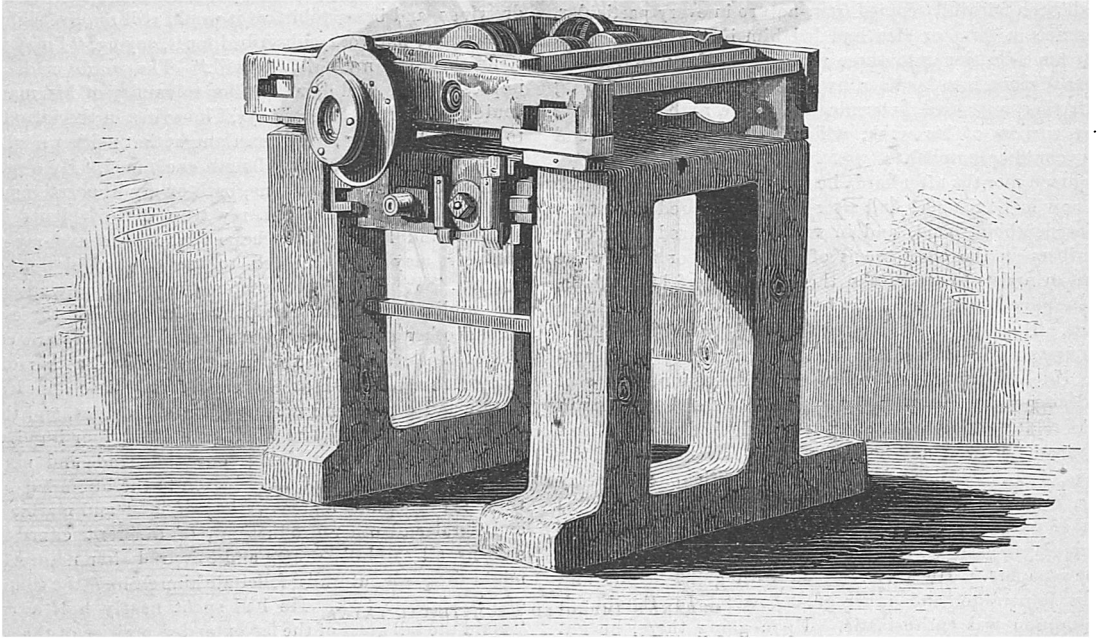


BANK-NOTE ENGRAVING IN AMERICA.

The object of the present article is not to examine the origin of bank-notes or bank-note engraving, but to furnish a simple outline of their production and its history in the New World. As a department of industry, bank-note engraving claims

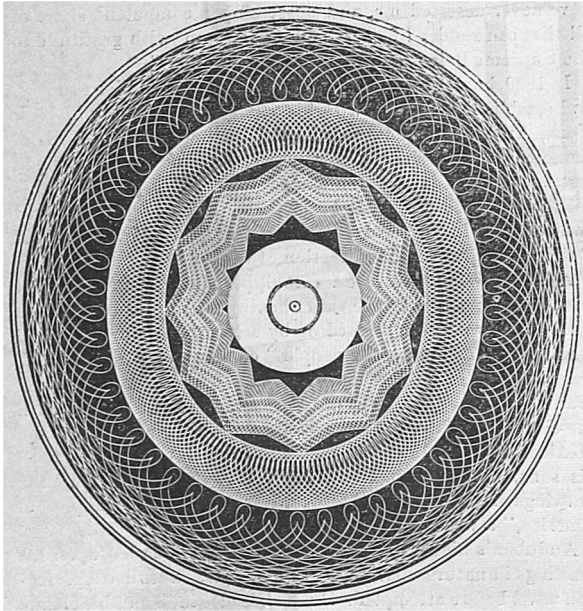
In "The Illustrated Magazine of Art" we can occupy ourselves with only one of these subjects—bank-note engraving—a subject which has in itself no necessary connexion with monetary crises, and little even with the disturbances pro-



