385	21.54	24.23	26.93	29.62	32.31	35.00	37.70
117	29.25	5.408	21.63	24.34	27.04	29.74	32.45	35.15	37.86
118	29.50	5.431	21.72	24.44	27.16	29.87	32.59	35.30	38.02
119	29.75	5.454	21.82	24.54	27.27	30.00	32.73	35.45	38.18
120	30.00	5.477	21.91	24.65	27.39	30.12	32.86	35.60	38.34

FOUR PLY TWIST TABLE—(Continued)

No. of Yarn to be Twisted	No. of Twisted Yarn	Sq. Root of No. of Twisted Yarn	TWIST PER INCH						
			Square Root Multiplied by						
			4	4½	5	5½	6	6½	7
121	30.25	5.500	22.00	24.75	27.50	30.25	33.00	35.75	38.50
122	30.50	5.523	22.09	24.85	27.61	30.38	33.14	35.90	38.66
123	30.75	5.545	22.18	24.95	27.73	30.50	33.27	36.04	38.82
124	31.00	5.568	22.27	25.06	27.84	30.62	33.41	36.19	38.98
125	31.25	5.590	22.36	25.16	27.95	30.75	33.54	36.34	39.13
126	31.50	5.613	22.45	25.26	28.06	30.87	33.68	36.48	39.29
127	31.75	5.635	22.54	25.36	28.17	30.99	33.81	36.63	39.45
128	32.00	5.657	22.63	25.46	28.28	31.11	33.94	36.77	39.60
129	32.25	5.679	22.72	25.56	28.39	31.23	34.07	36.91	39.75
130	32.50	5.701	22.80	25.65	28.50	31.36	34.21	37.06	39.91
131	32.75	5.723	22.89	25.75	28.61	31.48	34.34	37.20	40.06
132	33.00	5.745	22.98	25.85	28.72	31.60	34.47	37.34	40.22
133	33.25	5.766	23.06	25.95	28.83	31.71	34.60	37.48	40.36
134	33.50	5.788	23.15	26.05	28.94	31.83	34.73	37.62	40.52
135	33.75	5.810	23.24	26.15	29.05	31.96	34.86	37.77	40.67
136	34.00	5.831	23.32	26.24	29.15	32.07	34.99	37.90	40.82
137	34.25	5.852	23.41	26.33	29.26	32.19	35.11	38.04	40.96
138	34.50	5.874	23.50	26.43	29.37	32.31	35.24	38.18	41.12
139	34.75	5.895	23.58	26.53	29.47	32.42	35.37	38.32	41.27
140	35.00	5.916	23.66	26.62	29.58	32.54	35.50	38.45	41.41
141	35.25	5.937	23.75	26.72	29.69	32.65	35.62	38.59	41.56
142	35.50	5.958	23.83	26.81	29.79	32.77	35.75	38.73	41.71
143	35.75	5.979	23.92	26.91	29.90	32.88	35.87	38.86	41.85
144	36.00	6.000	24.00	27.00	30.00	33.00	36.00	39.00	42.00
145	36.25	6.021	24.08	27.09	30.10	33.12	36.13	39.14	42.15
146	36.50	6.042	24.17	27.19	30.21	33.23	36.25	39.27	42.29
147	36.75	6.062	24.25	27.28	30.31	33.34	36.37	39.40	42.43
148	37.00	6.083	24.33	27.37	30.41	33.46	36.50	39.54	42.58
149	37.25	6.103	24.41	27.46	30.52	33.57	36.62	39.67	42.72
150	37.50	6.124	24.50	27.56	30.62	33.68	36.74	39.81	42.87
151	37.75	6.144	24.58	27.65	30.72	33.79	36.86	39.94	43.01
152	38.00	6.164	24.66	27.74	30.82	33.90	36.98	40.07	43.15
153	38.25	6.185	24.74	27.83	30.93	34.02	37.11	40.20	43.30
154	38.50	6.205	24.82	27.92	31.03	34.13	37.23	40.33	43.44
155	38.75	6.225	24.90	28.01	31.13	34.24	37.35	40.46	43.58
156	39.00	6.245	24.98	28.10	31.23	34.35	37.47	40.59	43.72
157	39.25	6.265	25.06	28.19	31.33	34.46	37.59	40.72	43.86
158	39.50	6.285	25.14	28.28	31.43	34.57	37.71	40.85	44.00
159	39.75	6.305	25.22	28.37	31.53	34.68	37.83	40.98	44.14
160	40.00	6.325	25.30	28.46	31.63	34.79	37.95	41.11	44.28
161	40.25	6.344	25.38	28.55	31.72	34.89	38.06	41.24	44.41
162	40.50	6.364	25.46	28.64	31.82	35.00	38.18	41.37	44.55
163	40.75	6.384	25.54	28.73	31.92	35.11	38.30	41.50	44.69
164	41.00	6.403	25.61	28.81	32.02	35.22	38.42	41.62	44.82
165	41.25	6.423	25.69	28.90	32.12	35.33	38.54	41.75	44.96
166	41.50	6.442	25.77	28.99	32.21	35.43	38.65	41.87	45.09
167	41.75	6.461	25.84	29.07	32.31	35.54	38.77	42.00	45.23
168	42.00	6.481	25.92	29.16	32.41	35.65	38.89	42.13	45.37
169	42.25	6.500	26.00	29.25	32.50	35.75	39.00	42.25	45.50
170	42.50	6.519	26.08	29.34	32.60	35.85	39.11	42.37	45.63
171	42.75	6.538	26.15	29.42	32.69	35.96	39.23	42.50	45.77
172	43.00	6.557	26.23	29.51	32.79	36.06	39.34	42.62	45.90
173	43.25	6.576	26.30	29.59	32.88	36.17	39.46	42.74	46.03
174	43.50	6.595	26.38	29.68	32.98	36.27	39.57	42.87	46.17
175	43.75	6.614	26.46	29.76	33.07	36.38	39.68	42.99	46.30
176	44.00	6.633	26.53	29.85	33.17	36.48	39.80	43.11	46.43
177	44.25	6.652	26.61	29.93	33.26	36.59	39.91	43.24	46.56
178	44.50	6.671	26.68	30.02	33.36	36.69	40.03	43.36	46.70
179	44.75	6.690	26.76	30.11	33.45	36.80	40.14	43.49	46.83
180	45.00	6.708	26.83	30.19	33.54	36.89	40.25	43.60	46.96

FIVE PLY TWIST TABLE

No. of Yarn to be Twisted	No. of Twisted Yarn	Sq. Root of No. of Twisted Yarn	TWIST PER INCH						
			Square Root Multiplied by						
			1½	2	2½	3	3½	4	4½
1	.2	.447	.67	.89	1.11	1.34	1.56	1.79	2.01
2	.4	.632	.95	1.26	1.58	1.90	2.22	2.53	2.85
3	.6	.775	1.16	1.55	1.94	2.33	2.71	3.10	3.49
4	.8	.894	1.34	1.79	2.24	2.68	3.13	3.58	4.02
5	1.0	1.000	1.50	2.00	2.50	3.00	3.50	4.00	4.50
6	1.2	1.095	1.64	2.19	2.74	3.29	3.83	4.38	4.93
7	1.4	1.183	1.77	2.37	2.96	3.55	4.14	4.73	5.32
8	1.6	1.265	1.90	2.53	3.16	3.80	4.43	5.06	5.69
9	1.8	1.342	2.01	2.68	3.36	4.03	4.70	5.37	6.04
10	2.0	1.414	2.12	2.83	3.54	4.24	4.95	5.66	6.36
11	2.2	1.483	2.22	2.97	3.71	4.45	5.19	5.93	6.67
12	2.4	1.549	2.32	3.10	3.87	4.65	5.42	6.20	6.97
13	2.6	1.612	2.42	3.22	4.03	4.84	5.65	6.45	7.26
14	2.8	1.673	2.51	3.35	4.18	5.02	5.86	6.69	7.53
15	3.0	1.732	2.60	3.46	4.33	5.20	6.06	6.93	7.79
16	3.2	1.789	2.68	3.58	4.47	5.37	6.26	7.16	8.05
17	3.4	1.844	2.77	3.69	4.61	5.53	6.45	7.38	8.30
18	3.6	1.897	2.85	3.79	4.74	5.69	6.64	7.59	8.54
19	3.8	1.949	2.92	3.90	4.87	5.85	6.82	7.80	8.77
20	4.0	2.000	3.00	4.00	5.00	6.00	7.00	8.00	9.00
21	4.2	2.049	3.07	4.10	5.12	6.15	7.17	8.20	9.22
22	4.4	2.098	3.15	4.20	5.25	6.29	7.34	8.39	9.44
23	4.6	2.145	3.22	4.29	5.36	6.44	7.51	8.58	9.65
24	4.8	2.191	3.29	4.38	5.48	6.57	7.67	8.76	9.86
25	5.0	2.236	3.35	4.47	5.59	6.71	7.83	8.94	10.06
26	5.2	2.280	3.42	4.56	5.70	6.84	7.98	9.12	10.26
27	5.4	2.324	3.49	4.65	5.81	6.97	8.13	9.30	10.46
28	5.6	2.366	3.55	4.73	5.92	7.10	8.28	9.47	10.65
29	5.8	2.408	3.61	4.82	6.02	7.22	8.43	9.63	10.84
30	6.0	2.449	3.67	4.90	6.12	7.35	8.57	9.80	11.02
31	6.2	2.490	3.74	4.98	6.23	7.47	8.72	9.96	11.21
32	6.4	2.530	3.80	5.06	6.33	7.59	8.86	10.12	11.39
33	6.6	2.569	3.85	5.14	6.42	7.71	8.99	10.28	11.56
34	6.8	2.608	3.91	5.22	6.52	7.82	9.13	10.43	11.74
35	7.0	2.646	3.97	5.29	6.62	7.94	9.26	10.58	11.91
36	7.2	2.683	4.02	5.37	6.71	8.05	9.39	10.73	12.07
37	7.4	2.720	4.08	5.44	6.80	8.16	9.52	10.88	12.24
38	7.6	2.757	4.14	5.51	6.89	8.27	9.65	11.03	12.41
39	7.8	2.793	4.19	5.59	6.98	8.38	9.78	11.17	12.57
40	8.0	2.828	4.24	5.66	7.07	8.48	9.90	11.31	12.73
41	8.2	2.864	4.30	5.73	7.16	8.59	10.02	11.46	12.89
42	8.4	2.898	4.35	5.80	7.25	8.69	10.14	11.59	13.04
43	8.6	2.933	4.40	5.87	7.33	8.80	10.27	11.73	13.20
44	8.8	2.966	4.45	5.93	7.42	8.90	10.38	11.86	13.35
45	9.0	3.000	4.50	6.00	7.50	9.00	10.50	12.00	13.50
46	9.2	3.033	4.55	6.07	7.58	9.10	10.62	12.13	13.65
47	9.4	3.066	4.60	6.13	7.67	9.20	10.73	12.26	13.80
48	9.6	3.098	4.65	6.20	7.75	9.29	10.84	12.39	13.94
49	9.8	3.130	4.70	6.26	7.83	9.39	10.96	12.52	14.09
50	10.0	3.162	4.74	6.32	7.91	9.49	11.07	12.65	14.23
51	10.2	3.194	4.79	6.39	7.99	9.58	11.18	12.78	14.38
52	10.4	3.225	4.84	6.45	8.06	9.68	11.29	12.90	14.51
53	10.6	3.256	4.88	6.51	8.14	9.77	11.40	13.02	14.65
54	10.8	3.286	4.93	6.57	8.22	9.86	11.50	13.15	14.79
55	11.0	3.317	4.98	6.63	8.29	9.95	11.61	13.27	14.93
56	11.2	3.347	5.02	6.69	8.37	10.04	11.71	13.39	15.06
57	11.4	3.376	5.06	6.75	8.44	10.13	11.82	13.51	15.19
58	11.6	3.406	5.11	6.81	8.52	10.22	11.92	13.62	15.33
59	11.8	3.435	5.15	6.87	8.59	10.31	12.02	13.74	15.46
60	12.0	3.464	5.20	6.93	8.66	10.39	12.12	13.86	15.59

FIVE PLY TWIST TABLE — (Continued)

