J. MERRILL.

Oil Still.

No. 32,706. Patented July 2, 1861.

Fig. 6

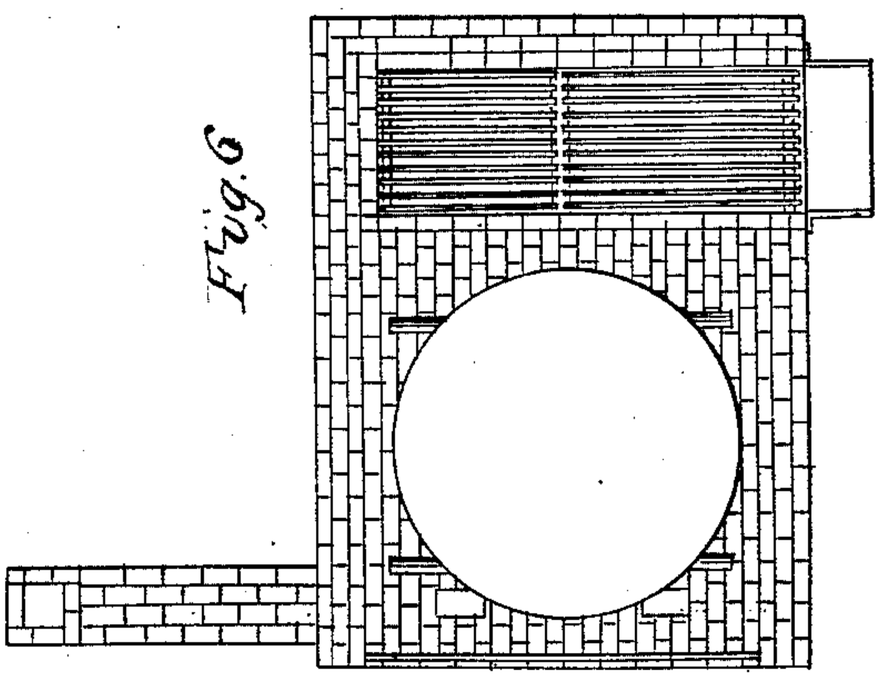
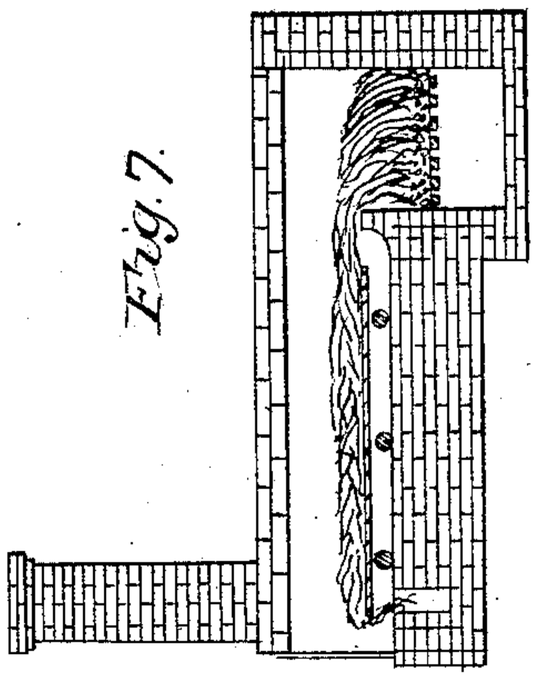
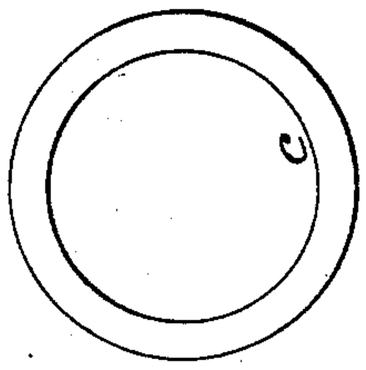
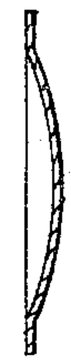


Fig. 7.







