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BUREAU OF CHEMISTRY—Circular No. 115.

CARL L. ALSBERG, Chief of Bureau.

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## AN ALL-METAL POULTRY-COOLING RACK.<sup>1</sup>

(Public patent No. 1,020,575.)

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It is essential that the animal heat be removed from poultry as quickly as possible after killing. The all-metal portable rack for the cooling and grading of poultry, rabbits, game, etc., which is herein described, facilitates cooling and permits rapid and accurate grading.

Figure 1 shows a rack capable of holding 180 chickens, ducks, or rabbits, 48 to 60 turkeys, or 72 geese. Figure 6 shows the same rack filled with poultry. Figures 2 and 3 show the construction of the iron fingers and the base of the rack, respectively, and figures 4 and 5 give detailed working drawings of a rack which will hold 100 instead of 180 chickens.

### *Dimensions of angle-iron poultry-cooling rack.*

- Height, over all, 69 inches.
- Width, over all, 38 inches.
- Width of base, 38 inches.
- Length of base, 61 inches.
- Width of top of frame, 33 inches.
- Height of top of frame, 68 inches.
- End supports, 4 inches apart at base.
- Bend in end supports, 19 inches from floor.
- First cross bar, 29 inches from floor.
- Cross bars, 8 inches apart.
- Two bottom cross bars, 9 inches apart.
- End cross brace, 26 inches long, 57 inches from floor.

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<sup>1</sup> Covered by public patent No. 1,020,575, under which the device herein described may be used by anyone without the payment of royalties.

Center brace rods, 76 inches long.

Top of base, 8 inches from floor.

Corner brace plates, 10 inches on square edges.

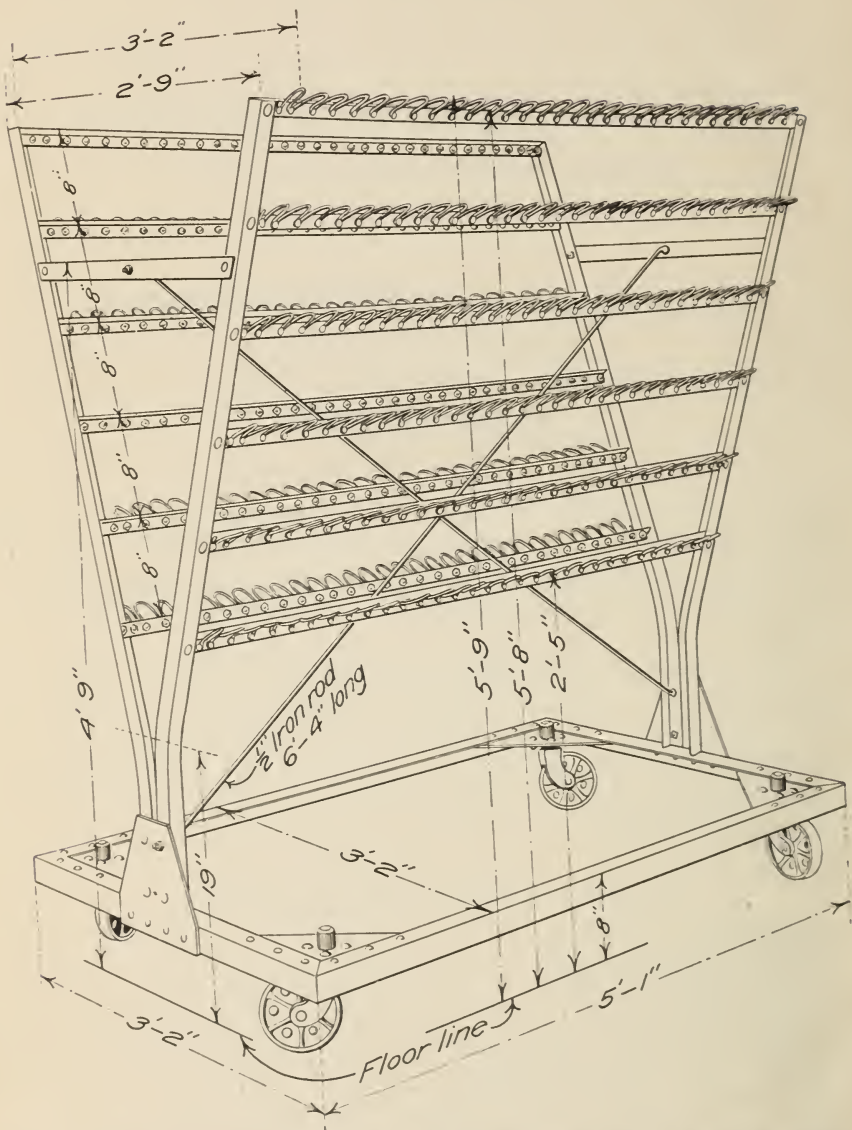


FIG. 1.—Angle-iron poultry-cooling rack. (All metal except finger wire is galvanized. Finger wire is No. 10 steel wire, tinned. One set of casters may be replaced by wheels if desired. Each rack this size holds 180 chickens, rabbits, or ducks, or 48 turkeys.)