No. of Yarn to be Twisted	No. of Twisted Yarn	Sq. Root of No. of Twisted Yarn	TWIST PER INCH						
			Square Root Multiplied by						
			5	5½	6	6½	7	7½	8
1	.2	.447	2.24	2.46	2.68	2.91	3.13	3.35	3.58
2	.4	.632	3.16	3.48	3.79	4.11	4.42	4.74	5.06
3	.6	.775	3.88	4.26	4.65	5.04	5.43	5.81	6.20
4	.8	.894	4.47	4.92	5.36	5.81	6.26	6.71	7.15
5	1.0	1.000	5.00	5.50	6.00	6.50	7.00	7.50	8.00
6	1.2	1.095	5.48	6.02	6.57	7.12	7.67	8.21	8.76
7	1.4	1.183	5.92	6.51	7.10	7.69	8.28	8.87	9.46
8	1.6	1.265	6.32	6.96	7.59	8.22	8.86	9.49	10.12
9	1.8	1.342	6.71	7.38	8.05	8.72	9.39	10.07	10.74
10	2.0	1.414	7.07	7.78	8.48	9.19	9.90	10.61	11.31
11	2.2	1.483	7.42	8.16	8.90	9.64	10.38	11.12	11.86
12	2.4	1.549	7.75	8.52	9.29	10.07	10.84	11.62	12.39
13	2.6	1.612	8.06	8.87	9.67	10.48	11.28	12.09	12.90
14	2.8	1.673	8.37	9.20	10.04	10.87	11.71	12.55	13.38
15	3.0	1.732	8.66	9.53	10.39	11.26	12.12	12.99	13.86
16	3.2	1.789	8.95	9.84	10.73	11.63	12.52	13.42	14.31
17	3.4	1.844	9.22	10.14	11.06	11.99	12.91	13.83	14.75
18	3.6	1.897	9.49	10.43	11.38	12.33	13.28	14.23	15.18
19	3.8	1.949	9.75	10.72	11.69	12.67	13.64	14.62	15.59
20	4.0	2.000	10.00	11.00	12.00	13.00	14.00	15.00	16.00
21	4.2	2.049	10.25	11.27	12.29	13.32	14.34	15.37	16.39
22	4.4	2.098	10.49	11.54	12.59	13.64	14.69	15.74	16.78
23	4.6	2.145	10.73	11.80	12.87	13.94	15.02	16.09	17.16
24	4.8	2.191	10.96	12.05	13.15	14.24	15.34	16.43	17.53
25	5.0	2.236	11.18	12.30	13.42	14.53	15.65	16.77	17.89
26	5.2	2.280	11.40	12.54	13.68	14.82	15.96	17.10	18.24
27	5.4	2.324	11.62	12.78	13.94	15.11	16.27	17.43	18.59
28	5.6	2.366	11.83	13.01	14.20	15.38	16.56	17.75	18.93
29	5.8	2.408	12.04	13.24	14.45	15.65	16.86	18.06	19.26
30	6.0	2.449	12.25	13.47	14.69	15.92	17.14	18.37	19.59
31	6.2	2.490	12.45	13.70	14.94	16.19	17.43	18.68	19.92
32	6.4	2.530	12.65	13.92	15.18	16.45	17.71	18.98	20.24
33	6.6	2.569	12.85	14.13	15.41	16.70	17.98	19.27	20.55
34	6.8	2.608	13.04	14.34	15.65	16.95	18.26	19.56	20.86
35	7.0	2.646	13.23	14.55	15.87	17.20	18.52	19.85	21.17
36	7.2	2.683	13.42	14.76	16.10	17.44	18.78	20.12	21.46
37	7.4	2.720	13.60	14.96	16.32	17.68	19.04	20.40	21.76
38	7.6	2.757	13.78	15.16	16.54	17.92	19.30	20.68	22.06
39	7.8	2.793	13.96	15.36	16.76	18.16	19.55	20.95	22.34
40	8.0	2.828	14.14	15.55	16.97	18.38	19.80	21.21	22.62
41	8.2	2.864	14.32	15.75	17.18	18.62	20.05	21.48	22.91
42	8.4	2.898	14.49	15.94	17.39	18.84	20.29	21.74	23.18
43	8.6	2.933	14.66	16.13	17.60	19.06	20.53	22.00	23.46
44	8.8	2.966	14.83	16.32	17.80	19.28	20.76	22.25	23.73
45	9.0	3.000	15.00	16.50	18.00	19.50	21.00	22.50	24.00
46	9.2	3.033	15.17	16.68	18.20	19.71	21.23	22.75	24.26
47	9.4	3.066	15.33	16.86	18.40	19.93	21.46	23.00	24.53
48	9.6	3.098	15.49	17.04	18.59	20.14	21.69	23.24	24.78
49	9.8	3.130	15.65	17.22	18.78	20.35	21.91	23.48	25.04
50	10.0	3.162	15.81	17.39	18.97	20.55	22.13	23.72	25.30
51	10.2	3.194	15.97	17.57	19.16	20.76	22.36	23.96	25.55
52	10.4	3.225	16.12	17.74	19.35	20.96	22.58	24.19	25.80
53	10.6	3.256	16.28	17.91	19.54	21.16	22.79	24.42	26.05
54	10.8	3.286	16.43	18.07	19.72	21.36	23.00	24.65	26.29
55	11.0	3.317	16.58	18.24	19.90	21.56	23.22	24.88	26.54
56	11.2	3.347	16.73	18.41	20.08	21.76	23.43	25.10	26.78
57	11.4	3.376	16.88	18.57	20.26	21.94	23.63	25.32	27.01
58	11.6	3.406	17.03	18.73	20.44	22.14	23.84	25.55	27.25
59	11.8	3.435	17.18	18.89	20.61	22.33	24.05	25.76	27.48
60	12.0	3.464	17.32	19.05	20.78	22.52	24.25	25.98	27.71

FIVE PLY TWIST TABLE —(Continued)

No. of Yarn to be Twisted	No. of Twisted Yarn	Sq. Root of No. of Twisted Yarn	TWIST PER INCH						
			Square Root Multiplied by						
			4	4½	5	5½	6	6½	7
61	12.2	3.493	13.97	15.72	17.47	19.21	20.96	22.70	24.45
62	12.4	3.521	14.08	15.84	17.61	19.37	21.13	22.89	24.65
63	12.6	3.550	14.20	15.98	17.75	19.53	21.30	23.08	24.85
64	12.8	3.578	14.31	16.10	17.89	19.68	21.47	23.26	25.05
65	13.0	3.606	14.42	16.23	18.03	19.83	21.63	23.44	25.24
66	13.2	3.633	14.53	16.35	18.17	19.98	21.80	23.61	25.43
67	13.4	3.661	14.64	16.47	18.31	20.14	21.97	23.80	25.63
68	13.6	3.688	14.75	16.60	18.44	20.28	22.13	23.97	25.82
69	13.8	3.715	14.86	16.72	18.58	20.43	22.29	24.15	26.01
70	14.0	3.742	14.97	16.84	18.71	20.58	22.45	24.32	26.19
71	14.2	3.768	15.07	16.96	18.84	20.72	22.61	24.49	26.38
72	14.4	3.795	15.18	17.08	18.98	20.87	22.77	24.67	26.57
73	14.6	3.821	15.28	17.19	19.10	21.02	22.93	24.84	26.75
74	14.8	3.847	15.39	17.31	19.24	21.16	23.08	25.01	26.93
75	15.0	3.873	15.49	17.43	19.37	21.30	23.24	25.17	27.11
76	15.2	3.899	15.60	17.55	19.49	21.44	23.39	25.34	27.29
77	15.4	3.924	15.70	17.66	19.62	21.58	23.55	25.51	27.47
78	15.6	3.950	15.80	17.78	19.75	21.73	23.70	25.68	27.65
79	15.8	3.975	15.90	17.89	19.87	21.86	23.85	25.84	27.83
80	16.0	4.000	16.00	18.00	20.00	22.00	24.00	26.00	28.00
81	16.2	4.025	16.10	18.11	20.12	22.14	24.15	26.16	28.18
82	16.4	4.050	16.20	18.23	20.25	22.28	24.30	26.33	28.35
83	16.6	4.074	16.30	18.33	20.37	22.41	24.45	26.48	28.52
84	16.8	4.099	16.40	18.45	20.50	22.54	24.59	26.64	28.69
85	17.0	4.123	16.49	18.55	20.62	22.68	24.74	26.80	28.86
86	17.2	4.147	16.59	18.66	20.74	22.81	24.88	26.96	29.03
87	17.4	4.171	16.68	18.77	20.86	22.94	25.03	27.11	29.20
88	17.6	4.195	16.78	18.88	20.98	23.07	25.17	27.27	29.37
89	17.8	4.219	16.88	18.99	21.10	23.20	25.31	27.42	29.53
90	18.0	4.243	16.97	19.09	21.22	23.34	25.46	27.58	29.70
91	18.2	4.266	17.06	19.20	21.33	23.46	25.60	27.73	29.86
92	18.4	4.290	17.16	19.31	21.45	23.60	25.74	27.89	30.03
93	18.6	4.313	17.25	19.41	21.56	23.72	25.88	28.03	30.19
94	18.8	4.336	17.34	19.51	21.68	23.85	26.02	28.18	30.35
95	19.0	4.359	17.44	19.62	21.80	23.97	26.15	28.33	30.51
96	19.2	4.382	17.53	19.72	21.91	24.10	26.29	28.48	30.67
97	19.4	4.405	17.62	19.82	22.03	24.23	26.43	28.63	30.84
98	19.6	4.427	17.71	19.92	22.14	24.35	26.56	28.78	30.99
99	19.8	4.450	17.80	20.03	22.25	24.48	26.70	28.93	31.15
100	20.0	4.472	17.89	20.12	22.36	24.60	26.83	29.07	31.30
101	20.2	4.494	17.98	20.22	22.47	24.72	26.97	29.21	31.46
102	20.4	4.517	18.07	20.33	22.59	24.84	27.10	29.36	31.62
103	20.6	4.539	18.16	20.43	22.70	24.96	27.23	29.50	31.77
104	20.8	4.561	18.24	20.52	22.81	25.09	27.37	29.65	31.93
105	21.0	4.583	18.33	20.62	22.91	25.21	27.50	29.79	32.08
106	21.2	4.604	18.42	20.72	23.02	25.32	27.63	29.93	32.23
107	21.4	4.626	18.50	20.82	23.13	25.44	27.76	30.07	32.38
108	21.6	4.648	18.59	20.92	23.24	25.56	27.89	30.21	32.54
109	21.8	4.669	18.68	21.01	23.35	25.68	28.01	30.35	32.68
110	22.0	4.690	18.76	21.11	23.45	25.80	28.14	30.49	32.83
111	22.2	4.712	18.85	21.20	23.56	25.92	28.27	30.63	32.98
112	22.4	4.733	18.93	21.30	23.67	26.03	28.40	30.76	33.13
113	22.6	4.754	19.02	21.39	23.77	26.15	28.52	30.90	33.28
114	22.8	4.775	19.10	21.49	23.88	26.26	28.65	31.04	33.43
115	23.0	4.796	19.18	21.58	23.98	26.38	28.78	31.17	33.57
116	23.2	4.817	19.27	21.68	24.09	26.49	28.90	31.31	33.72
117	23.4	4.837	19.35	21.77	24.19	26.60	29.02	31.44	33.86
118	23.6	4.858	19.43	21.86	24.29	26.72	29.15	31.58	34.01
119	23.8	4.879	19.52	21.96	24.40	26.83	29.27	31.71	34.15
120	24.0	4.899	19.60	22.05	24.50	26.94	29.39	31.84	34.29

FIVE PLY TWIST TABLE—(Continued)

No. of Yarn to be Twisted	No. of Twisted Yarn	Sq. Root of No. of Twisted Yarn	TWIST PER INCH						
			Square Root Multiplied by						
			4	4½	5	5½	6	6½	7
121	24.2	4.919	19.68	22.14	24.60	27.05	29.51	31.97	34.43
122	24.4	4.940	19.76	22.23	24.70	27.17	29.64	32.11	34.58
123	24.6	4.960	19.84	22.32	24.80	27.28	29.76	32.24	34.72
124	24.8	4.980	19.92	22.41	24.90	27.39	29.88	32.37	34.86
125	25.0	5.000	20.00	22.50	25.00	27.50	30.00	32.50	35.00
126	25.2	5.020	20.08	22.59	25.10	27.61	30.12	32.63	35.14
127	25.4	5.040	20.16	22.68	25.20	27.72	30.24	32.76	35.28
128	25.6	5.060	20.24	22.77	25.30	27.83	30.36	32.89	35.42
129	25.8	5.079	20.32	22.86	25.40	27.93	30.47	33.01	35.55
130	26.0	5.099	20.40	22.95	25.50	28.04	30.59	33.14	35.69
131	26.2	5.119	20.48	23.04	25.60	28.15	30.71	33.27	35.83
132	26.4	5.138	20.55	23.12	25.69	28.26	30.83	33.40	35.97
133	26.6	5.158	20.63	23.21	25.79	28.37	30.95	33.53	36.11
134	26.8	5.177	20.71	23.30	25.89	28.47	31.06	33.65	36.24
135	27.0	5.196	20.78	23.38	25.98	28.58	31.18	33.77	36.37
136	27.2	5.215	20.86	23.47	26.08	28.68	31.29	33.90	36.51
137	27.4	5.235	20.94	23.56	26.18	28.79	31.41	34.03	36.65
138	27.6	5.254	21.02	23.64	26.27	28.90	31.52	34.15	36.78
139	27.8	5.273	21.09	23.73	26.37	29.00	31.64	34.27	36.91
140	28.0	5.292	21.17	23.81	26.46	29.11	31.75	34.40	37.04
141	28.2	5.310	21.24	23.90	26.55	29.21	31.86	34.52	37.17
142	28.4	5.329	21.32	23.98	26.65	29.31	31.97	34.64	37.30
143	28.6	5.348	21.39	24.07	26.74	29.41	32.09	34.76	37.44
144	28.8	5.367	21.47	24.15	26.84	29.52	32.20	34.89	37.57
145	29.0	5.385	21.54	24.23	26.93	29.62	32.31	35.00	37.70
146	29.2	5.404	21.62	24.32	27.02	29.72	32.42	35.13	37.83
147	29.4	5.422	21.69	24.40	27.11	29.82	32.53	35.24	37.95
148	29.6	5.441	21.76	24.48	27.21	29.93	32.65	35.37	38.09
149	29.8	5.459	21.84	24.57	27.30	30.02	32.75	35.48	38.21
150	30.0	5.477	21.91	24.65	27.39	30.12	32.86	35.60	38.34
151	30.2	5.495	21.98	24.73	27.48	30.22	32.97	35.72	38.47
152	30.4	5.514	22.06	24.81	27.57	30.33	33.08	35.84	38.60
153	30.6	5.532	22.13	24.89	27.66	30.43	33.19	35.96	38.72
154	30.8	5.550	22.20	24.98	27.75	30.53	33.30	36.08	38.85
155	31.0	5.568	22.27	25.06	27.84	30.62	33.41	36.19	38.98
156	31.2	5.586	22.34	25.14	27.93	30.72	33.52	36.31	39.10
157	31.4	5.604	22.42	25.22	28.02	30.82	33.62	36.43	39.23
158	31.6	5.621	22.48	25.29	28.11	30.92	33.73	36.54	39.35
159	31.8	5.639	22.56	25.38	28.20	31.01	33.83	36.65	39.47
160	32.0	5.657	22.63	25.46	28.29	31.11	33.94	36.77	39.60
161	32.2	5.675	22.70	25.54	28.38	31.21	34.05	36.89	39.73
162	32.4	5.692	22.77	25.61	28.46	31.31	34.15	37.00	39.84
163	32.6	5.710	22.84	25.70	28.55	31.41	34.26	37.12	39.97
164	32.8	5.727	22.91	25.77	28.64	31.50	34.36	37.23	40.09
165	33.0	5.745	22.98	25.85	28.73	31.60	34.47	37.34	40.22
166	33.2	5.762	23.05	25.93	28.81	31.69	34.57	37.45	40.33
167	33.4	5.779	23.12	26.01	28.90	31.78	34.67	37.56	40.45
168	33.6	5.797	23.19	26.09	28.99	31.88	34.78	37.68	40.58
169	33.8	5.814	23.26	26.16	29.07	31.98	34.88	37.79	40.70
170	34.0	5.831	23.32	26.24	29.16	32.07	34.99	37.90	40.82
171	34.2	5.848	23.39	26.32	29.24	32.16	35.09	38.01	40.94
172	34.4	5.865	23.46	26.40	29.33	32.26	35.19	38.13	41.06
173	34.6	5.882	23.53	26.47	29.41	32.35	35.29	38.23	41.17
174	34.8	5.899	23.60	26.55	29.50	32.44	35.39	38.34	41.29
175	35.0	5.916	23.66	26.62	29.58	32.54	35.50	38.45	41.41
176	35.2	5.933	23.73	26.70	29.67	32.63	35.60	38.56	41.53
177	35.4	5.950	23.80	26.78	29.75	32.73	35.70	38.68	41.65
178	35.6	5.967	23.87	26.85	29.84	32.82	35.80	38.79	41.77
179	35.8	5.983	23.93	26.92	29.92	32.91	35.90	38.89	41.88
180	36.0	6.000	24.00	27.00	30.00	33.00	36.00	39.00	42.00