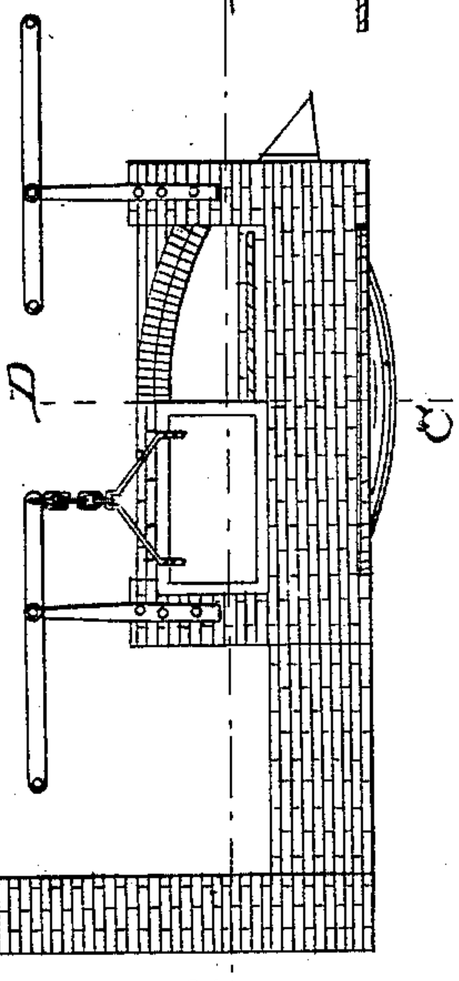


Fig. 3

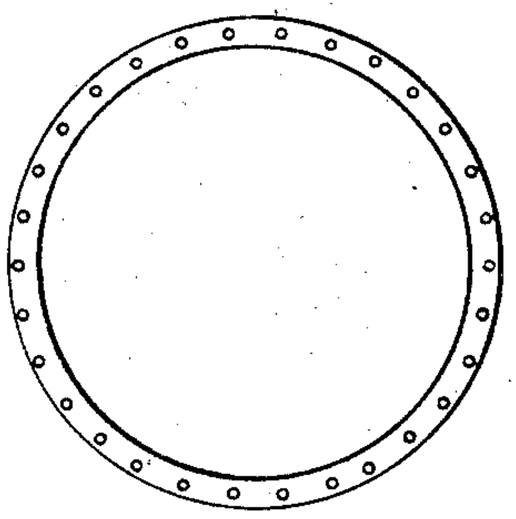


Fig. 4.

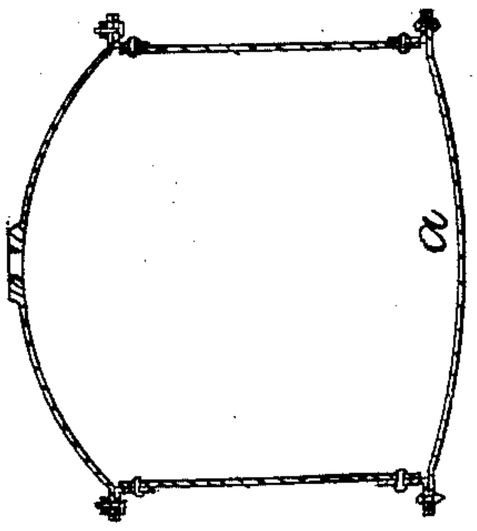


Fig. 1.

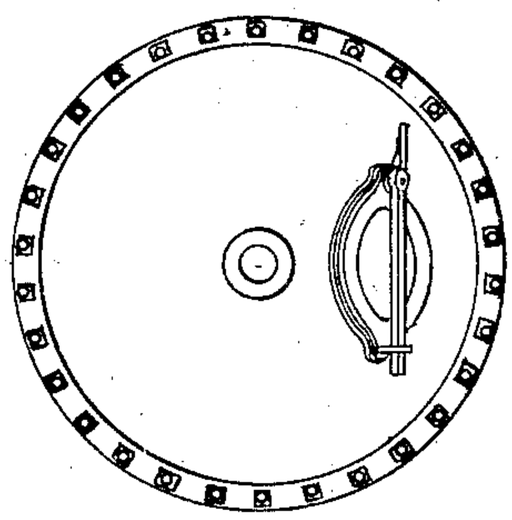
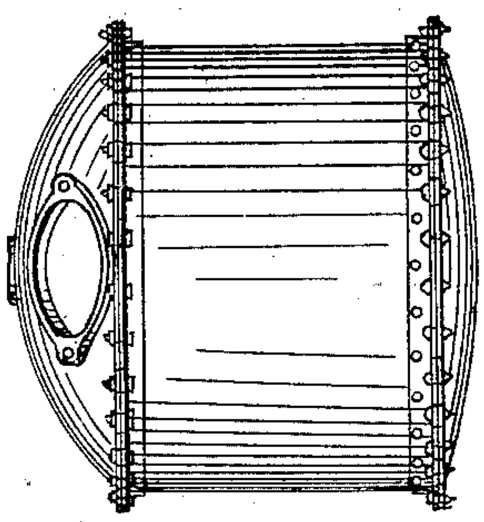


Fig. 2



WITNESSES

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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN THE CONSTRUCTION OF STILLS.

Specification forming part of Letters Patent No. **32,706**, dated July 2, 1861.

To all whom it may concern:

Be it known that I, JOSHUA MERRILL, of the city of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in the Construction of Stills; and I do hereby declare that the following is a full and correct description thereof, reference being had to the annexed drawings, and to the letters of reference thereon.