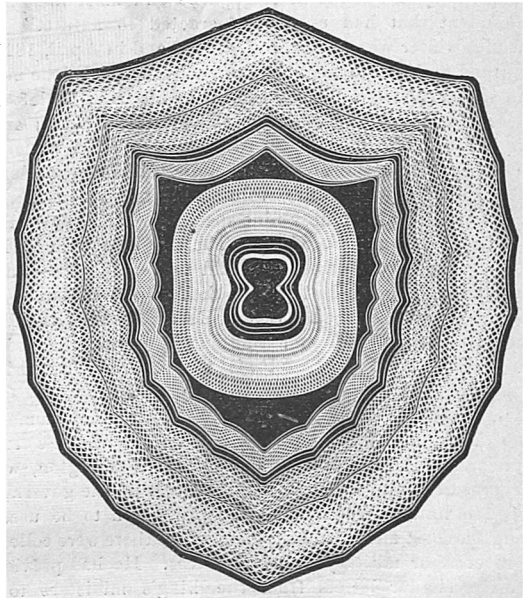
SPENCER'S GEOMETRICAL LATHE—THE FIRST MADE.

more than a passing regard from all classes of citizens. It involves processes which are unknown to the community at large, and to be ignorant of which is not very reputable to a people who read and write so much. It is connected, more-

duced in business by counterfeiting; but, on the other hand, has, if properly guarded by the states and understood by the people, an intimate connexion with monied prosperity and confidence in the circulation of bank-notes.



COMPOUND OF CYCLOIDAL AND WAVE OVAL OF THE GEOMETRICAL AND ROSE ENGINE COMBINED.



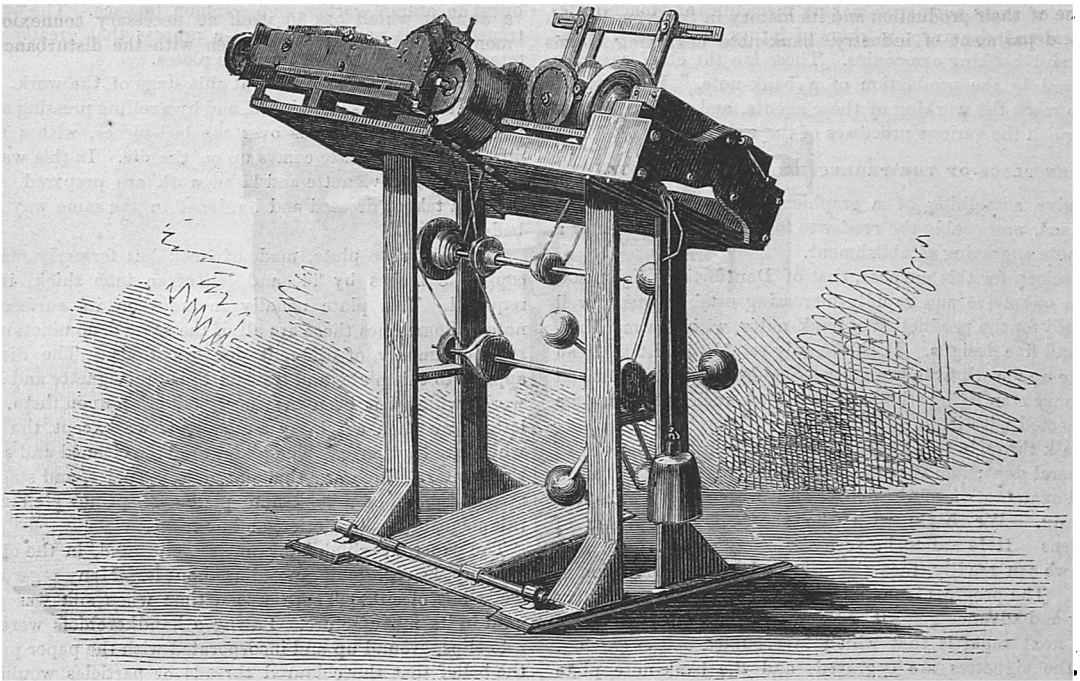
LATEST IMPROVEMENT OF GEOMETRICAL LATHE.

over, so intimately with monied interests and public confidence in paper currency, as to require that we become better acquainted with it and the guarantees which it holds out against the various forms of counterfeiting.