TWIST TABLE FOR TWISTING

SIX PLY TWIST TABLE

No. of Yarn to be Twisted	No. of Twisted Yarn	Sq. Root of No. of Twisted Yarn	TWIST PER INCH						
			Square Root Multiplied by						
			1½	2	2½	3	3½	4	4½
1	.17	.408	.61	.82	1.02	1.22	1.43	1.63	1.84
2	.33	.577	.87	1.15	1.44	1.73	2.02	2.31	2.60
3	.50	.707	1.06	1.41	1.77	2.12	2.47	2.83	3.18
4	.67	.817	1.23	1.63	2.04	2.45	2.86	3.27	3.68
5	.83	.913	1.37	1.83	2.28	2.74	3.20	3.65	4.11
6	1.00	1.000	1.50	2.00	2.50	3.00	3.50	4.00	4.50
7	1.17	1.080	1.62	2.16	2.70	3.24	3.78	4.32	4.86
8	1.33	1.155	1.73	2.31	2.89	3.47	4.04	4.62	5.20
9	1.50	1.225	1.84	2.45	3.06	3.68	4.29	4.90	5.51
10	1.67	1.291	1.94	2.58	3.23	3.87	4.52	5.16	5.81
11	1.83	1.354	2.03	2.71	3.39	4.06	4.74	5.42	6.09
12	2.00	1.414	2.12	2.83	3.54	4.24	4.95	5.66	6.36
13	2.17	1.472	2.21	2.94	3.68	4.42	5.15	5.89	6.62
14	2.33	1.528	2.29	3.06	3.82	4.58	5.35	6.11	6.88
15	2.50	1.581	2.37	3.16	3.95	4.74	5.53	6.32	7.11
16	2.67	1.633	2.45	3.27	4.08	4.90	5.72	6.53	7.35
17	2.83	1.683	2.52	3.37	4.21	5.05	5.89	6.73	7.57
18	3.00	1.732	2.60	3.46	4.33	5.20	6.06	6.93	7.79
19	3.17	1.780	2.67	3.56	4.45	5.34	6.23	7.12	8.01
20	3.33	1.826	2.74	3.65	4.56	5.48	6.39	7.30	8.21
21	3.50	1.871	2.81	3.74	4.68	5.61	6.55	7.48	8.42
22	3.67	1.915	2.87	3.83	4.79	5.75	6.70	7.66	8.62
23	3.83	1.958	2.94	3.92	4.90	5.87	6.85	7.83	8.81
24	4.00	2.000	3.00	4.00	5.00	6.00	7.00	8.00	9.00
25	4.17	2.041	3.06	4.08	5.10	6.12	7.14	8.16	9.18
26	4.33	2.082	3.12	4.16	5.21	6.25	7.29	8.33	9.37
27	4.50	2.121	3.18	4.24	5.30	6.36	7.42	8.48	9.54
28	4.67	2.160	3.24	4.32	5.40	6.48	7.56	8.64	9.72
29	4.83	2.199	3.30	4.40	5.50	6.60	7.70	8.80	9.90
30	5.00	2.236	3.35	4.47	5.59	6.71	7.83	8.94	10.06
31	5.17	2.273	3.41	4.55	5.68	6.82	7.96	9.09	10.23
32	5.33	2.309	3.46	4.62	5.77	6.93	8.08	9.24	10.39
33	5.50	2.345	3.52	4.69	5.86	7.04	8.21	9.38	10.55
34	5.67	2.381	3.57	4.76	5.95	7.14	8.33	9.52	10.71
35	5.83	2.415	3.62	4.83	6.04	7.25	8.45	9.66	10.87
36	6.00	2.449	3.67	4.90	6.13	7.35	8.58	9.80	11.03
37	6.17	2.483	3.72	4.97	6.21	7.45	8.69	9.93	11.17
38	6.33	2.517	3.78	5.03	6.29	7.55	8.81	10.07	11.33
39	6.50	2.550	3.83	5.10	6.38	7.65	8.93	10.20	11.47
40	6.67	2.582	3.87	5.16	6.46	7.75	9.04	10.33	11.62
41	6.83	2.614	3.92	5.23	6.54	7.84	9.15	10.46	11.76
42	7.00	2.646	3.97	5.29	6.62	7.94	9.26	10.58	11.91
43	7.17	2.677	4.02	5.35	6.69	8.03	9.37	10.71	12.05
44	7.33	2.708	4.06	5.42	6.77	8.12	9.48	10.83	12.19
45	7.50	2.739	4.11	5.48	6.85	8.22	9.59	10.96	12.33
46	7.67	2.769	4.15	5.54	6.92	8.31	9.69	11.08	12.46
47	7.83	2.798	4.20	5.60	7.00	8.39	9.79	11.19	12.59
48	8.00	2.828	4.24	5.66	7.07	8.48	9.90	11.31	12.73
49	8.17	2.858	4.29	5.72	7.15	8.57	10.00	11.43	12.86
50	8.33	2.887	4.33	5.77	7.22	8.66	10.10	11.55	12.99
51	8.50	2.916	4.37	5.83	7.29	8.75	10.21	11.66	13.12
52	8.67	2.944	4.42	5.89	7.36	8.83	10.30	11.78	13.25
53	8.83	2.972	4.46	5.94	7.43	8.92	10.40	11.89	13.37
54	9.00	3.000	4.50	6.00	7.50	9.00	10.50	12.00	13.50
55	9.17	3.028	4.54	6.05	7.57	9.08	10.60	12.11	13.63
56	9.33	3.055	4.58	6.11	7.64	9.17	10.69	12.22	13.75
57	9.50	3.082	4.62	6.16	7.71	9.25	10.79	12.33	13.87
58	9.67	3.109	4.66	6.22	7.77	9.33	10.88	12.44	13.99
59	9.83	3.136	4.70	6.27	7.84	9.41	10.98	12.54	14.11
60	10.00	3.162	4.74	6.32	7.91	9.49	11.07	12.65	14.23

TWIST TABLE FOR TWISTING

SIX PLY TWIST TABLE — (Continued)

No. of Yarn to be Twisted	No. of Twisted Yarn	Sq. Root of No. of Twisted Yarn	TWIST PER INCH						
			Square Root Multiplied by						
			5	5½	6	6½	7	7½	8
1	.17	.408	2.04	2.24	2.45	2.65	2.86	3.06	3.26
2	.33	.577	2.89	3.17	3.46	3.75	4.04	4.33	4.62
3	.50	.707	3.54	3.89	4.24	4.60	4.95	5.30	5.66
4	.67	.817	4.08	4.49	4.90	5.31	5.72	6.13	6.54
5	.83	.913	4.56	5.02	5.48	5.93	6.39	6.85	7.30
6	1.00	1.000	5.00	5.50	6.00	6.50	7.00	7.50	8.00
7	1.17	1.080	5.40	5.94	6.48	7.02	7.56	8.10	8.64
8	1.33	1.155	5.77	6.35	6.93	7.51	8.08	8.66	9.24
9	1.50	1.225	6.12	6.74	7.35	7.96	8.57	9.19	9.80
10	1.67	1.291	6.45	7.10	7.75	8.39	9.04	9.68	10.33
11	1.83	1.354	6.77	7.45	8.12	8.80	9.48	10.15	10.83
12	2.00	1.414	7.07	7.78	8.49	9.19	9.90	10.61	11.31
13	2.17	1.472	7.36	8.10	8.83	9.57	10.30	11.04	11.78
14	2.33	1.528	7.64	8.40	9.17	9.93	10.70	11.46	12.22
15	2.50	1.581	7.91	8.70	9.49	10.28	11.07	11.86	12.65
16	2.67	1.633	8.17	8.98	9.80	10.61	11.43	12.25	13.06
17	2.83	1.683	8.42	9.26	10.10	10.94	11.78	12.62	13.46
18	3.00	1.732	8.66	9.53	10.39	11.26	12.12	12.99	13.86
19	3.17	1.780	8.90	9.79	10.68	11.57	12.46	13.35	14.24
20	3.33	1.826	9.13	10.04	10.96	11.87	12.78	13.70	14.61
21	3.50	1.871	9.36	10.29	11.23	12.16	13.10	14.03	14.97
22	3.67	1.915	9.58	10.53	11.49	12.45	13.41	14.36	15.32
23	3.83	1.958	9.79	10.77	11.75	12.73	13.71	14.69	15.66
24	4.00	2.000	10.00	11.00	12.00	13.00	14.00	15.00	16.00
25	4.17	2.041	10.21	11.23	12.25	13.27	14.29	15.31	16.33
26	4.33	2.082	10.41	11.45	12.49	13.53	14.57	15.62	16.66
27	4.50	2.121	10.61	11.67	12.73	13.79	14.85	15.91	16.97
28	4.67	2.160	10.80	11.88	12.96	14.04	15.12	16.20	17.28
29	4.83	2.199	10.99	12.09	13.19	14.29	15.39	16.49	17.59
30	5.00	2.236	11.18	12.30	13.42	14.53	15.65	16.77	17.89
31	5.17	2.273	11.37	12.50	13.64	14.77	15.91	17.05	18.18
32	5.33	2.309	11.55	12.70	13.86	15.01	16.16	17.32	18.47
33	5.50	2.345	11.73	12.90	14.07	15.24	16.42	17.59	18.76
34	5.67	2.381	11.90	13.09	14.28	15.48	16.67	17.86	19.05
35	5.83	2.415	12.08	13.28	14.49	15.70	16.91	18.11	19.32
36	6.00	2.449	12.25	13.47	14.70	15.92	17.15	18.37	19.59
37	6.17	2.483	12.42	13.66	14.90	16.14	17.38	18.62	19.86
38	6.33	2.517	12.58	13.84	15.10	16.36	17.62	18.88	20.14
39	6.50	2.550	12.75	14.03	15.30	16.58	17.85	19.13	20.40
40	6.67	2.582	12.91	14.20	15.49	16.78	18.07	19.37	20.66
41	6.83	2.614	13.07	14.38	15.68	16.99	18.30	19.61	20.91
42	7.00	2.646	13.23	14.55	15.88	17.20	18.52	19.85	21.17
43	7.17	2.677	13.39	14.72	16.06	17.40	18.74	20.08	21.42
44	7.33	2.708	13.54	14.89	16.25	17.60	18.96	20.31	21.66
45	7.50	2.739	13.69	15.06	16.43	17.80	19.17	20.54	21.91
46	7.67	2.769	13.85	15.23	16.61	18.00	19.38	20.77	22.15
47	7.83	2.798	13.99	15.39	16.79	18.19	19.59	20.99	22.38
48	8.00	2.828	14.14	15.55	16.97	18.38	19.80	21.21	22.62
49	8.17	2.858	14.29	15.72	17.15	18.58	20.01	21.44	22.86
50	8.33	2.887	14.44	15.88	17.32	18.77	20.21	21.65	23.10
51	8.50	2.916	14.58	16.04	17.50	18.95	20.41	21.87	23.33
52	8.67	2.944	14.72	16.19	17.66	19.14	20.61	22.08	23.55
53	8.83	2.972	14.86	16.35	17.83	19.32	20.80	22.29	23.78
54	9.00	3.000	15.00	16.50	18.00	19.50	21.00	22.50	24.00
55	9.17	3.028	15.14	16.65	18.17	19.68	21.20	22.71	24.22
56	9.33	3.055	15.28	16.80	18.33	19.86	21.39	22.91	24.44
57	9.50	3.082	15.41	16.95	18.49	20.03	21.57	23.12	24.66
58	9.67	3.109	15.55	17.10	18.65	20.21	21.76	23.32	24.87
59	9.83	3.136	15.68	17.25	18.82	20.38	21.95	23.52	25.09
60	10.00	3.162	15.81	17.39	18.97	20.55	22.13	23.72	25.30

SIX PLY TWIST TABLE —(Continued)