End brace plate, 10 inches wide, 9 inches high (upper corners beveled).  
 Casters, 6 inches in diameter, 1 1/4-inch face; extra-strong caster socket.  
 Base frame, 2 inch  $\times$  1/4 inch angle iron.

End supports,  $1\frac{1}{2}$  inch  $\times$   $\frac{3}{8}$  inch angle iron.

Cross bars,  $1\frac{1}{4}$  inch  $\times$   $\frac{3}{8}$  inch angle iron.

End cross bars,  $1\frac{1}{2}$  inch  $\times$   $\frac{3}{8}$  inch angle iron.

Center brace rods,  $\frac{3}{8}$ -inch or  $\frac{1}{2}$ -inch round iron, threaded at both ends, one end passing through center of end cross bar, and the other end replacing one of the bolts fastening end supports to end brace plate.

Corner and end brace plates,  $\frac{1}{4}$ -inch flat iron.

Fingers for holding feet of birds made of No. 10 tinned steel wire. The fingers are formed by bending the wire around 3 pins placed in a triangular position. The fingers are  $3\frac{1}{4}$  inches long and approximately  $1\frac{1}{2}$  inches apart, center to center, being spaced so as to allow 30 openings to hold 15 chickens within a distance of  $58\frac{1}{4}$  inches, which is the clear distance along the cross

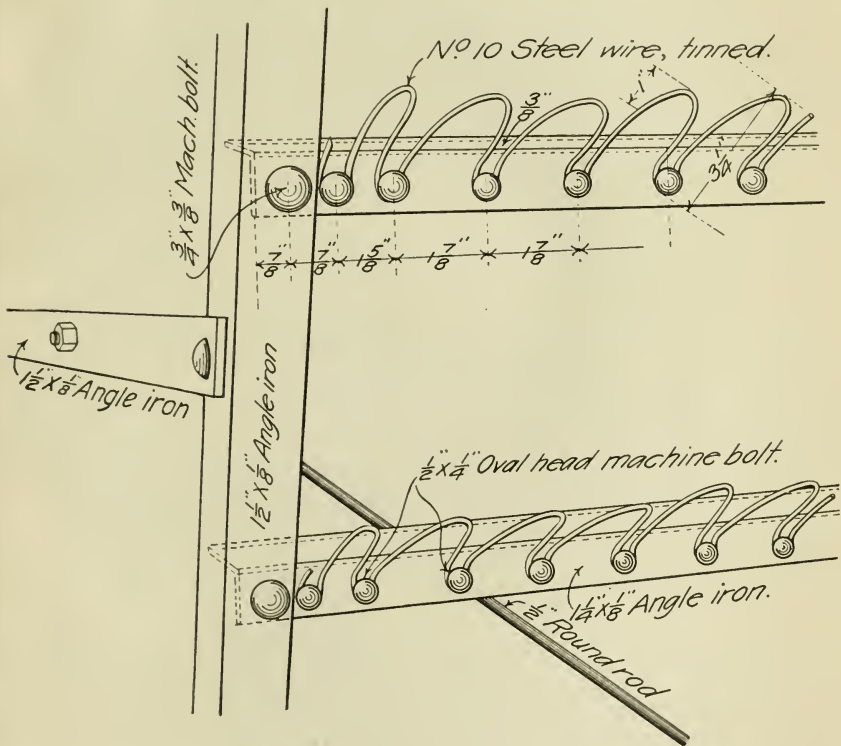


FIG. 2.—Construction of wire fingers.

bars between the upright supports on either end. The slots between the fingers are  $\frac{3}{8}$  inch wide at the bottom and then widen to a round point at the top as shown.

The finger wire is fastened on with  $\frac{1}{2}$  inch  $\times$   $\frac{1}{4}$  inch oval-headed machine bolts, galvanized. It requires 32 bolts to each cross bar.

All other bolts or rivets are  $\frac{3}{8}$  inch  $\times$   $\frac{3}{8}$  inch galvanized, except the caster bolts, which are 1 inch  $\times$   $\frac{1}{2}$  inch galvanized.