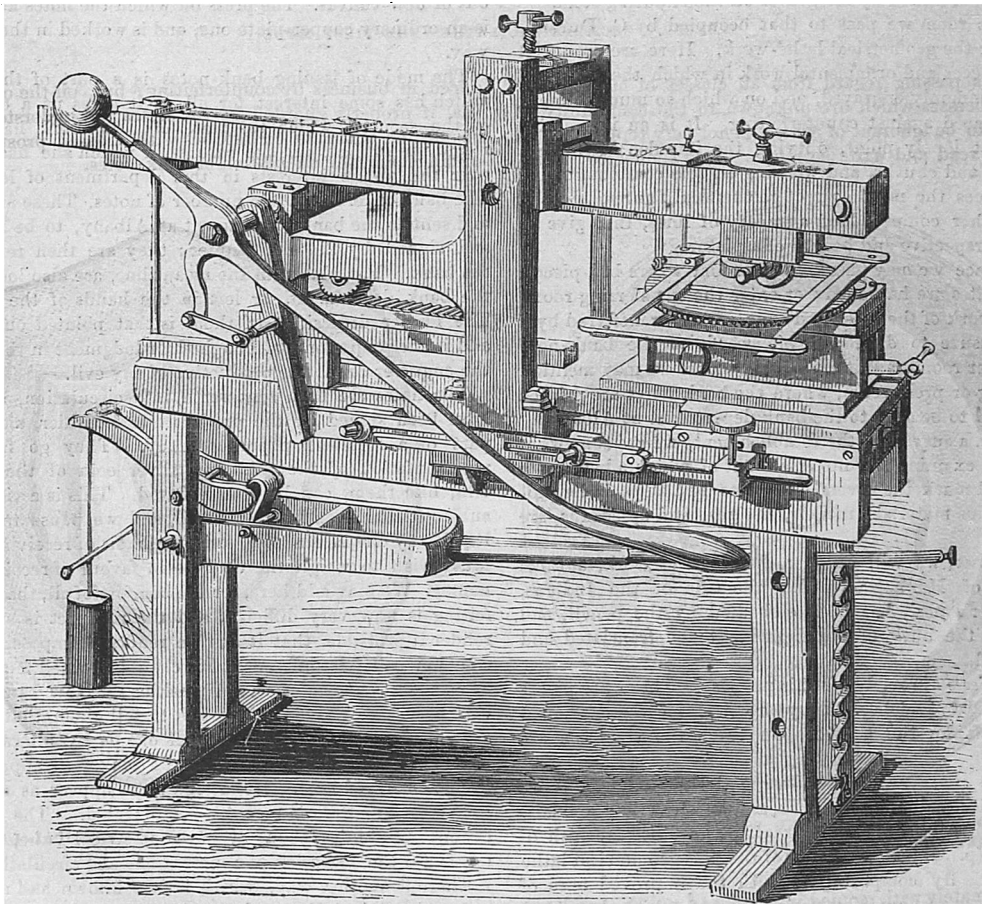
THE BANK-NOTE AS A WORK OF ART.

We proceed now to consider the bank-note simply as a work of art. As such, it belongs solely to the engraver, and its production is to be sought and studied in his line of life.

The banking company and state have little to do with it. The former, by committees, can only order certain plates, and notes printed from the plates furnished by the engraver—laws that respect the welfare of the public. The bank-note, as we



DURAND'S IMPROVED GEOMETRICAL LATHE.



DURAND'S TRANSFER PRESS.

select those designs which suit their taste; the latter can only pass certain laws or regulations regarding the issue of the have already intimated, is the point from which we wish to observe its production. It is before us, and, as we examine it,

we have a striking instance of the division of labour. Its production is the joint work of many and very diverse hands: miners and charcoal men, smelters and ironmongers, hemp-growers, weavers, and paper-makers, mechanics and machinists, designers and engravers, workers of lathes and presses, legislators and banking companies. These are the chief agencies employed in the production of a bank-note. We proceed now to mark the working of these agents, and the stages that distinguish the various processes of the work.

THE PLACE OF THE PRODUCTION OF A BANK-NOTE.

To give something of a graphical character to our presentations, and enable the reader to follow us, we will enter a bank-note engraving establishment.