No. of Yarn to be Twisted	No. of Twisted Yarn	Sq. Root of No. of Twisted Yarn	TWIST PER INCH						
			Square Root Multiplied by						
			4	4½	5	5½	6	6½	7
61	10:17	3.189	12.76	14.35	15.94	17.54	19.13	20.73	22.32
62	10.33	3.215	12.86	14.47	16.07	17.68	19.29	20.90	22.50
63	10.50	3.240	12.96	14.58	16.20	17.82	19.44	21.06	22.68
64	10.67	3.266	13.06	14.70	16.33	17.96	19.60	21.23	22.86
65	10.83	3.291	13.16	14.81	16.46	18.10	19.75	21.39	23.04
66	11.00	3.317	13.27	14.93	16.58	18.24	19.90	21.56	23.22
67	11.17	3.342	13.37	15.04	16.71	18.38	20.05	21.72	23.39
68	11.33	3.367	13.47	15.15	16.83	18.52	20.20	21.88	23.57
69	11.50	3.391	13.56	15.26	16.96	18.65	20.35	22.04	23.74
70	11.67	3.416	13.66	15.37	17.08	18.79	20.50	22.20	23.91
71	11.83	3.440	13.76	15.48	17.20	18.92	20.64	22.36	24.08
72	12.00	3.464	13.86	15.59	17.32	19.05	20.78	22.52	24.25
73	12.17	3.488	13.95	15.70	17.44	19.18	20.93	22.67	24.42
74	12.33	3.512	14.05	15.80	17.56	19.32	21.07	22.83	24.58
75	12.50	3.536	14.14	15.91	17.68	19.45	21.21	22.98	24.75
76	12.67	3.559	14.24	16.02	17.80	19.57	21.35	23.13	24.91
77	12.83	3.582	14.33	16.12	17.91	19.70	21.49	23.28	25.07
78	13.00	3.606	14.42	16.23	18.03	19.83	21.63	23.44	25.24
79	13.17	3.629	14.52	16.33	18.14	19.96	21.77	23.59	25.40
80	13.33	3.651	14.60	16.43	18.26	20.09	21.91	23.74	25.56
81	13.50	3.674	14.70	16.53	18.37	20.21	22.04	23.88	25.72
82	13.67	3.697	14.79	16.64	18.48	20.33	22.18	24.03	25.88
83	13.83	3.719	14.88	16.74	18.60	20.45	22.31	24.17	26.03
84	14.00	3.742	14.97	16.84	18.71	20.58	22.45	24.32	26.19
85	14.17	3.764	15.06	16.94	18.82	20.70	22.58	24.47	26.35
86	14.33	3.786	15.14	17.04	18.93	20.82	22.72	24.61	26.50
87	14.50	3.808	15.23	17.14	19.04	20.94	22.85	24.75	26.66
88	14.67	3.830	15.32	17.24	19.15	21.07	22.98	24.89	26.81
89	14.83	3.851	15.40	17.33	19.26	21.18	23.11	25.03	26.96
90	15.00	3.873	15.49	17.43	19.36	21.30	23.24	25.17	27.11
91	15.17	3.894	15.58	17.52	19.47	21.42	23.37	25.31	27.26
92	15.33	3.916	15.66	17.62	19.58	21.54	23.50	25.45	27.41
93	15.50	3.937	15.75	17.72	19.69	21.65	23.62	25.59	27.56
94	15.67	3.958	15.83	17.81	19.79	21.77	23.75	25.73	27.71
95	15.83	3.979	15.92	17.91	19.90	21.88	23.87	25.86	27.85
96	16.00	4.000	16.00	18.00	20.00	22.00	24.00	26.00	28.00
97	16.17	4.021	16.08	18.09	20.10	22.12	24.13	26.14	28.15
98	16.33	4.042	16.17	18.19	20.21	22.23	24.25	26.27	28.29
99	16.50	4.062	16.25	18.28	20.31	22.34	24.37	26.40	28.43
100	16.67	4.082	16.33	18.37	20.41	22.45	24.49	26.53	28.57
101	16.83	4.103	16.41	18.46	20.51	22.57	24.62	26.67	28.72
102	17.00	4.123	16.49	18.55	20.62	22.68	24.74	26.80	28.86
103	17.17	4.143	16.57	18.64	20.72	22.79	24.86	26.93	29.00
104	17.33	4.163	16.65	18.73	20.82	22.90	24.98	27.06	29.14
105	17.50	4.183	16.73	18.82	20.92	23.01	25.10	27.19	29.28
106	17.67	4.203	16.81	18.91	21.02	23.12	25.22	27.32	29.42
107	17.83	4.223	16.89	19.00	21.11	23.23	25.34	27.45	29.56
108	18.00	4.243	16.97	19.09	21.21	23.34	25.46	27.58	29.70
109	18.17	4.262	17.05	19.18	21.31	23.44	25.57	27.70	29.83
110	18.33	4.282	17.13	19.27	21.41	23.55	25.69	27.83	29.97
111	18.50	4.301	17.20	19.35	21.51	23.66	25.81	27.96	30.11
112	18.67	4.321	17.28	19.44	21.60	23.77	25.93	28.09	30.25
113	18.83	4.340	17.36	19.53	21.70	23.87	26.04	28.21	30.38
114	19.00	4.359	17.44	19.62	21.79	23.97	26.15	28.33	30.51
115	19.17	4.378	17.51	19.70	21.89	24.08	26.27	28.46	30.65
116	19.33	4.397	17.59	19.79	21.98	24.18	26.38	28.58	30.78
117	19.50	4.416	17.66	19.87	22.08	24.29	26.50	28.70	30.91
118	19.67	4.435	17.74	19.96	22.17	24.39	26.61	28.83	31.04
119	19.83	4.454	17.82	20.04	22.27	24.50	26.72	28.95	31.17
120	20.00	4.472	17.89	20.12	22.36	24.60	26.83	29.07	31.30

TWIST TABLE FOR TWISTING

SIX PLY TWIST TABLE—(Continued)

No. of Yarn to be Twisted	No. of Twisted Yarn	Sq. Root of No. of Twisted Yarn	TWIST PER INCH						
			Square Root Multiplied by						
			4	4½	5	5½	6	6½	7
121	20.17	4.491	17.96	20.21	22.45	24.70	26.94	29.19	31.44
122	20.33	4.509	18.04	20.29	22.55	24.80	27.05	29.31	31.56
123	20.50	4.528	18.11	20.38	22.64	24.90	27.17	29.43	31.70
124	20.67	4.546	18.18	20.46	22.73	25.00	27.28	29.55	31.82
125	20.83	4.564	18.26	20.54	22.82	25.10	27.38	29.67	31.95
126	21.00	4.583	18.33	20.62	22.91	25.21	27.50	29.79	32.08
127	21.17	4.601	18.40	20.70	23.00	25.31	27.61	29.91	32.21
128	21.33	4.619	18.48	20.79	23.09	25.40	27.71	30.02	32.33
129	21.50	4.637	18.55	20.87	23.18	25.50	27.82	30.14	32.46
130	21.67	4.655	18.62	20.95	23.27	25.60	27.93	30.26	32.59
131	21.83	4.673	18.69	21.03	23.36	25.70	28.04	30.37	32.71
132	22.00	4.690	18.76	21.11	23.45	25.80	28.14	30.49	32.83
133	22.17	4.708	18.83	21.19	23.54	25.89	28.25	30.60	32.96
134	22.33	4.726	18.90	21.27	23.63	25.99	28.36	30.72	33.08
135	22.50	4.743	18.97	21.34	23.72	26.09	28.46	30.83	33.20
136	22.67	4.761	19.04	21.42	23.80	26.19	28.57	30.95	33.33
137	22.83	4.778	19.11	21.50	23.89	26.28	28.67	31.06	33.45
138	23.00	4.796	19.18	21.58	23.98	26.38	28.78	31.17	33.57
139	23.17	4.813	19.25	21.66	24.07	26.47	28.88	31.28	33.69
140	23.33	4.830	19.32	21.74	24.15	26.57	28.98	31.40	33.81
141	23.50	4.848	19.39	21.82	24.24	26.66	29.09	31.51	33.94
142	23.67	4.865	19.46	21.89	24.32	26.76	29.19	31.62	34.06
143	23.83	4.882	19.53	21.97	24.41	26.85	29.29	31.73	34.17
144	24.00	4.899	19.60	22.05	24.49	26.94	29.39	31.84	34.29
145	24.17	4.916	19.66	22.12	24.58	27.04	29.50	31.95	34.41
146	24.33	4.933	19.73	22.20	24.66	27.13	29.60	32.06	34.53
147	24.50	4.950	19.80	22.28	24.75	27.23	29.70	32.18	34.65
148	24.67	4.967	19.87	22.35	24.83	27.32	29.80	32.29	34.77
149	24.83	4.983	19.93	22.42	24.92	27.41	29.90	32.39	34.88
150	25.00	5.000	20.00	22.50	25.00	27.50	30.00	32.50	35.00
151	25.17	5.017	20.07	22.58	25.09	27.59	30.10	32.61	35.12
152	25.33	5.033	20.13	22.65	25.17	27.68	30.20	32.71	35.23
153	25.50	5.050	20.20	22.73	25.25	27.77	30.30	32.83	35.35
154	25.67	5.066	20.26	22.80	25.33	27.86	30.40	32.93	35.46
155	25.83	5.083	20.33	22.87	25.42	27.96	30.50	33.04	35.58
156	26.00	5.099	20.40	22.95	25.50	28.04	30.59	33.14	35.69
157	26.17	5.115	20.46	23.02	25.58	28.13	30.69	33.25	35.81
158	26.33	5.132	20.53	23.09	25.66	28.23	30.79	33.36	35.92
159	26.50	5.148	20.59	23.17	25.74	28.31	30.89	33.46	36.04
160	26.67	5.164	20.66	23.24	25.82	28.40	30.98	33.57	36.15
161	26.83	5.180	20.72	23.31	25.90	28.49	31.08	33.67	36.26
162	27.00	5.196	20.78	23.38	25.98	28.58	31.18	33.77	36.37
163	27.17	5.212	20.85	23.46	26.06	28.67	31.27	33.88	36.48
164	27.33	5.228	20.91	23.53	26.14	28.75	31.37	33.98	36.60
165	27.50	5.244	20.98	23.60	26.22	28.84	31.46	34.09	36.71
166	27.67	5.260	21.04	23.67	26.30	28.93	31.56	34.19	36.82
167	27.83	5.276	21.10	23.74	26.38	29.02	31.66	34.29	36.93
168	28.00	5.292	21.17	23.81	26.46	29.11	31.75	34.40	37.04
169	28.17	5.307	21.23	23.88	26.54	29.19	31.84	34.50	37.15
170	28.33	5.323	21.29	23.95	26.62	29.28	31.94	34.60	37.26
171	28.50	5.339	21.36	24.03	26.70	29.36	32.03	34.70	37.37
172	28.67	5.354	21.42	24.09	26.77	29.45	32.12	34.80	37.48
173	28.83	5.370	21.48	24.17	26.85	29.54	32.22	34.91	37.59
174	29.00	5.385	21.54	24.23	26.93	29.62	32.31	35.00	37.70
175	29.17	5.401	21.60	24.30	27.01	29.71	32.41	35.11	37.81
176	29.33	5.416	21.66	24.37	27.08	29.79	32.50	35.20	37.91
177	29.50	5.431	21.72	24.44	27.16	29.87	32.59	35.30	38.02
178	29.67	5.447	21.79	24.51	27.24	29.96	32.68	35.41	38.13
179	29.83	5.462	21.85	24.58	27.31	30.04	32.77	35.50	38.23
180	30.00	5.477	21.91	24.65	27.39	30.12	32.86	35.60	38.34

PRODUCTION TABLES

On the following pages will be found our production tables for two, three, four, five and six ply yarns.

In preparing these tables our object has been to fully cover the ordinary range of ply yarns in a series of tables based on the various plies, each table being subdivided to conform to the general range and variation of the twist multipliers. The twist multipliers, with the resultant twists per inch for the various numbers of yarn and plies, may be found in the series of tables on the preceding pages, in which we have given a new and complete gradation from $1\frac{1}{2}$ to 8 twist multiplier by halves.

Each complete production table — covering two opposite pages for each ply — gives the usual range of yarns and the general variation in the twist, and shows the gauge and size of ring for the various numbers of yarn. The length of traverse, size of bobbin and weight of yarn on bobbin may be found on the table of styles and dimensions of bobbins which follows the production tables. Thus the data contained in the production and bobbin tables forms the basis upon which we have calculated the production, our long experience and a careful consideration of actual conditions having shown such data to be a fair average.

It will of course be understood that our reference to actual conditions not only refers to the practical working conditions of the twisting machine itself, but also takes into consideration as far as possible the quality of the yarn and its use for specific purposes.

The front roll speeds, with the corresponding spindle speeds, have been decided upon after an extensive tabulation and careful study of data

obtained from many of the best mills of the country. We believe that these speeds are conservative, and that they represent a fair average of actual running conditions. The front roll speeds have been taken as a basis and the spindle speeds have been given only to the nearest hundred revolutions; thus the spindle speeds will be found correct if figured from the front roll speeds, but on the other hand the front roll speeds will not always appear correct if figured from the given spindle speeds. No allowance has been made for the contraction of ply yarns, since the actual contraction is extremely variable, depending as it does on whether the twist is with or opposite to the single yarn, whether first or second twist and whether the twist is soft or hard. Contraction as applied to the case in hand would mean, either that the spindle speeds would not be as much as given in the tables, or that the front roll speeds would exceed those given, since, on account of contraction, the actual twist per inch of the yarn would exceed the figured twist produced by a given front roll and spindle speed.

We have given the production for 58 hours per week only, since it would require an unnecessary elaboration of the tables to give also the production for 60 and 66 hours per week.

The production for 60 and 66 hours per week may be obtained with sufficient accuracy by adding to the given production 3 per cent for 60 hours and 13 per cent for 66 hours.

In estimating the production due allowance has been made for cleaning, oiling, doffing, ends down and stoppages. This allowance depending on the number of ply and the twist per inch, when carefully proportioned for the different numbers of yarn, is found to vary from 5 to 25 per cent.

TWO PLY PRODUCTION TABLE

POUNDS PER SPINDLE PER WEEK OF 58 HOURS

Number of Yarn	Gauge	Ring	MULTIPLIER 2			MULTIPLIER 3			MULTIPLIER 4		
			R.P.M. of 1 1/2 in. Roll	R.P.M. of Spindle	Pounds per Spindle	R.P.M. of 1 1/2 in. Roll	R.P.M. of Spindle	Pounds per Spindle	R.P.M. of 1 1/2 in. Roll	R.P.M. of Spindle	Pounds per Spindle
4	4"	3"	187	2500	38.01	175	3500	37.03	142	3800	31.00
5	"	"	182	2700	30.99	164	3700	29.00	133	4000	24.09
6	"	"	178	2900	26.05	155	3800	23.38	125	4100	19.32
7	"	"	175	3100	22.36	147	3900	19.28	119	4200	15.95
8	"	"	172	3300	19.53	141	4000	16.39	114	4300	13.49
9	3 1/2"	2 1/2"	169	3400	17.26	137	4100	14.30	110	4400	11.66
10	"	"	166	3500	15.40	133	4200	12.61	107	4500	10.29
11	"	"	163	3600	13.87	130	4300	11.28	104	4600	9.16
12	"	"	160	3700	12.56	127	4400	10.16	102	4700	8.28
13	"	"	158	3800	11.52	125	4500	9.27	100	4800	7.53
14	"	"	156	3900	10.61	123	4600	8.51	98	4900	6.87
15	"	"	155	4000	9.87	121	4700	7.84	97	5000	6.37
16	3 1/4"	2 1/4"	154	4100	9.22	120	4800	7.31	96	5100	5.93
17	"	"	153	4200	8.64	119	4900	6.84	95	5200	5.53
18	"	"	152	4300	8.13	118	5000	6.42	94	5300	5.18
19	"	"	151	4400	7.66	117	5100	6.04	93	5400	4.86
20	"	"	150	4500	7.24	116	5200	5.69	92	5500	4.58
22	"	"	147	4600	6.46	113	5300	5.05	90	5600	4.08
24	"	"	144	4700	5.82	110	5400	4.52	88	5700	3.66
26	3"	2"	141	4800	5.27	107	5500	4.07	86	5800	3.31
28	"	"	139	4900	4.83	105	5600	3.71	84	5900	3.01
30	"	"	137	5000	4.46	103	5600	3.41	82	6000	2.74
32	"	"	135	5100	4.13	101	5700	3.14	80	6000	2.51
34	"	"	134	5200	3.86	99	5800	2.90	78	6100	2.31
36	"	"	133	5300	3.62	97	5800	2.68	76	6100	2.13
38	"	"	132	5400	3.41	96	5900	2.52	75	6200	1.99
40	2 3/4"	1 3/4"	131	5500	3.22	95	6000	2.37	74	6200	1.87
42	"	"	130	5600	3.05	94	6100	2.24	73	6300	1.76
44	"	"	129	5700	2.89	93	6200	2.11	72	6400	1.66
46	"	"	128	5800	2.75	92	6200	2.00	71	6400	1.56
50	"	"	126	5900	2.49	90	6300	1.80	69	6500	1.40
55	"	"	123	6100	2.21	87	6400	1.59	66	6500	1.22
60	"	"	120	6200	1.98	84	6500	1.41	64	6600	1.08
65	2 3/4"	1 5/8"	117	6300	1.78	82	6600	1.27	62	6700	.97
70	"	"	115	6400	1.63	80	6700	1.16	60	6700	.87
75	"	"	113	6500	1.50	78	6700	1.05	58	6700	.79
80	"	"	111	6600	1.38	76	6800	.96	57	6800	.73
85	"	"				74	6800	.88	56	6900	.67
90	"	"				72	6800	.81	55	7000	.62
95	"	"				70	6800	.75	54	7000	.58
100	2 1/2"	1 1/2"				69	6900	.70	53	7100	.54
110	"	"				66	6900	.61	51	7100	.47
120	"	"				63	6900	.53	49	7100	.42
130	"	"							47	7100	.37
140	"	"							45	7100	.33
150	"	"							44	7200	.30
160	"	"							43	7200	.28