The upright supports are fastened to end brace plates with 2 bolts each.

The corner brace plates are riveted to base.

The caster spindles are  $\frac{3}{8}$  inch in diameter, turning in an extra-strong socket, as considerable strain comes at this place.

The size of the rack may be changed in accordance with the number of birds to be handled, the size of the doorways through which it must be moved, and other conditions, by changing the dimensions of the base, the height, and the length. The general construction, however, should remain the same. The racks in use by the department have been constructed to enter doors 6 feet high and 4 feet wide and for use in small rooms. Where the coolers have a width of at least 20 feet the rack may be more easily controlled by one man if two fixed wheels are placed in the center of the sides of the base frame and one caster in the center of each end of the base. The

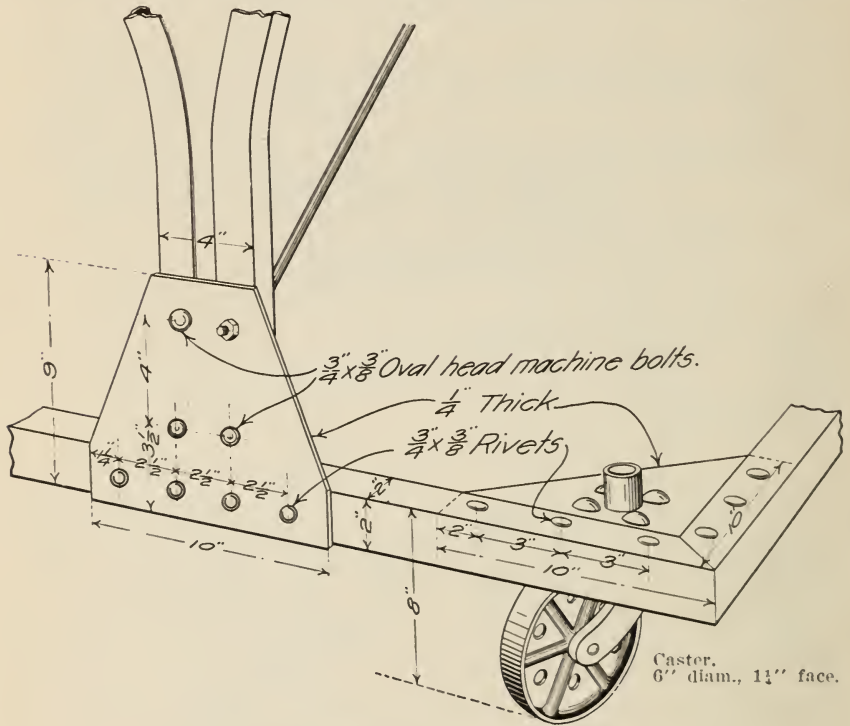


FIG. 3.—Detail of construction of base.

rack as shown, however, with wheels in each corner is slightly easier to build and may be moved forward in any direction with but little difficulty if the casters are kept clean and well oiled. The detailed drawing shown in figure 5 has two fixed-direction wheels at one end also, making it easier for the rack to be controlled by one man, but making it more difficult to be turned.

While the size of the rack may be changed in accordance with the environment in which it is to be used, there are certain dimensions which should be constant: namely, the height of the bottom finger bar from the floor should be 2 feet 5 inches (if closer than this

to the floor, the heads of the chickens will drag); the distance of the finger bars apart should never be less than  $7\frac{1}{2}$  inches, and, where the run of poultry is uniformly large, it may be necessary to increase this distance by 1 inch; and the angle of the supports holding the upright finger bar should be as specified, and the dimensions of the finger wires themselves should not be altered.

The materials required for the construction of the rack are angle iron, No. 10 B. & S. gauge tinned steel wire, bolts, or rivets, fixed wheels, and casters. Iron and copper wire are too soft, and brass wire is too brittle. Sizes smaller than No. 10 are too easily bent to be serviceable, while larger sizes are too stiff to bend well around the rivets or to hold the varying-sized legs of the chickens.

The wire fingers may be fastened to the angle iron by means of rivets instead of bolts, and the rivets are to be preferred, because they give a more rigid construction. The finger wire will in the course of time show rust, as will also the bars. They should therefore be galvanized, and it is desirable to dip the bars with the finger wire in place before fastening the bars to the uprights. By so doing a neater job is obtained and, in addition, the spelter helps to hold the wire rivets or bolts together. If it is not done when the rack is first assembled, the finger bars may be removed at any time and so treated.