We select, for this purpose, that of Dantforth, Wright, and Co., an extensive and rapidly-increasing establishment, well organised for the production of bank-notes, with new machine-work and fine designs. It is the only establishment that can produce new work from the geometrical lathe: Cyrus Durand is the only man living who is able to work such lathes, and he is connected with it.

A walk through this establishment, and a general survey of the several departments of business, will prepare us for a more careful examination of the details and processes of bank-note engraving. We begin with the show-room, or room of specimens. Here are to be seen show-frames and books, in which we can readily trace the past and present condition of the art. The progress is marked, and fully sustains the enterprising and advancing spirit of the people.

The next room is that which is occupied for engraving. Here the vignettes are engraved, and the bank-note plate lettered. Designs that represent the most pleasing conceptions of our artists are fixed by the graver on the enduring steel.

From this room we pass to that occupied by C. Durand, and used for the geometrical lathe-work. Here are produced those end-pieces and ornamental work in which the figures of notes are commonly engraved, and on which so much reliance has been placed against counterfeiting. It is an instructive place. That lonely point, obeying the impulse of wheels, concentrics, and chucks, and working endless combinations of lines, produces the most correct geometrical figures, adorned with, or rather composed of, a tracery of lines, that give to them the perspective and beauty of a picture.

From thence we may pass into the room where bed-pieces, dies, and plates are hardened; or enter the transferring room, where the work of the lathe and engraver are transferred by a rolling pressure to dies, and afterwards to the bank-note plate. Other rooms await us, among which we may mention the printing or press-room, where the bank-notes are printed and prepared to be sent to the bank department at Albany.

After such a survey of the establishment, we are somewhat prepared to examine the materials out of which a bank-note is made, and mark the several processes and steps in its production. The materials, models, designs, and apparatus, are all at hand.

The designer, we will suppose, has been at work, and his conception of Manhattan under the rule of the Indians, or the hosier's nest, has been embodied by the pencil, and now awaits the burin of the engraver to be translated and fixed in steel.

The *bed-pieces* are ready for this purpose. These are pieces of steel, $2\frac{1}{2}$ by 4 inches. They are first decarbonised, and rendered soft for the graver. On these the vignettes are engraved.

While the engraver was producing the vignettes on steel, the geometrical lathe was at work, and a rich variety of ovals, circles and shields, machine engravings, have been furnished. We present (p. 308) an engraving of the first geometrical lathe ever made. By comparing it with the improved ones of Durand, an engraving illustrating one of which has been given, the reader will see that great progress has been made in this department of invention.

The *dies* are now to be called into use. These are cylindrical in shape; $2\frac{1}{2}$ inches in diameter, and having an inch hole

in the centre, to admit a mandril. On these, the vignettes from the bed-pieces, and also the lathe-work, are to be taken up. For this purpose, the bed-pieces are hardened, by being burnt in animal carbon in a common furnace. The work of transferring is now to be done—a process that greatly facilitates the production of bank-note plates.

A transfer press is needed at this stage of the work. Into this press the die is introduced, and by a rolling pressing motion backwards and forwards over the bed-pieces, with a strong purchase, the vignette comes up on the die. In this way the several dies of vignette and lathe-work are prepared. They are then taken, dressed and hardened in the same way as the bed-pieces.

The bank-note plate, made of steel, but formerly made of copper, 8 inches by 14, and $\frac{1}{8}$ th of an inch thick, is now required. This plate usually includes on its surface four notes. Sometimes these are all of the same denomination, but most commonly of different denominations. The dies are applied to this plate, and transfer to it the vignette and lathe-work, which has been previously taken up upon them. The letters are then cut in by a graver, if we except the titles, which are transferred. The plates are then cleaned and sent to the printer. Such are the materials, agencies, and stages in the production of a bank-note plate. Its printing claims, at this stage, a passing notice, and no more.

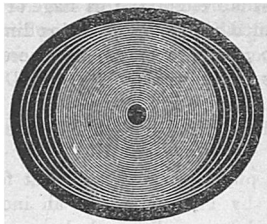
The paper on which bank-notes are printed, in the opinion of many, has something peculiar about it. Many regard it as made out of silk. There was a time when silk was partly used in its manufacture. Pawnee handkerchiefs were torn into slips, ground up and incorporated with the paper pulp, in the belief that the coloured threads or particles would be a protection against counterfeiting. Bank-note paper is made out of new canvas. The press on which the notes are printed is an ordinary copper-plate one, and is worked in the ordinary way.