PRODUCTION TABLE FOR TWISTING

TWO PLY PRODUCTION TABLE

(Continued)

POUNDS PER SPINDLE PER WEEK OF 58 HOURS

Number of Yarn	Gauge	Ring	MULTIPLIER 5			MULTIPLIER 6			MULTIPLIER 7		
			R.P.M. of 1½ in. Roll	R.P.M. of Spindle	Pounds per Spindle	R.P.M. of 1½ in. Roll	R.P.M. of Spindle	Pounds per Spindle	R.P.M. of 1½ in. Roll	R.P.M. of Spindle	Pounds per Spindle
			4	4"	3"	120	4000	26.84	102	4100	23.23
5	"	"	111	4100	20.59	94	4200	17.64	82	4300	15.62
6	"	"	104	4200	16.37	88	4300	14.05	77	4400	12.46
7	"	"	98	4300	13.38	83	4400	11.46	73	4500	10.20
8	"	"	93	4400	11.21	80	4500	9.73	70	4600	8.61
9	3½"	2½"	90	4500	9.71	77	4600	8.38	67	4700	7.36
10	"	"	87	4600	8.49	74	4700	7.27	65	4800	6.44
11	"	"	85	4700	7.58	72	4800	6.46	63	4900	5.70
12	"	"	83	4800	6.80	70	4900	5.78	62	5000	5.15
13	"	"	81	4900	6.15	69	5000	5.27	61	5100	4.69
14	"	"	80	5000	5.66	68	5100	4.84	60	5200	4.29
15	"	"	79	5100	5.23	67	5200	4.46	59	5300	3.95
16	3¼"	2¼"	78	5200	4.85	66	5300	4.13	58	5400	3.64
17	"	"	77	5300	4.52	65	5400	3.83	57	5500	3.38
18	"	"	76	5400	4.22	64	5400	3.57	56	5500	3.13
19	"	"	75	5400	3.95	63	5500	3.33	55	5600	2.92
20	"	"	74	5500	3.70	62	5500	3.12	55	5700	2.77
22	"	"	72	5600	3.28	61	5700	2.79	54	5900	2.48
24	"	"	70	5700	2.93	60	5900	2.52	53	6100	2.23
26	3"	2"	68	5800	2.63	59	6000	2.29	52	6200	2.02
28	"	"	67	5900	2.41	58	6100	2.09	51	6300	1.85
30	"	"	66	6000	2.22	57	6200	1.92	50	6400	1.69
32	"	"	65	6100	2.05	56	6300	1.77	49	6500	1.55
34	"	"	64	6200	1.90	55	6400	1.64	48	6500	1.43
36	"	"	63	6300	1.77	54	6500	1.52	47	6600	1.33
38	"	"	62	6400	1.65	53	6500	1.42	46	6600	1.23
40	2¾"	1¾"	61	6400	1.55	52	6600	1.32	45	6600	1.15
42	"	"	60	6500	1.45	51	6600	1.24	44	6700	1.07
44	"	"	59	6500	1.36	50	6600	1.16	43	6700	1.00
46	"	"	58	6600	1.28	49	6600	1.09	42	6700	.93
50	"	"	56	6600	1.14	47	6600	.96	41	6800	.84
55	"	"	54	6700	.98	46	6800	.85	40	6900	.74
60	"	"	52	6700	.88	45	7000	.77	39	7000	.67
65	2½"	1½"	50	6700	.79	44	7100	.69	38	7100	.60
70	"	"	49	6800	.72	43	7200	.63	37	7200	.54
75	"	"	48	6900	.65	42	7300	.57	36	7300	.49
80	"	"	47	7000	.60	41	7300	.53	35	7400	.45
85	"	"	46	7100	.55	40	7400	.48	35	7500	.42
90	"	"	45	7100	.51	39	7400	.45	34	7500	.39
95	"	"	44	7100	.47	38	7400	.41	33	7500	.36
100	2½"	1½"	43	7200	.44	37	7400	.38	32	7500	.33
110	"	"	41	7200	.38	35	7400	.33	30	7500	.28
120	"	"	39	7200	.33	34	7400	.29	29	7500	.25
130	"	"	38	7200	.30						
140	"	"	37	7300	.27						
150	"	"	36	7300	.25						
160	"	"	35	7400	.22						

THREE PLY PRODUCTION TABLE

POUNDS PER SPINDLE PER WEEK OF 58 HOURS

Number of Yarn	Gauge	Ring	MULTIPLIER 2			MULTIPLIER 3			MULTIPLIER 4		
			R.P.M. of 1½ in. Roll	R.P.M. of Spindle	Pounds per Spindle	R.P.M. of 1½ in. Roll	R.P.M. of Spindle	Pounds per Spindle	R.P.M. of 1½ in. Roll	R.P.M. of Spindle	Pounds per Spindle
4	4½"	3½"	184	2000	56.12	171	2800	54.25	147	3200	48.14
5	"	"	180	2200	45.98	163	3000	43.23	138	3400	37.36
6	"	"	177	2400	38.64	157	3100	35.54	131	3500	30.26
7	"	"	174	2500	33.16	151	3300	29.65	125	3600	25.04
8	"	"	172	2700	29.03	147	3400	25.50	121	3700	21.41
9	4"	3"	170	2800	25.72	143	3500	22.21	117	3800	18.53
10	"	"	168	2900	23.04	140	3600	19.68	114	3900	16.34
11	"	"	167	3000	20.95	137	3700	17.59	111	4000	14.53
12	"	"	166	3100	19.17	135	3800	15.96	109	4100	13.12
13	"	"	165	3200	17.68	133	3900	14.56	107	4200	11.93
14	"	"	164	3300	16.39	131	4000	13.36	106	4300	11.01
15	3½"	2½"	163	3400	15.26	130	4100	12.42	105	4400	10.21
16	"	"	162	3500	14.26	129	4200	11.60	104	4500	9.52
17	"	"	161	3600	13.39	128	4300	10.86	103	4600	8.89
18	"	"	160	3700	12.61	127	4400	10.22	102	4700	8.33
19	"	"	159	3800	11.91	126	4500	9.64	101	4800	7.83
20	"	"	158	3800	11.28	125	4600	9.10	100	4900	7.39
22	"	"	156	4000	10.16	122	4700	8.09	98	5000	6.59
24	3¼"	2¼"	154	4100	9.23	120	4800	7.32	96	5100	5.94
26	"	"	152	4200	8.43	118	4900	6.63	94	5200	5.38
28	"	"	150	4300	7.74	116	5000	6.09	92	5300	4.90
30	"	"	148	4400	7.14	114	5100	5.60	90	5400	4.48
32	"	"	146	4500	6.62	112	5200	5.16	88	5400	4.11
34	"	"	145	4600	6.20	110	5200	4.78	87	5500	3.83
36	"	"	144	4700	5.83	108	5300	4.45	86	5600	3.58
38	3"	2"	143	4800	5.50	107	5400	4.18	85	5700	3.35
40	"	"	142	4900	5.19	106	5500	3.94	84	5800	3.15
42	"	"	141	5000	4.92	105	5600	3.72	83	5900	2.97
44	"	"	140	5100	4.66	104	5600	3.52	82	5900	2.81
46	"	"	139	5100	4.43	103	5700	3.34	81	6000	2.65
50	"	"	137	5300	4.03	101	5800	3.02	79	6100	2.38
55	"	"	134	5400	3.59	98	5900	2.67	76	6100	2.09
60	2¾"	1¾"				95	6000	2.38	74	6200	1.87
65	"	"				92	6100	2.13	72	6300	1.68
70	"	"				90	6100	1.93	70	6400	1.52
75	"	"				88	6200	1.77	68	6400	1.38
80	"	"				86	6300	1.62	66	6400	1.26
85	"	"				84	6300	1.49	65	6500	1.16
90	2¾"	1¾"							64	6600	1.08
59	"	"							63	6700	1.01
100	"	"							62	6700	.95
110	"	"							60	6800	.83
120	"	"							58	6900	.74

THREE PLY PRODUCTION TABLE

(Continued)

POUNDS PER SPINDLE PER WEEK OF 58 HOURS

Number of Yarn	Gauge	Ring	MULTIPLIER 5			MULTIPLIER 6			MULTIPLIER 7		
			R.P.M. of 1½ in. Roll	R.P.M. of Spindle	Pounds per Spindle	R.P.M. of 1½ in. Roll	R.P.M. of Spindle	Pounds per Spindle	R.P.M. of 1½ in. Roll	R.P.M. of Spindle	Pounds per Spindle
4	1½"	3½"	121	3300	40.36	104	3400	35.32	92	3500	31.81
5	"	"	114	3500	31.53	98	3600	27.49	86	3700	24.48
6	"	"	108	3600	25.42	93	3700	22.22	81	3800	19.61
7	"	"	103	3700	20.95	88	3800	18.14	78	3900	16.28
8	"	"	99	3800	17.74	85	3900	15.42	75	4000	13.76
9	4"	3"	96	3900	15.39	82	4000	13.29	72	4100	11.78
10	"	"	93	4000	13.49	80	4100	11.73	70	4200	10.34
11	"	"	91	4100	12.05	78	4200	10.43	68	4300	9.15
12	"	"	89	4200	10.84	76	4300	9.33	67	4400	8.28
13	"	"	88	4300	9.92	75	4400	8.52	66	4500	7.55
14	"	"	87	4400	9.13	74	4500	7.83	65	4600	6.92
15	3½"	2½"	86	4500	8.44	73	4600	7.21	64	4700	6.37
16	"	"	85	4600	7.84	72	4700	6.69	63	4800	5.89
17	"	"	84	4700	7.31	71	4800	6.22	62	4900	5.47
18	"	"	83	4800	6.83	70	4800	5.80	61	4900	5.08
19	"	"	82	4900	6.41	69	4900	5.43	60	5000	4.74
20	"	"	81	4900	6.03	68	5000	5.09	60	5100	4.51
22	"	"	79	5000	5.36	67	5100	4.57	59	5300	4.04
24	3¼"	2¼"	77	5100	4.80	66	5300	4.13	58	5400	3.64
26	"	"	76	5300	4.38	65	5400	3.76	57	5500	3.31
28	"	"	75	5400	4.02	64	5500	3.44	56	5600	3.02
30	"	"	74	5500	3.70	63	5600	3.17	55	5700	2.77
32	"	"	73	5600	3.43	62	5700	2.93	54	5800	2.56
34	"	"	72	5700	3.19	61	5800	2.71	53	5900	2.36
36	"	"	71	5800	2.97	60	5900	2.52	52	5900	2.19
38	3"	2"	70	5900	2.79	59	5900	2.35	51	6000	2.04
40	"	"	69	5900	2.61	58	6000	2.20	50	6000	1.90
42	"	"	68	6000	2.45	57	6000	2.06	49	6100	1.78
44	"	"	67	6000	2.30	56	6100	1.93	48	6100	1.66
46	"	"	66	6100	2.17	55	6100	1.82	48	6200	1.59
50	"	"	64	6100	1.94	54	6200	1.64	47	6300	1.43
55	"	"	62	6200	1.71	52	6300	1.44	46	6500	1.28
60	2¾"	1¾"	60	6300	1.52	51	6400	1.30	45	6600	1.15
65	"	"	58	6400	1.36	50	6600	1.18	44	6700	1.04
70	"	"	57	6500	1.24	49	6700	1.07	43	6800	.94
75	"	"	56	6600	1.14	48	6800	.98	42	6900	.86
80	"	"	55	6700	1.05	47	6900	.90	41	7000	.79
85	"	"	54	6800	.97	46	6900	.83	40	7000	.72
90	2¾"	1½"	53	6800	.90	45	7000	.77	39	7000	.67
95	"	"	52	6900	.84	44	7000	.71	38	7000	.62
100	"	"	51	6900	.78	43	7000	.66	37	7000	.57
110	"	"	49	7000	.68	41	7000	.57	35	7000	.49
120	"	"	47	7000	.60	39	7000	.50	34	7000	.44