The racks which are shown in figure 6 have been in use for one year with no signs as yet of strain or wear except that in some places the finger wire is rusting and a few bolts show signs of rust. These racks, however, were made from pregalvanized material and not galvanized after assemblage.

Aside from the advantage of ease of handling and a maximum utilization of cooler space, these racks are highly desirable from the viewpoint of preserving the condition of the poultry. Their routine use in poultry-packing houses is generally according to the following plan:

The birds, having been killed, roughed, and pinned, are conveyed to a receiving station in the killing room, where the feet of the birds are washed, if this is necessary, the beak freed from blood, and the head wiped to remove bloodstains and at once inclosed in an appropriate paper head wrap. If satisfactory to the killing-room inspector, the bird is immediately hung on the portable rack. As soon as the rack is filled, which in an establishment of the ordinary size does not usually require more than one-half to three-quarters of an hour, it is wheeled into the chill room.

At the expiration of 18 to 24 hours a thermometer is inserted through the vent into the body cavity of the largest bird on the rack which is located in the most unfavorable position in the chill room. If the reading shows that the temperature of the body cavity of the

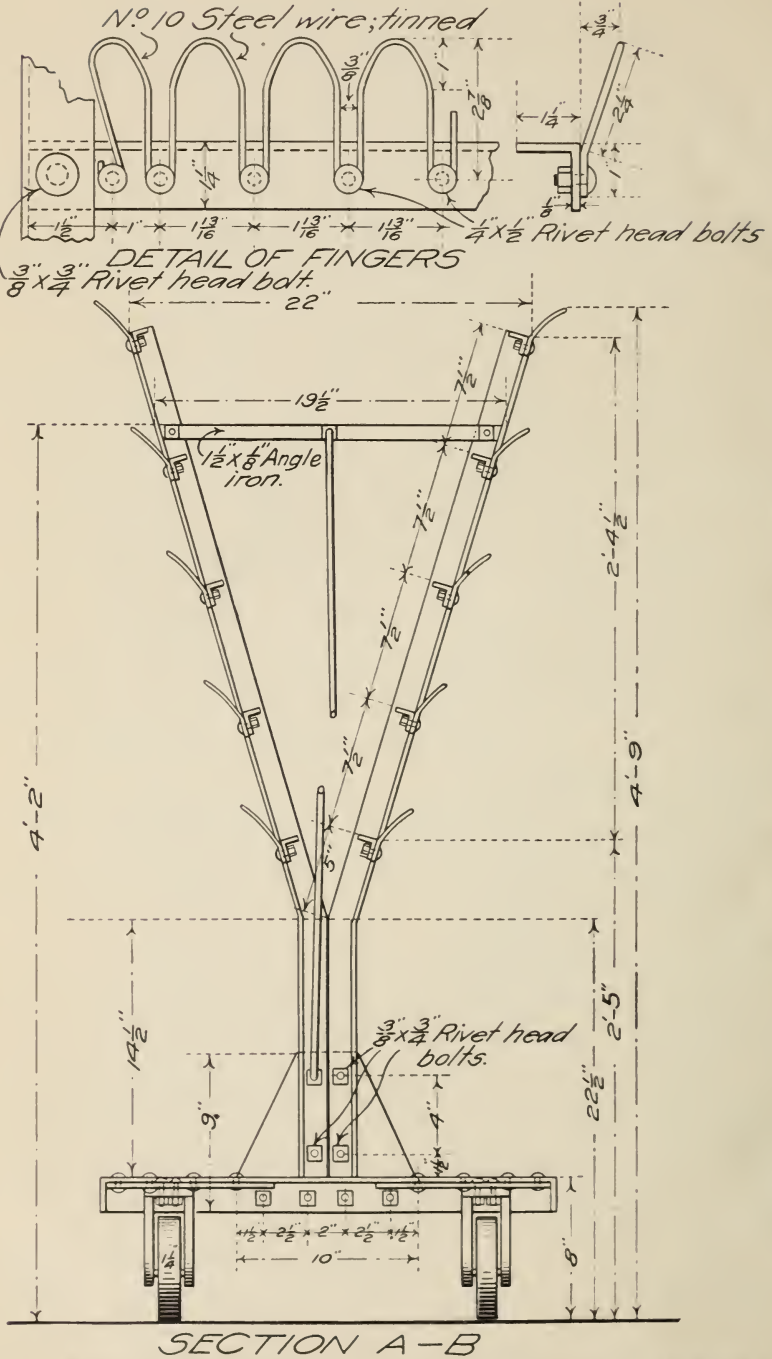


FIG. 4.—Working drawing of angle-iron cooling rack to hold 100 fowls. Section A-B.