The mode of issuing bank-notes is a part of the process which has some interest for all, as it gives us a clear view of the security which the state of New York has thrown round the subject, and the care with which she has watched over the public interests in this department of legislation. The bank orders a certain number of notes. These are printed and sent to the bank department at Albany, to be registered and signed by the comptroller; they are then returned to the bank. The plates, in the mean time, are also lodged with the bank department, or left in the hands of the engraver. The former disposition of them is that pointed out by law, and is the proper one, although their lodgment in the hands of the engraver cannot be productive of any evil.

The notes are then sent forth into circulation, after they have been signed by the president and cashier, and become part of a legalised paper currency. They go forth as a representation of the gold and silver coin of the country, and, like them, can be counterfeited. This is a view of the subject that has an interest for all, and we pause to consider it. Every one in business, or in the habit of receiving money, must wish to weigh the chances in favour of receiving good money. We may add here, for the comfort of all, that counterfeiting is now very difficult, and the prospect is such as to render it probable that it can be rendered impossible. The common belief is different. Merchants, learned men, as well as mechanics and labourers, are asking, "How can notes be counterfeited?" It is not enough to tell them that there are several ways, and that the chief one is by alteration, and in all such cases the note so altered makes its appearance in public as an old note. No altered notes appear as new ones, because the alteration could be detected. The engraver cannot imitate the labour of the geometrical lathe, and calls to this aid the deception of apparent age and circulation.

There is another way, which is less known and more dangerous. Original dies, and even bank plates, have found their way among the public, and fallen into the hands of counterfeiters. How is this? it is asked. It is easily seen. Some years ago petty banks sprung up on all hands, and, after a petty existence, expired. Their dies and plates survived, and

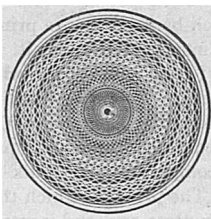
were, in many cases, sold by the officers of the bank or sheriff. In this way they fell into the hands of counterfeiters, and supplied them with the means of making notes or altering them. A ten or fifty could be easily cut out of a plate, hardened, and transferred to notes from which the denomination had been extracted. Such things can no longer exist



PLAIN OVALS AND CIRCLES.

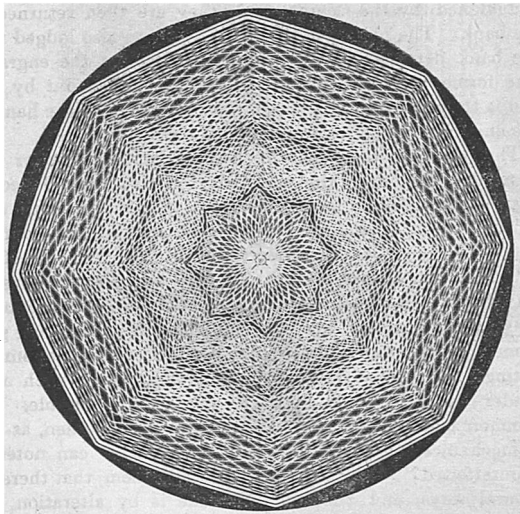
under the new banking law of New York. Counterfeiting in every form has nearly closed its career. We are able to announce an improvement in connexion with lathe-work, that will render it impossible.

A sketch of the history of bank-note engraving in this country will put the general reader in possession of all that is



COMMON GEOMETRICAL LATHE-WORK.

important in connexion with the subject. English money, as is well known, circulated in the colonies. During the revolution, the paper currency, known as continental money, was little better than a common label. Notes were engraved with a graver up to the year 1812. About this time, or perhaps a little before it, we find the house of Lennie and Rawlinson



ROSE ENGINE AND GEOMETRICAL LATHE-WORK COMBINED.

adding some water-work at the end of notes, produced by the crossing of wave lines.