PRODUCTION TABLE FOR TWISTING

FOUR PLY PRODUCTION TABLE

POUNDS PER SPINDLE PER WEEK OF 58 HOURS

Number of Yarn	Gauge	Ring	MULTIPLIER 2			MULTIPLIER 3			MULTIPLIER 4		
			R.P.M. of 1½ in. Roll	R.P.M. of Spindle	Pounds per Spindle	R.P.M. of 1½ in. Roll	R.P.M. of Spindle	Pounds per Spindle	R.P.M. of 1½ in. Roll	R.P.M. of Spindle	Pounds per Spindle
4	5"	4"	181	1700	73.61	177	2500	73.41	144	2700	62.87
5	"	"	178	1900	60.62	171	2700	59.34	136	2900	48.97
6	"	"	176	2000	51.22	166	2900	49.33	129	3000	39.40
7	"	"	174	2200	44.21	161	3000	41.80	124	3100	32.96
8	4½"	3½"	172	2300	38.70	156	3100	35.87	120	3200	28.17
9	"	"	171	2400	34.49	152	3200	31.32	117	3300	24.59
10	"	"	170	2500	31.08	148	3300	27.61	115	3400	21.85
11	"	"	169	2600	28.26	145	3400	24.70	113	3500	19.58
12	"	"	168	2700	25.87	142	3500	22.25	111	3600	17.67
13	4"	3"	167	2800	23.82	140	3600	20.30	110	3700	16.20
14	"	"	166	2900	22.06	138	3600	18.62	109	3800	14.94
15	"	"	165	3000	20.52	136	3700	17.16	108	3900	13.85
16	"	"	164	3100	19.16	134	3800	15.89	107	4000	12.89
17	"	"	163	3200	17.96	133	3900	14.88	106	4100	12.05
18	"	"	162	3200	16.88	132	4000	13.98	105	4200	11.30
19	"	"	161	3300	15.93	131	4000	13.17	104	4300	10.61
20	3½"	2½"	160	3400	15.06	130	4100	12.43	103	4300	9.99
22	"	"	158	3500	13.56	127	4200	11.08	101	4500	8.94
24	"	"	156	3600	12.32	125	4300	10.03	99	4600	8.04
26	"	"	155	3700	11.34	123	4400	9.14	97	4700	7.31
28	"	"	154	3800	10.49	121	4500	8.38	96	4800	6.74
30	"	"	153	3900	9.75	119	4600	7.71	95	4900	6.24
32	"	"	152	4000	9.10	117	4700	7.13	94	5000	5.80
34	3¼"	2¼"	151	4100	8.53	116	4800	6.67	93	5100	5.41
36	"	"	150	4200	8.02	115	4900	6.26	92	5200	5.06
38	"	"	149	4300	7.56	114	5000	5.88	91	5300	4.75
40	"	"	148	4400	7.14	113	5100	5.55	90	5400	4.47
42	"	"	147	4500	6.76	112	5100	5.24	89	5400	4.21
44	"	"	146	4600	6.42	111	5200	4.96	88	5500	3.98
46	"	"	145	4600	6.19	110	5300	4.71	87	5600	3.77
50	3"	2"				108	5400	4.26	85	5700	3.39
55	"	"				105	5500	3.78	83	5800	3.02
60	"	"				102	5600	3.37	81	5900	2.70
65	"	"				100	5700	3.05	79	6000	2.44
70	"	"				98	5800	2.78	77	6100	2.21
75	"	"				96	5900	2.54	75	6100	2.01
80	2¾"	1¾"							73	6200	1.84
85	"	"							71	6200	1.68
90	"	"							70	6300	1.57
95	"	"							69	6300	1.47
100	"	"							68	6400	1.37

PRODUCTION TABLE FOR TWISTING

FOUR PLY PRODUCTION TABLE

(Continued)

POUNDS PER SPINDLE PER WEEK OF 58 HOURS

Number of Yarn	Gauge	Ring	MULTIPLIER 5			MULTIPLIER 6			MULTIPLIER 7		
			R. P. M. of 1½ in. Roll	R. P. M. of Spindle	Pounds per Spindle	R. P. M. of 1½ in. Roll	R. P. M. of Spindle	Pounds per Spindle	R. P. M. of 1½ in. Roll	R. P. M. of Spindle	Pounds per Spindle
4	5"	4"	119	2800	52.91	103	2900	46.63	88	2900	40.57
5	"	"	113	3000	41.57	97	3100	36.28	84	3100	31.89
6	"	"	108	3100	33.77	92	3200	29.16	80	3200	25.49
7	"	"	104	3200	28.16	89	3300	24.40	77	3400	21.38
8	4½"	3½"	101	3400	24.12	87	3500	21.02	75	3500	18.35
9	"	"	99	3500	21.14	85	3600	18.36	73	3600	15.76
10	"	"	97	3600	18.72	83	3700	16.20	71	3700	14.00
11	"	"	95	3700	16.73	81	3800	14.42	69	3800	12.39
12	"	"	94	3800	15.20	80	3900	13.09	68	3900	11.22
13	4"	3"	93	3900	13.91	79	4000	11.96	67	4000	10.22
14	"	"	92	4000	12.81	78	4100	10.97	66	4100	9.36
15	"	"	91	4100	11.84	77	4200	10.12	66	4200	8.74
16	"	"	90	4200	10.99	76	4300	9.38	65	4300	8.08
17	"	"	89	4300	10.24	75	4400	8.71	65	4400	7.61
18	"	"	88	4400	9.58	74	4400	8.13	64	4500	7.09
19	"	"	87	4500	8.98	73	4500	7.61	64	4600	6.72
20	3½"	2½"	86	4500	8.44	73	4600	7.24	63	4700	6.29
22	"	"	84	4600	7.51	72	4800	6.50	62	4800	5.64
24	"	"	82	4700	6.73	71	4900	5.89	61	4900	5.09
26	"	"	81	4900	6.15	70	5000	5.37	60	5000	4.63
28	"	"	80	5000	5.65	69	5100	4.93	59	5100	4.23
30	"	"	79	5100	5.22	67	5200	4.48	58	5200	3.88
32	"	"	78	5200	4.84	66	5300	4.14	57	5300	3.59
34	3¼"	2¼"	77	5300	4.51	65	5400	3.84	56	5400	3.32
36	"	"	76	5400	4.21	64	5400	3.57	55	5500	3.08
38	"	"	75	5400	3.94	63	5500	3.34	55	5600	2.92
40	"	"	74	5500	3.70	62	5500	3.12	54	5600	2.73
42	"	"	73	5600	3.48	61	5600	2.93	53	5700	2.55
44	"	"	72	5600	3.28	60	5600	2.75	53	5700	2.44
46	"	"	71	5700	3.10	59	5700	2.59	52	5800	2.29
50	3"	2"	69	5800	2.78	58	5800	2.34	52	5900	2.11
55	"	"	67	5900	2.46	56	5900	2.06	50	6100	1.84
60	"	"	65	5900	2.19	55	6000	1.86	49	6300	1.66
65	"	"	63	6000	1.96	54	6200	1.68	48	6400	1.50
70	"	"	62	6100	1.79	53	6300	1.53	47	6500	1.37
75	"	"	61	6200	1.65	52	6400	1.41	46	6600	1.25
80	2¾"	1¾"	60	6300	1.52	51	6400	1.30	45	6600	1.15
85	"	"	59	6400	1.41	50	6500	1.20	44	6700	1.06
90	"	"	58	6500	1.31	49	6600	1.10	43	6700	.98
95	"	"	57	6500	1.22	48	6600	1.03	42	6800	.90
100	"	"	56	6600	1.14	47	6700	.96	41	6800	.84

PRODUCTION TABLE FOR TWISTING

FIVE PLY PRODUCTION TABLE

POUNDS PER SPINDLE PER WEEK OF 58 HOURS

Number of Yarn	Gauge	Ring	MULTIPLIER 2			MULTIPLIER 3			MULTIPLIER 4		
			R.P.M. of 1½ in. Roll	R.P.M. of Spindle	Pounds per Spindle	R.P.M. of 1½ in. Roll	R.P.M. of Spindle	Pounds per Spindle	R.P.M. of 1½ in. Roll	R.P.M. of Spindle	Pounds per Spindle
4	5½"	4½"	180	1500	91.51	174	2200	90.83	142	2400	77.50
5	"	"	177	1700	75.35	167	2400	72.63	134	2500	60.31
6	"	"	175	1800	63.67	161	2500	60.03	127	2600	48.49
7	5"	4"	173	1900	54.95	155	2600	50.43	122	2700	40.55
8	"	"	171	2000	48.04	151	2700	43.40	119	2800	34.93
9	"	"	170	2100	42.82	148	2800	38.08	116	2900	30.41
10	"	"	169	2200	38.58	146	2900	33.97	114	3000	26.96
11	"	"	168	2300	35.07	144	3000	30.56	112	3100	24.19
12	4½"	3½"	167	2400	32.11	142	3100	27.72	111	3200	22.05
13	"	"	166	2500	29.57	141	3200	25.50	110	3300	20.24
14	"	"	165	2600	27.35	140	3300	23.57	109	3400	18.66
15	"	"	164	2700	25.44	139	3400	21.88	109	3500	17.46
16	"	"	163	2700	23.76	138	3500	20.42	108	3600	16.25
17	"	"	163	2800	22.38	137	3600	19.12	107	3700	15.19
18	4"	3"	162	2900	21.04	136	3600	17.97	107	3800	14.36
19	"	"	161	3000	19.83	135	3700	16.91	106	3900	13.49
20	"	"	161	3000	18.86	134	3800	15.97	105	4000	12.71
22	"	"	160	3200	17.08	132	3900	14.35	103	4100	11.37
24	"	"	159	3300	15.59	130	4000	13.00	101	4200	10.25
26	"	"	158	3400	14.34	128	4100	11.85	100	4300	9.39
28	3½"	2½"	157	3500	13.26	126	4200	10.86	99	4400	8.65
30	"	"	156	3600	12.32	124	4300	10.00	98	4500	8.01
32	"	"	155	3700	11.51	123	4400	9.32	97	4600	7.45
34	"	"	154	3800	10.78	122	4500	8.72	96	4700	6.95
36	"	"	153	3900	10.14	121	4600	8.18	95	4800	6.51
38	"	"	152	3900	9.56	120	4700	7.71	94	4900	6.11
40	"	"	151	4000	9.03	119	4800	7.27	93	5000	5.75
42	3¼"	2¼"				118	4800	6.87	92	5000	5.42
44	"	"				117	4900	6.51	91	5100	5.13
46	"	"				116	5000	6.18	90	5100	4.85
50	"	"				114	5100	5.60	88	5200	4.38
55	"	"				111	5200	4.97	86	5400	3.90
60	"	"				108	5300	4.44	84	5500	3.49
65	3"	2"							82	5600	3.15
70	"	"							81	5700	2.89
75	"	"							80	5800	2.67
80	"	"							79	5900	2.47

PRODUCTION TABLE FOR TWISTING

FIVE PLY PRODUCTION TABLE

(Continued)

POUNDS PER SPINDLE PER WEEK OF 58 HOURS

Number of Yarn	Gauge	Ring	MULTIPLIER 5			MULTIPLIER 6			MULTIPLIER 7		
			R.P.M. of 1½ in. Roll	R.P.M. of Spindle	Pounds per Spindle	R.P.M. of 1½ in. Roll	R.P.M. of Spindle	Pounds per Spindle	R.P.M. of 1½ in. Roll	R.P.M. of Spindle	Pounds per Spindle
4	5½"	4½"	119	2500	66.14	103	2600	58.29	88	2600	50.71
5	"	"	111	2600	51.05	96	2700	44.88	82	2700	38.90
6	"	"	105	2700	41.04	91	2800	36.07	78	2800	31.30
7	5"	4"	101	2800	34.19	87	2900	29.82	75	2900	26.00
8	"	"	98	2900	29.23	84	3000	25.37	73	3000	22.29
9	"	"	96	3000	25.56	82	3100	22.11	71	3100	19.36
10	"	"	94	3100	22.61	80	3200	19.48	69	3200	16.99
11	"	"	93	3200	20.40	79	3300	17.55	68	3300	15.25
12	4½"	3½"	92	3300	18.54	78	3400	15.92	67	3400	13.81
13	"	"	91	3400	16.97	77	3500	14.54	66	3500	12.57
14	"	"	90	3500	15.62	77	3600	13.51	66	3600	11.68
15	"	"	89	3600	14.45	76	3700	12.46	65	3700	10.75
16	"	"	88	3700	13.41	75	3800	11.54	65	3800	10.09
17	"	"	88	3800	12.63	75	3900	10.88	64	3900	9.36
18	4"	3"	87	3900	11.81	74	4000	10.14	64	4000	8.85
19	"	"	86	4000	11.07	73	4000	9.49	63	4100	8.26
20	"	"	86	4100	10.53	73	4100	9.03	63	4200	7.85
22	"	"	85	4200	9.48	72	4300	8.11	62	4300	7.03
24	"	"	84	4300	8.61	71	4400	7.35	61	4400	6.35
26	"	"	83	4400	7.87	70	4500	6.70	60	4500	5.77
28	3½"	2½"	82	4500	7.23	69	4600	6.14	59	4600	5.27
30	"	"	81	4600	6.68	68	4700	5.65	59	4700	4.92
32	"	"	80	4700	6.19	67	4800	5.22	58	4800	4.55
34	"	"	79	4800	5.76	66	4900	4.85	57	4900	4.21
36	"	"	78	4900	5.39	66	5000	4.59	57	5000	3.98
38	"	"	77	5000	5.04	65	5100	4.28	56	5100	3.71
40	"	"	76	5100	4.73	65	5200	4.08	56	5200	3.53
42	3¼"	2¼"	75	5100	4.45	64	5200	3.83	55	5200	3.30
44	"	"	74	5200	4.20	63	5300	3.60	54	5300	3.10
46	"	"	74	5300	4.02	63	5400	3.44	54	5400	2.96
50	"	"	73	5400	3.65	62	5500	3.12	53	5500	2.68
55	"	"	71	5500	3.24	60	5600	2.75	51	5600	2.35
60	"	"	69	5600	2.89	58	5700	2.44	50	5700	2.11
65	3"	2"	67	5700	2.59	57	5800	2.21	49	5800	1.91
70	"	"	66	5800	2.37	56	5900	2.02	48	5900	1.74
75	"	"	65	5900	2.18	55	6000	1.86	47	6000	1.59
80	"	"	64	6000	2.02	54	6100	1.71	46	6100	1.46

PRODUCTION TABLE FOR TWISTING

SIX PLY PRODUCTION TABLE

POUNDS PER SPINDLE PER WEEK OF 58 HOURS

Number of Yarn	Gauge	Ring	MULTIPLIER 2			MULTIPLIER 3			MULTIPLIER 4		
			R.P.M. of 1½ in. Roll	R.P.M. of Spindle	Pounds per Spindle	R.P.M. of 1½ in. Roll	R.P.M. of Spindle	Pounds per Spindle	R.P.M. of 1½ in. Roll	R.P.M. of Spindle	Pounds per Spindle
4	5½"	4½"	183	1400	110.16	173	2000	106.94	143	2200	92.45
5	"	"	180	1600	90.78	167	2200	85.31	135	2300	72.22
6	"	"	178	1700	77.22	163	2300	71.61	128	2400	58.30
7	"	"	176	1800	66.68	159	2400	61.19	123	2500	48.89
8	"	"	175	1900	58.66	155	2500	52.95	120	2600	42.12
9	5"	4"	174	2000	52.27	152	2600	46.54	117	2700	36.72
10	"	"	173	2100	47.06	149	2700	41.30	115	2800	32.63
11	"	"	172	2200	42.73	147	2800	37.22	114	2900	29.51
12	"	"	171	2300	39.08	145	2900	33.77	113	3000	26.87
13	"	"	170	2400	36.00	143	3000	30.86	112	3100	24.64
14	"	"	169	2400	33.31	142	3100	28.55	111	3200	22.73
15	4½"	3½"	168	2500	30.98	141	3100	26.52	110	3300	21.07
16	"	"	167	2600	28.93	140	3200	24.74	109	3400	19.60
17	"	"	166	2600	27.13	139	3300	23.17	108	3400	18.29
18	"	"	165	2700	25.50	138	3400	21.75	107	3500	17.14
19	"	"	164	2800	24.04	137	3400	20.48	106	3600	16.10
20	"	"	163	2800	22.73	136	3500	19.40	106	3700	15.32
22	4"	3"	161	2900	20.48	133	3600	17.25	105	3800	13.84
24	"	"	160	3000	18.70	131	3700	15.63	104	3900	12.60
26	"	"	159	3100	17.19	129	3800	14.26	103	4000	11.55
28	"	"	158	3200	15.90	128	3900	13.16	102	4100	10.64
30	"	"	157	3300	14.78	127	4000	12.22	101	4200	9.86
32	"	"	156	3400	13.80	126	4100	11.39	100	4300	9.17
34	3½"	2½"				125	4200	10.66	99	4400	8.56
36	"	"				124	4300	10.01	98	4500	8.02
38	"	"				123	4400	9.42	97	4600	7.52
40	"	"				122	4500	8.88	96	4700	7.08
42	"	"				121	4500	8.40	95	4700	6.68
44	"	"				120	4600	7.96	94	4800	6.32
46	"	"				119	4700	7.56	93	4900	5.99
50	3¼"	2¼"							91	5000	5.40
55	"	"							89	5100	4.81
60	"	"							87	5200	4.32
65	"	"							85	5300	3.91
70	"	"							84	5400	3.59