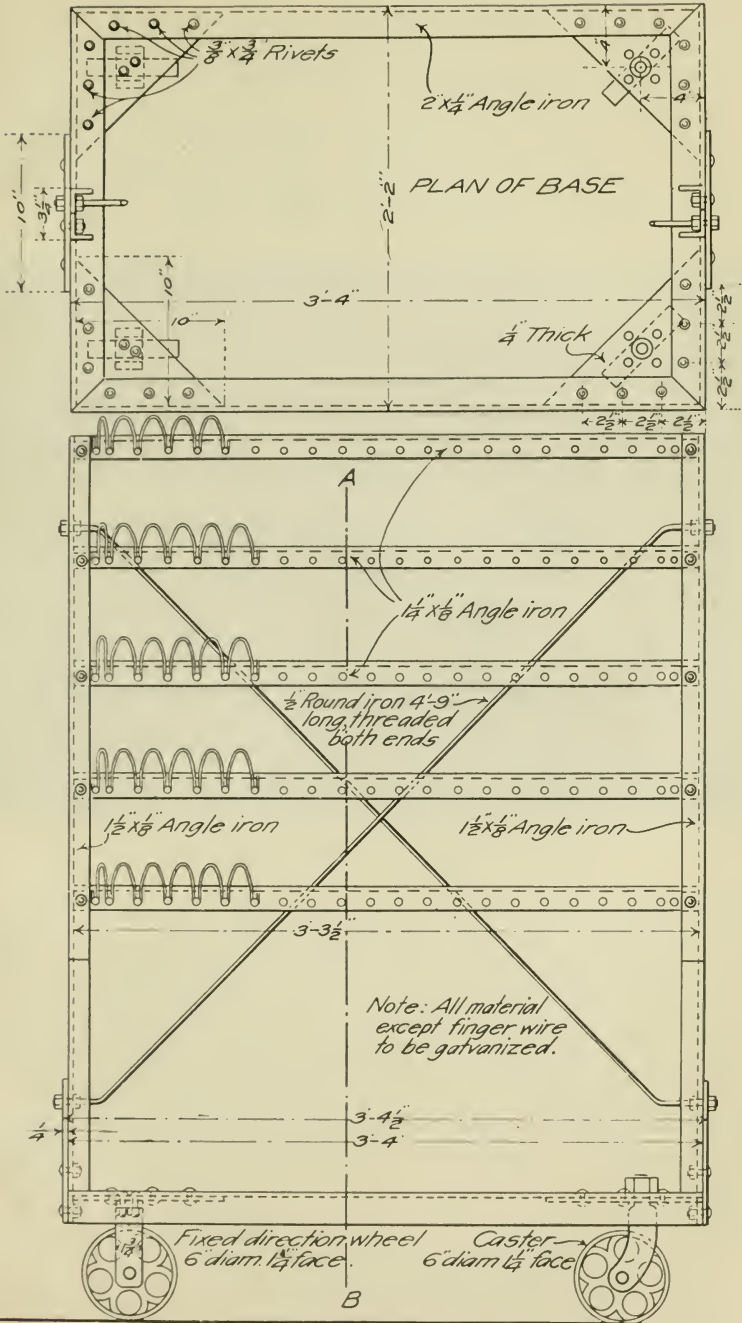


FIG. 5.—Working drawing of angle-iron cooling rack to hold 100 fowls. Side elevation.

bird is the same as that of the surrounding atmosphere, preferably from 30° to 32° F., all the birds on the racks are boxed or barreled for shipment. It can be seen that grading from these racks is more easily and more accurately accomplished than from the old type of rack, on which the birds are laid rather than hung and where they are subjected to the many handlings which must occur if they are sorted out into piles on a grading table, all of which routine is extremely detrimental to the appearance of the flesh.



FIG. 6.—Filled racks standing in chill room.

The carcass of the bird when hung by the feet is straight, and therefore makes a better looking package than one which is distorted on one side by being laid warm upon a wooden support. Neither does it sweat under the wings, since these fall back when the bird is hung, thereby eliminating the bitterness which is so often present in the flesh of the wing due to retarded cooling. The fact that the wings do not lie close to the body, as they do when the bird is laid on its side to chill, is no detriment to the making of a neat package.

Figure 6 shows a chill room in which a number of these racks are standing.

Approved:

JAMES WILSON,  
*Secretary of Agriculture.*

WASHINGTON, D. C., *January 15, 1913.*