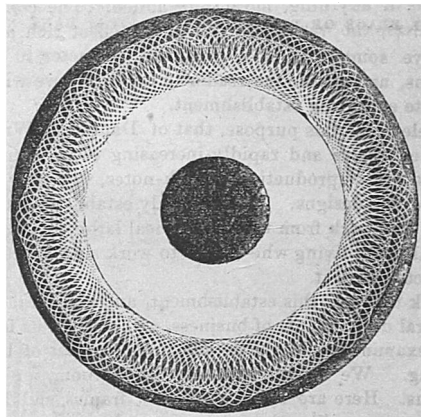
In 1815, Spencer of Philadelphia, and C. Durand of New York, produced some concentric circles and ovals, the first work of the geometrical lathe.

About the year 1817, Mr. Gobright, of the Philadelphia Mint, got Mr. Spencer to make a machine, called a medallion roller, by which medals were ruled, and for a long time

adorned bank-notes. They are, in some cases, still used on county bank-notes.

During the same time a new improvement was made in the ovals and circles by Durand. The wave oval and circle were introduced, and added much to the effect of the note. Their varieties are endless.

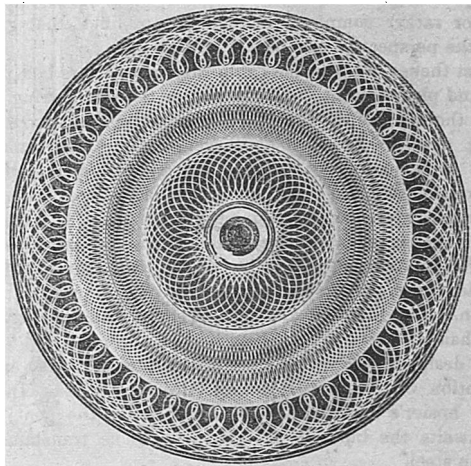
Up to this period the process of bank-note engraving was slow; all the work was made on the plate by *etching*, and afterwards bit in by a mordant. The invention of the transfer



CYCLOIDAL LATHE-WORK.

press by Durand changed the whole process, and offered new facilities in the production of plates. It seems that Perkins and Spencer of Philadelphia used, even before that time, a rude machine, by which they transferred some vignettes. It was a long beam that passed down through the floor, a kind of lever by which they increased pressure. It had little, if any, points in common with the presses of Cyrus Durand.

About the year 1824, Durand introduced some simple improvements into the working of the printing and transfer presses, that facilitated the process of bank-note engraving, and added something to the correctness of the processes and



COMPOUND WAVE AND CYCLOIDAL LATHE-WORK.

work. These consisted mainly of a plank, rolling on four rollers, separated by another plank or bed.

The improvements that were made from time to time to the geometrical lathe form the most pleasing features in the history of bank-note engraving, but features which we can only indicate here. The elegance of designs and the perfection of engravings belong to fine art as well as to bank-note engraving. The rise and fall of houses are simply matters of business, and belong to general prosperity. But the work of the lathe is almost characteristic of the bank-note, and is destined to be its security against counterfeiting.

