(No Model.)

J. ROBERTSON.

PRESS FOR DISHING HOLLOW ARTICLES.

No. 308,098. Patented Nov. 18, 1884.

Fig. 1.

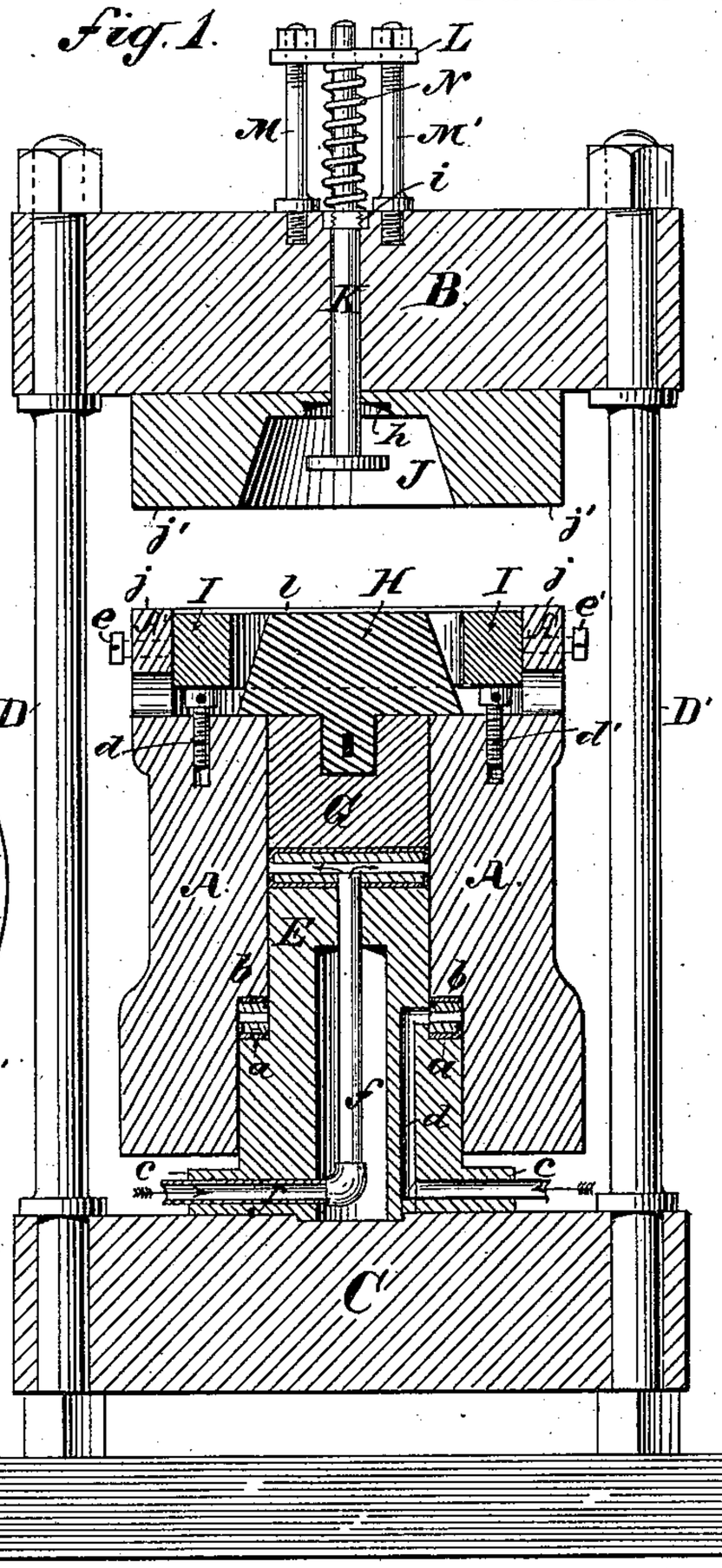


Fig. 3.