PRODUCTION TABLE FOR TWISTING

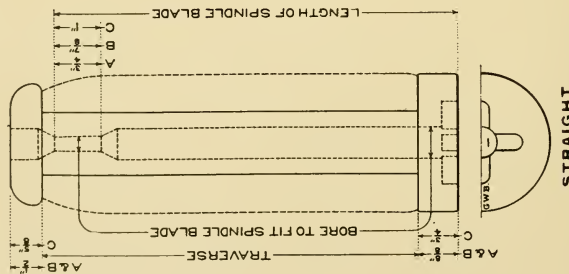
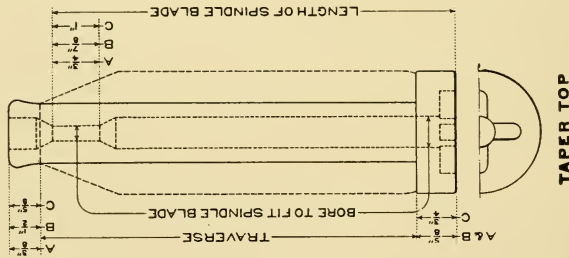
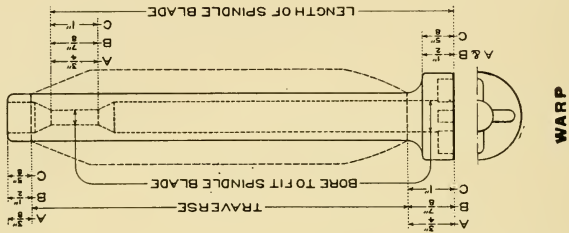
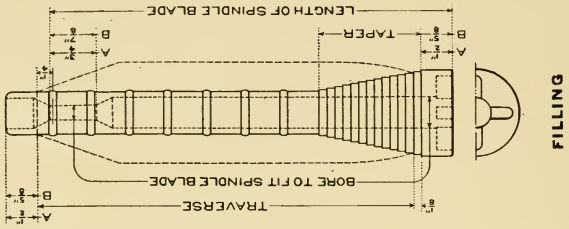
SIX PLY PRODUCTION TABLE

(Continued)

POUNDS PER SPINDLE PER WEEK OF 58 HOURS

Number of Yarn	Gauge	Ring	MULTIPLIER 5			MULTIPLIER 6			MULTIPLIER 7		
			R.P.M. of 1½ in. Roll	R.P.M. of Spindle	Pounds per Spindle	R.P.M. of 1½ in. Roll	R.P.M. of Spindle	Pounds per Spindle	R.P.M. of 1½ in. Roll	R.P.M. of Spindle	Pounds per Spindle
4	5½"	4½"	120	2300	79.56	100	2300	67.52	86	2300	59.10
5	"	"	113	2400	62.06	94	2400	52.49	80	2400	45.29
6	"	"	107	2500	49.96	89	2500	42.19	76	2500	36.47
7	"	"	103	2600	41.61	85	2600	34.81	73	2600	30.27
8	"	"	100	2700	35.55	83	2700	29.94	71	2700	25.90
9	5"	4"	98	2800	31.18	81	2800	26.09	70	2800	22.80
10	"	"	96	2900	27.61	80	2900	23.27	69	2900	20.29
11	"	"	95	3000	24.92	79	3000	20.96	68	3000	18.22
12	"	"	94	3100	22.66	78	3100	19.02	67	3100	16.50
13	"	"	93	3200	20.74	77	3200	17.36	66	3200	15.03
14	"	"	92	3300	19.10	77	3300	16.16	66	3300	13.99
15	4½"	3½"	91	3400	17.67	76	3400	14.92	65	3400	12.87
16	"	"	90	3500	16.40	75	3500	13.82	65	3500	12.08
17	"	"	89	3500	15.28	75	3600	13.02	64	3600	11.20
18	"	"	88	3600	14.29	74	3600	12.15	64	3700	10.60
19	"	"	87	3700	13.40	73	3700	11.37	63	3700	9.89
20	"	"	87	3800	12.74	73	3800	10.81	63	3800	9.40
22	4"	3"	86	3900	11.47	72	3900	9.71	62	3900	8.41
24	"	"	85	4000	10.42	71	4000	8.80	61	4000	7.60
26	"	"	84	4100	9.52	70	4100	8.01	60	4100	6.90
28	"	"	83	4200	8.76	69	4200	7.34	59	4200	6.32
30	"	"	82	4300	8.09	68	4300	6.76	58	4300	5.80
32	"	"	81	4400	7.50	68	4400	6.35	58	4400	5.44
34	3½"	2½"	80	4500	6.98	67	4500	5.88	57	4500	5.04
36	"	"	79	4600	6.52	66	4600	5.49	57	4600	4.77
38	"	"	79	4700	6.18	66	4700	5.21	56	4700	4.44
40	"	"	78	4700	5.81	65	4700	4.88	56	4800	4.22
42	"	"	77	4800	5.46	65	4800	4.65	55	4800	3.95
44	"	"	77	4900	5.22	64	4900	4.37	55	4900	3.78
46	"	"	76	5000	4.93	64	5000	4.19	55	5000	3.61
50	3¼"	2¼"	75	5100	4.49	63	5100	3.80	54	5100	3.27
55	"	"	73	5200	3.98	61	5200	3.35	52	5200	2.86
60	"	"	71	5300	3.55	59	5300	2.97	51	5300	2.58
65	"	"	69	5400	3.19	58	5400	2.70	50	5400	2.33
70	"	"	68	5500	2.92	57	5500	2.46	49	5500	2.13

STYLES AND DIMENSIONS OF BOBBINS



STYLES AND DIMENSIONS OF BOBBINS—(Continued)

SIZE OF RING	L'gth of Trav. *	STRAIGHT WIND				TAPER TOP WIND				WARP WIND				FILLING WIND				
		Diam. of Bottom Head	Diam. of Top Head	Diam. of Barrel	Diam. of Bobbin	Diam. of Barrel	Diam. of Bobbin	Diam. of Barrel	Diam. of Bobbin	Diam. of Head	Diam. of Barrel	Diam. of Bobbin	Diam. of Head	Diam. of Barrel	Diam. of Bobbin	Length of Taper	Diam. of Barrel	Lbs. of Yarn on Bobbin
1½"	5"	1 ¼"	1"	8"	.084	11"	11"	8"	.079	11"	11"	1 ¼"	8"	8"	1 ¼"	1 ½"	16"	.069
1½"	5"	1 ¾"	1 ¼"	11"	.106	3"	3"	11"	.100	3"	3"	1 ¼"	11"	11"	1 ¼"	1 ½"	8"	.085
1½"	5½"	1 ½"	1 ¼"	3"	.144	13"	13"	3"	.136	13"	13"	1 ¾"	3"	3"	1 ¾"	1 ¾"	16"	.116
1½"	5½"	1 ¾"	1 ¾"	13"	.171	7"	7"	13"	.164	7"	7"	1 7/8"	13"	13"	1 7/8"	1 7/8"	3"	.139
2"	6"	1 11/16"	1 7/8"	7"	.201	15"	15"	7"	.191	15"	15"	1 ½"	7"	7"	1 ½"	1 ½"	13"	.163
2 1/8"	6"	1 15/16"	1 11/16"	15"	.285	1"	1"	15"	.269	1"	1"	1 1/8"	15"	15"	1 1/8"	1 1/8"	7"	.228
2 1/8"	6"	2 1/8"	1 15/16"	1"	.377	1 1/8"	1 1/8"	1"	.354	1 1/8"	1 1/8"	1 1/8"	1"	1"	1 1/8"	1 1/8"	15"	.289
2 3/8"	6"	2 1/8"	2 1/8"	1 1/8"	.459	1 1/8"	1 1/8"	1 1/8"	.418	1 1/8"	1 1/8"	2 1/8"	1 1/8"	1 1/8"	2 1/8"	1 1/8"	1"	.357
3"	6"	2 3/8"	2 3/8"	1 1"	.491	1 3/8"	1 3/8"	1 1"	.454	1 3/8"	1 3/8"	2 1/4"	1 1"	1 1"	2 1/4"	1 3/8"		
3 1/8"	6"	3 1/8"	2 7/8"	1 3/8"	.710	1 1/2"	1 1/2"	3 1/8"	.650	1 1/2"	1 1/2"							
4"	6"	3 1/8"	3 1/8"	1 3/8"	.870	1 3/8"	1 3/8"											
4 1/2"	6"	4"	3 3/4"	1 1/2"	1.127	1 3/4"	1 3/4"											

* The letters A, B and C refer to the cut on the opposite page and show the dimensions which apply to each size of ring.

Notes: In addition to the styles of bobbins given above may be mentioned the Spool and the Reverse Taper Top Wind bobbins. The Spool Wind bobbin has a top head of the same diameter as the bottom head, but is otherwise the same as the Straight Wind bobbin; the Reverse Taper Top Wind bobbin is similar to the Taper Top Wind bobbin except that it has a straight top like the Warp Wind bobbin, with an allowance of an additional quarter of an inch above the top of the wind.

The weight of yarn on bobbins as given above is an average only, since for any particular case this weight varies according to the number of yarn, ply, twist per inch, speed of spindles, weight of travelers, etc. The weight of yarn for wet twist on filling wind has been omitted from the tables, as this wind is not considered satisfactory for wet twisting.

CYLINDER SPEED TABLE

**REVOLUTIONS PER MINUTE OF 7 INCH CYLINDER
REQUIRED FOR VARIOUS SPINDLE SPEEDS**

Revolutions per Minute of Spindle	REVOLUTIONS PER MINUTE OF CYLINDER				
	1 IN. WHIRL	$1\frac{1}{8}$ IN. WHIRL	$1\frac{1}{4}$ IN. WHIRL	$1\frac{3}{8}$ IN. WHIRL	$1\frac{1}{2}$ IN. WHIRL
	Ratio 6.18	Ratio 5.61	Ratio 5.12	Ratio 4.70	Ratio 4.35
3000				638	690
3100				660	713
3200				681	736
3300				702	759
3400				723	782
3500			684	745	805
3600			703	766	828
3700			723	787	851
3800			742	809	874
3900			762	830	897
4000		713	781	851	920
4100		731	801	872	943
4200		749	820	894	966
4300		766	840	915	988
4400		784	859	936	1011
4500	728	802	879	957	1034
4600	744	820	898	979	1057
4700	761	838	918	1000	1080
4800	777	856	938	1021	1103
4900	793	873	957	1043	1126
5000	809	891	977	1064	1149
5100	825	909	996	1085	1172
5200	841	927	1016	1106	1195
5300	858	945	1035	1128	1218
5400	874	963	1055	1149	1241
5500	890	980	1074	1170	1264
5600	906	998	1094	1191	1287
5700	922	1016	1113	1213	1310
5800	939	1034	1133	1234	1333
5900	955	1052	1152	1255	1356
6000	971	1070	1172	1277	1379
6100	987	1087	1191	1298	1402
6200	1003	1105	1211	1319	1425
6300	1019	1123	1230	1340	1448
6400	1036	1141	1250	1362	1471
6500	1052	1159	1270	1383	1494
6600	1068	1176	1289	1404	1517
6700	1084	1194	1309	1426	1540
6800	1100	1212	1328	1447	1563
6900	1117	1230	1348	1468	1586
7000	1133	1248	1367	1489	
7100	1149	1266	1387	1511	
7200	1165	1283	1406	1532	
7300	1181	1301	1426	1553	
7400	1197	1319	1445	1574	
7500	1214	1337	1465		
7600	1230	1355	1484		
7700	1246	1373	1504		
7800	1262	1390	1523		
7900	1278	1408	1543		
8000	1294	1426	1563		

CYLINDER SPEED TABLE—(Continued)

REVOLUTIONS PER MINUTE OF 7 INCH CYLINDER
REQUIRED FOR VARIOUS SPINDLE SPEEDS

Revolutions per Minute of Spindle	REVOLUTIONS PER MINUTE OF CYLINDER				
	1 $\frac{5}{8}$ IN. WHIRL	1 $\frac{3}{4}$ IN. WHIRL	2 IN. WHIRL	2 $\frac{1}{4}$ IN. WHIRL	2 $\frac{1}{2}$ IN. WHIRL
	Ratio 4.04	Ratio 3.77	Ratio 3.35	Ratio 2.96	Ratio 2.64
1500			448	507	568
1600			478	541	606
1700			507	574	644
1800			537	608	682
1900			567	642	720
2000		531	597	676	758
2100		557	627	709	795
2200		584	657	743	833
2300		610	687	777	871
2400		637	716	811	909
2500	619	663	746	845	947
2600	644	690	776	878	985
2700	668	716	806	912	1023
2800	693	743	836	946	1061
2900	718	769	866	980	1098
3000	743	796	896	1014	1136
3100	767	822	925	1047	1174
3200	792	849	955	1081	1212
3300	817	875	985	1115	1250
3400	842	902	1015	1149	1288
3500	866	928	1045	1182	1326
3600	891	955	1075	1216	1364
3700	916	981	1104	1250	1402
3800	941	1008	1134	1284	1439
3900	965	1034	1164	1318	1477
4000	990	1061	1194	1351	1515
4100	1015	1088	1224	1385	1553
4200	1040	1114	1254	1419	1591
4300	1064	1141	1284	1453	1629
4400	1089	1167	1313	1486	1667
4500	1114	1194	1343	1520	
4600	1139	1220	1373	1554	
4700	1163	1247	1403	1588	
4800	1188	1273	1433	1622	
4900	1213	1300	1463	1655	
5000	1238	1326	1493		
5100	1262	1353	1522		
5200	1287	1379	1552		
5300	1312	1406	1582		
5400	1337	1432	1612		
5500	1361	1459			
5600	1386	1485			
5700	1411	1512			
5800	1436	1538			
5900	1460	1565			
6000	1485				
6100	1510				
6200	1535				
6300	1559				
6400	1584				
6500	1609				