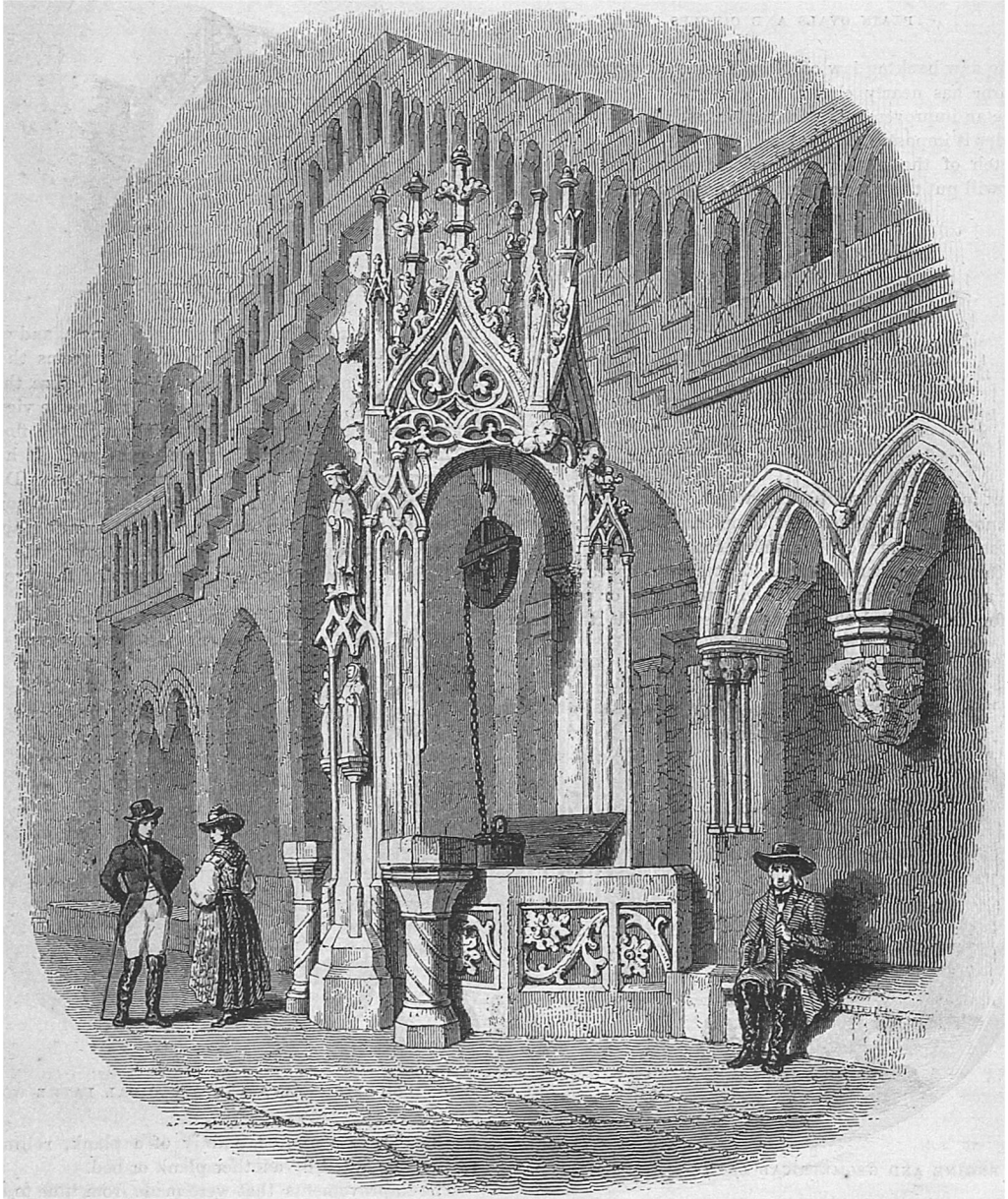
The introduction of the cycloidal motion, a motion like that of a nail in the hub of a carriage in motion, and the improvements on it, have added much beauty to the lathe-work. We regard this work as supplying the only happy and just illustration of what constitutes the beauty of lines and forms, the flexible play of life.

The last improvements, in our estimation, have carried forward the work of bank-note engraving, especially in the machine department, to a notable degree of perfection. We see little, if anything, more to be added. The combinations are endless, the varieties pleasing, the effect rich and pleas-

ing. There are no limits to be assigned to the varied labours of the improved geometrical lathe, but the want of capacity in man to calculate the combinations. The latest improvements consist in such a disposition of lines as produces with artistic effect the various geometrical figures, and indeed all beautiful forms.

Such is bank-note engraving in the New World, and as seen and illustrated in the enterprising house of Dantforth, Wright, and Co, of New York. The machine-work that accompanies this article was cut by Cyrus Durand on his own machines.

RATISBON.



GOthic WELL IN RATISBON CATHEDRAL.

RATISBON (in German, *Regensburg*), in the kingdom of Bavaria, is situated at the confluence of the Regen and the Danube, in the midst of a very picturesque and fertile country. It is now the chief town of the circle of the Regen: it is one of the most ancient cities of the Upper Danube. Under the Romans

it bore the name of *Reginum*, or *Castra Regina*; the emperor Tiberius stationed his fourth legion there, whence it took the name of *Tiberia Quadrata*; in the Latin of the middle ages it was called by a sort of surname, *Ratisbona* (good raft or vessel?). We shall not stop to devote much attention to the tradition