In the practical manufacture of illuminating and lubricating oils from crude coal-oil, petroleums, and similar substances stills are used about six feet in diameter, having capacity of about nine hundred gallons. Such stills have generally been made of cast-iron, the sides and bottom cast in one piece. They have also been made with sides and bottom cast separately with flange or V-joints, and secured together by bolts and nuts; but in whatever way cast-iron stills are made they are a source of great annoyance and expense to the manufacturer, because of the uncertainty of their operating without fracture during the first or any succeeding distillation in which they may be used after completion, and of the great weight and expensive quality of the iron used in their construction. The difficulty is principally in the bottom, which has to sustain the nine hundred gallons of oil—a great weight for a heated iron casting which is exposed to the direct action of a red-hot fire for a long time, say, from ten to eighteen hours, and is frequently covered, when exposed to the action of the fire, with alkalies introduced into the still during the operation of distillation, or with coke deposited by the operation. The great weight of the stills, being usually of thick cast-iron, makes them unwieldy, and renders the operation of removing and replacing them difficult and tedious. In the ordinary construction of such stills as have removable bottoms the flanges of the body to which the bottoms are secured are cast on the body, if the same is cast, or turned out, if the sides be of wrought-iron plate. Being thus made in one piece, the body of the still is liable to be destroyed by the fracture of the flanges in cutting off and forcing out the bolts or rivets connecting it with the bottom. As the bottoms require removal several times a year, this liability to destroy the body of the still at every such operation becomes a matter of serious inconvenience and expense.

My said invention consists of several improvements in construction, whereby the stills are made much lighter and more durable and economical.

The first part of my invention consists in a new kind of still-bottom—viz., a formed seamless wrought-iron still-bottom, sufficiently deflected or dish-shaped to admit of expansion and contraction consequent upon exposure to the direct action of the fire in the practical operation of the stills without breaking the joint by which it is secured to the body of the still. I prefer to use a cast-iron top on account of stiffness. This may be connected to the sides by an angle-iron coupling, or be riveted directly to the sides, as they seldom require to be disconnected on account of fracture of the top or sides; but I prefer the former or angle-iron connection.

Still-bottoms have been attempted to be made of wrought-iron, but with seams or riveted joints, which opened and leaked oil when exposed to the action of the fire, and they were abandoned, and cast-bottoms resorted to. In fact, before the date of my said invention, no plate-iron sufficiently wide, thick, and good in quality was manufactured to make a practical seamless dish-shaped still-bottom.

In order to reduce my invention to practice, I was compelled to induce a practical manufacturer of iron to put up rolls and furnaces of a size and capacity very largely exceeding any before known or used in the manufacture of plate-iron.

The drawings illustrate my invention.

Figures 1, 2, 3, and 4 represent views of my improved still with the seamless bottom *a* connected with the wrought-iron sides by the angle-iron *b*, the connection secured by rivets, as shown; or it may be made by bolts and nuts and a suitable packing. Figs. 5, 6, and 7 illustrate the mode of forming the seamless wrought-iron or steel bottom.

In making the seamless still-bottom I procure plates of the best flange-iron, of about five-eighths of an inch in thickness and of sufficient width to form a seamless bottom and flange, say, about seven feet wide. From such sheets I cut circular disks of suitable size for the bottoms, and place them, one at a time, in a reverberatory furnace, as represented at Figs. 5, 6, and 7, and close the door and expose the disk to the action of the fire until it has attained almost a white heat, or such heat

as to render it sufficiently ductile to admit of performing the subsequent operation of swaging. A stout cast-iron former, *c*, is embedded in the earth immediately in front of the furnace-door. When the plate is sufficiently heated, it is withdrawn from the furnace and placed on the former, and beaten alternately with iron and wooden swages by a sufficient number of workmen to bring it to the shape of the former before the metal cools. The bottom may then be riveted or bolted to the still.

In place of beating down the plate to the shape of the former with swages by hand, it may be pressed by a reverse die actuated by a powerful press or steam-hammer, which would be a more perfect way of performing the operation, and make the bottoms more uniform, the metal being so stiff that by hand swaging it does not take exactly the figure of the former, but has a rougher surface; but it is the cheapest way and simplest so far as apparatus is concerned, and sufficiently accurate for practical purposes. The still-bottom must be deflected or dished in order to avoid breaking the joint by expansion and contraction; but it may be fastened to the still either side outward; but I prefer it to dish downward, as shown in the drawings.

What I claim as my invention and improvement in the construction of hydrocarbon-oil stills is as follows, viz:

1. The formed seamless wrought-iron still-bottom substantially as described, and substantially for the purposes hereinbefore set forth.

2. The still, as a whole, consisting of a cast-iron top, wrought-iron sides, and wrought-iron seamless bottom, combined together by angle-iron couplings substantially as described, for the purpose of making a comparatively light and durable hydrocarbon-oil still.

JOSHUA MERRILL.

Witnesses:

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