CYLINDER SPEED TABLE

REVOLUTIONS PER MINUTE OF 8 INCH CYLINDER
REQUIRED FOR VARIOUS SPINDLE SPEEDS

Revolutions per Minute of Spindle	REVOLUTIONS PER MINUTE OF CYLINDER				
	1 IN. WHIRL	1 $\frac{1}{8}$ IN. WHIRL	1 $\frac{1}{4}$ IN. WHIRL	1 $\frac{3}{8}$ IN. WHIRL	1 $\frac{1}{2}$ IN. WHIRL
	Ratio 7.04	Ratio 6.39	Ratio 5.83	Ratio 5.35	Ratio 4.95
3000				561	606
3100				579	626
3200				598	646
3300				617	667
3400				636	687
3500			600	654	707
3600			617	673	727
3700			635	692	747
3800			652	710	768
3900			669	729	788
4000		626	686	748	808
4100		642	703	766	828
4200		657	720	785	848
4300		673	738	804	869
4400		689	755	822	889
4500	639	704	772	841	909
4600	653	720	789	860	929
4700	668	736	806	879	949
4800	682	751	823	897	970
4900	696	767	840	916	990
5000	710	782	858	935	1010
5100	724	798	875	953	1030
5200	739	813	892	972	1051
5300	753	829	909	991	1071
5400	767	845	926	1009	1091
5500	781	860	943	1028	1111
5600	795	876	961	1047	1131
5700	810	892	978	1065	1152
5800	824	907	995	1084	1172
5900	838	923	1012	1103	1192
6000	852	938	1029	1121	1212
6100	866	954	1046	1140	1232
6200	881	970	1063	1159	1253
6300	895	986	1081	1178	1273
6400	909	1002	1098	1196	1293
6500	923	1017	1115	1215	1313
6600	937	1033	1132	1234	1333
6700	952	1049	1149	1252	1354
6800	966	1064	1166	1271	1374
6900	980	1080	1184	1290	1394
7000	994	1095	1201	1308	
7100	1008	1111	1218	1327	
7200	1023	1127	1235	1346	
7300	1037	1142	1252	1364	
7400	1051	1158	1269	1383	
7500	1065	1174	1286		
7600	1080	1189	1304		
7700	1094	1205	1321		
7800	1108	1221	1338		
7900	1122	1236	1355		
8000	1136	1252	1372		

CYLINDER SPEED TABLE—(Continued)

REVOLUTIONS PER MINUTE OF 8 INCH CYLINDER
REQUIRED FOR VARIOUS SPINDLE SPEEDS

Revolutions per Minute of Spindle	REVOLUTIONS PER MINUTE OF CYLINDER				
	$1\frac{5}{8}$ IN. WHIRL Ratio 4.60	$1\frac{3}{4}$ IN. WHIRL Ratio 4.29	2 IN. WHIRL Ratio 3.81	$2\frac{1}{4}$ IN. WHIRL Ratio 3.39	$2\frac{1}{2}$ IN. WHIRL Ratio 3.02
1500			394	442	497
1600			420	472	530
1700			446	501	563
1800			472	531	596
1900			499	560	629
2000		466	525	590	662
2100		490	551	619	695
2200		513	577	649	728
2300		536	604	678	762
2400		559	630	708	795
2500	543	583	656	737	828
2600	565	606	682	767	861
2700	587	629	709	796	894
2800	609	653	735	826	927
2900	630	676	761	855	960
3000	652	699	787	885	993
3100	674	723	814	914	1026
3200	696	746	840	944	1060
3300	717	769	866	973	1093
3400	739	793	892	1003	1126
3500	761	816	918	1032	1159
3600	783	839	945	1062	1192
3700	804	862	971	1091	1225
3800	826	886	997	1121	1258
3900	848	909	1024	1150	1291
4000	870	932	1050	1180	1325
4100	891	956	1076	1209	1358
4200	913	979	1102	1239	1391
4300	935	1002	1128	1268	1424
4400	957	1026	1155	1298	1457
4500	978	1049	1181	1327	
4600	1000	1072	1207	1357	
4700	1022	1096	1234	1386	
4800	1043	1119	1260	1416	
4900	1065	1142	1286	1446	
5000	1087	1166	1312		
5100	1109	1189	1339		
5200	1130	1212	1365		
5300	1152	1235	1391		
5400	1174	1259	1417		
5500	1196	1282			
5600	1217	1305			
5700	1239	1329			
5800	1261	1352			
5900	1283	1375			
6000	1304				
6100	1326				
6200	1348				
6300	1370				
6400	1391				
6500	1413				

GROOVED PULLEY SPEED TABLE

REVOLUTIONS PER MINUTE OF 6 INCH GROOVED PULLEY
REQUIRED FOR VARIOUS SPINDLE SPEEDS

Revolutions per Minute of Spindle	REVOLUTIONS PER MINUTE OF GROOVED PULLEY					
	$1\frac{1}{2}$ INCH WHIRL	$1\frac{5}{8}$ INCH WHIRL	$1\frac{3}{4}$ INCH WHIRL	2 INCH WHIRL	$2\frac{1}{4}$ INCH WHIRL	$2\frac{1}{2}$ INCH WHIRL
	Ratio 3.57	Ratio 3.32	Ratio 3.12	Ratio 2.77	Ratio 2.49	Ratio 2.26
1000			321	361	402	442
1100			353	397	442	487
1200			385	433	482	531
1300			417	463	522	575
1400			449	505	562	619
1500		452	481	542	602	664
1600		482	513	578	643	708
1700		512	545	614	683	752
1800		542	577	650	723	796
1900		572	609	686	763	841
2000	560	602	641	722	803	885
2100	588	633	673	758	843	929
2200	616	663	705	794	884	973
2300	644	693	737	830	924	1018
2400	672	723	769	866	964	1062
2500	700	753	801	903	1004	1106
2600	728	783	833	939	1044	1150
2700	756	813	865	975	1084	1195
2800	784	843	897	1011	1124	1239
2900	812	873	929	1047	1165	1283
3000	840	903	962	1083	1205	1327
3100	868	934	994	1119	1245	1371
3200	896	964	1026	1155	1285	1416
3300	924	994	1058	1191	1325	1460
3400	952	1024	1090	1227	1365	1504
3500	980	1054	1122	1264	1406	
3600	1008	1084	1154	1300	1446	
3700	1036	1115	1186	1336	1486	
3800	1064	1145	1218	1372	1526	
3900	1092	1175	1250	1408	1566	
4000	1120	1205	1282	1444		
4100	1148	1235	1314	1480		
4200	1176	1265	1346	1516		
4300	1204	1295	1378	1552		
4400	1232	1325	1410	1588		
4500	1261	1356	1442			
4600	1289	1386	1474			
4700	1317	1416	1506			
4800	1345	1446	1538			
4900	1373	1476	1570			
5000	1401	1506				
5100	1429	1536				
5200	1457	1566				
5300	1485	1596				
5400	1513	1626				
5500	1541					
5600	1569					
5700	1597					
5800	1625					
5900	1653					
6000	1681					

TABLE OF RATIOS

NUMBER OF TURNS OF SPINDLE TO ONE TURN OF CYLINDER OR GROOVED PULLEY

Diameter of Spindle Whirl	TURNS OF SPINDLE TO ONE OF CYLINDER OR GROOVED PULLEY		
	Grooved Pulley 6 Inches Diameter	Cylinder 7 Inches Diameter	Cylinder 8 Inches Diameter
1"		6.18	7.04
1 $\frac{1}{8}$ "		5.61	6.39
1 $\frac{1}{4}$ "		5.12	5.83
1 $\frac{3}{8}$ "		4.70	5.35
1 $\frac{1}{2}$ "	3.57	4.35	4.95
1 $\frac{5}{8}$ "	3.32	4.04	5.60
1 $\frac{3}{4}$ "	3.12	3.77	4.29
2"	2.77	3.35	3.81
2 $\frac{1}{4}$ "	2.49	2.96	3.39
2 $\frac{1}{2}$ "	2.26	2.64	3.02

The above ratios have been obtained from actual tests made with bands suited to the various conditions of fine or coarse work and proportional to the size of whirl. The ratios may however vary in any particular case depending on the size of bands actually used and also on the tension of the bands.

In place of the 7 inch and 8 inch Cylinders for coarse work, we can furnish 7 inch and 8 inch Grooved Pulleys. The Grooved Pulleys are made of such a diameter that they give the same ratios as the corresponding Cylinder Drive, so that the twist gearing tables previously given for the Cylinder Drive may be used also for the Grooved Pulley Drive.

SPECIFICATIONS

Number of Dry Twisters?

Number of Wet Twisters?

Number of Spindles per Twister?

Gauge, or distance from centre to centre of spindles?

Size of Rings?

What make of Rings? *See Foot Note.*

What style of Rings? *See Foot Note.*


What style of Ring Holders? *See Foot Note.*

What pattern of Spindle? Diameter of Whirl? *See Foot Note.*

Length of Traverse? Number of teeth in Lay Gear?

Style of Wind?

Single line Top and Bottom Rolls? 

Double line Bottom and Single line Top Rolls? 

Double line Bottom and Double line Top Rolls? 

Diameter of Bottom Rolls?

Bottom Rolls plain or fluted?

Diameter of Top Rolls?

Diameter of Cylinder? or Diameter of Grooved Pulleys?

Diameter of Tight Pulleys? Width of Face?

Diameter of Loose Pulleys?

Belt from above or below? Are Belt Guards wanted?

What style of Guides for Thread Boards?

What kind of Thread Boards?

SPECIFICATIONS—(Continued)

Number of Yarn to be twisted?

Number of Ply?

How many Skewers per Spindle?

What style of Creel?

Diameter of Creel Skewers?

Length of Creel Skewers above Washer?

Flat or Oval Washer for Creel Skewers?

Extreme length of Creel Bobbins? *See Foot Note.*

Diameter of Creel Bobbins when full?

Range of Twist?

For what Turns Twist shall we furnish three changes of gears?

Number of teeth in Cylinder Gears?

Number of teeth in Variable Cylinder Gears?

Number of teeth in Jack Gears?

Width of Twistors?

Shall we ship set up on skids, or taken down and packed in car?

By what lines shall we ship?

Shall we send men to erect?

Remarks:

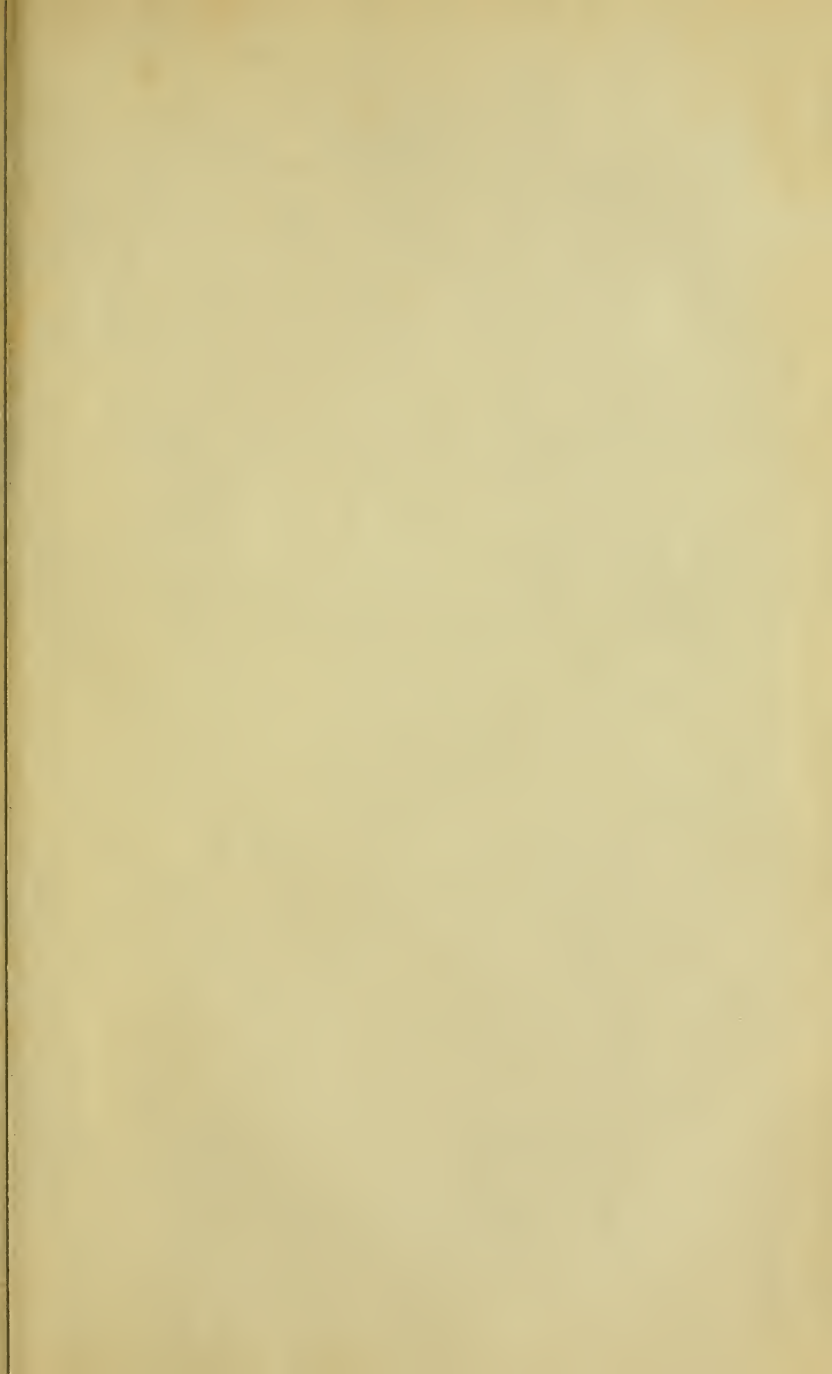
NOTE:—If present equipment is to be matched, do not fail to send sample SPINDLE and BOBBIN, RING and HOLDER, also sample CREEL BOBBIN.

24⁵/₂ July 7/16
for AB Mann Bendages
Style 1174 & 1186 Parker

24¹/₂ Trust 40 Turns.

Speed feet roll

Production 1.06 lb 54 Hours.



Sp. Co 1
TSJ583
F2
C.1

~~67702852~~^x
~~F18~~

TS1583
F2

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