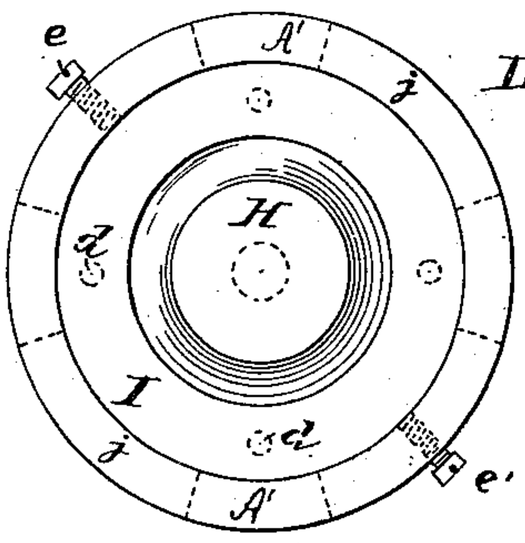
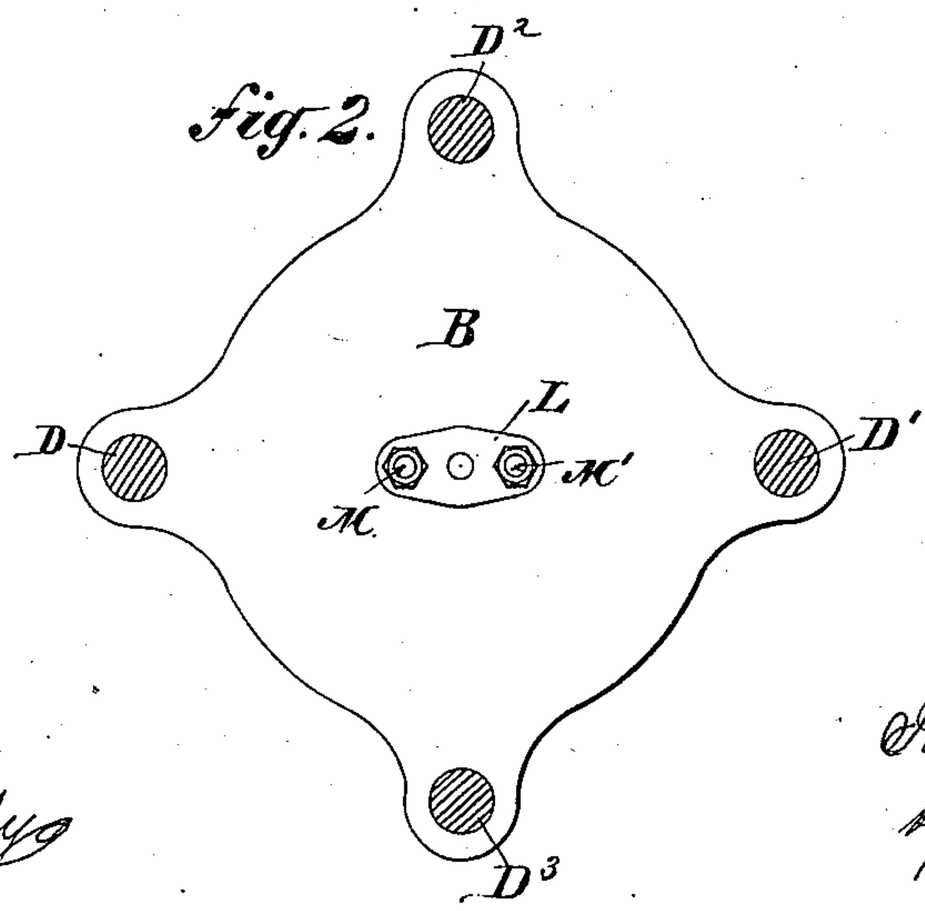


Fig. 2.



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PRESS FOR DISHING HOLLOW ARTICLES.

SPECIFICATION forming part of Letters Patent No. 308,098, dated November 18, 1884.

Application filed September 3, 1884. (No model.)

To all whom it may concern:

Be it known that I, JOHN ROBERTSON, of Brooklyn, in the county of Kings and State of New York, and a citizen of the United States of America, have invented a new and useful Improvement in Hydraulic Presses for Dishing Sheet-Metal Hollow Wares, of which the following is a specification, reference being had to the accompanying drawings, forming part of the same.

In presses of this class some difficulty is experienced in holding the rim or peripheral portion of the plate or sheet of metal flat or in a plane and yet allowing it to be drawn in toward the dies by which the dishing of the plate is effected.

It is the object of my present invention to obviate this difficulty; and this invention consists in the devices and combinations of devices herein described and claimed. To this end I construct a strong hollow cylinder, open at both ends, with two different interior diameters. This is arranged vertically to work up and down upon a fixed core or abutment, having external diameters corresponding to those of the cylinder, the large diameters being at the lower end or portion of the cylinder and abutment, forming on them corresponding opposing shoulders at the lines of separation between the larger and smaller diameters. The cylinder is forced upward on the core by the forcing of water between the said shoulders. The core extends into the cylinder above the shoulders only part way to the top, leaving a space into which is fitted a piston-head, which is operated by water forced into the cylinder above the upper end of the core under said piston-head, on the upper face of which is secured the male dishing-die. Immediately over the cylinder is placed and fixedly held the female dishing-die, into which the said male die is forced by the upward movement of the piston. The parts are so arranged that the upward movement of the cylinder is stopped against the plane surface of the said female die, suitable provision being made for such stopping without breaking or undue straining of the machine by an overflow safety-valve or otherwise. The cylinder carries with it in its upward movement the male die and the piston-head to which it is connected. Now, if a sheet of metal intended to be dished up has been laid upon the upper end of the cylinder it will be gripped between the cylinder and the female die by the full measure of the hydraulic force being exerted on the cylinder. Under these conditions the sheet metal cannot be drawn in toward the center of the die, as is required in the dishing process, without danger of rupturing the sheet. To obviate this, I form a recess in the upper end face of the cylinder equal to or a little less in depth than the thickness of the sheet metal, leaving an outer rim of the end of the cylinder to press against the upper or female die, while the sheet metal or blank is left free or but slightly gripped between the cylinder and upper die at the same time that it is held smooth and plane, so as to prevent its buckling or bending around its outer portions while the dishing operation is being performed. As sheets of metal of different thicknesses are required to be dished I make provision for adjusting the depth of the recess in the top of the cylinder to the thickness of the metal to be operated upon, as hereinafter particularly described.

I will now proceed to describe in detail the machine embodying my invention.

Figure 1 is a vertical central section of a hydraulic press containing my invention. Fig. 2 is a plan or top view of the same; and Fig. 3 is a top view of the cylinder and lower die.

A is a hollow cylinder formed with the interior diameter of its lower portion greater than that of its upper portion.

E is a core or abutment which rests fixedly on the base-plate of a frame, which may be composed of the said base-plate C and head B tied together by rods D D′ D^2 D^3. This abutment corresponds in form with the interior of the said cylinder and fits into it, so that the cylinder may move up and down on it. At the line where the two diameters meet a shoulder, *a*, is formed on the said abutment, and a corresponding shoulder, *b*, in the cylinder. As the cylinder passes down upon the abutment it comes to a stop at the bottom on the base *c* of the said abutment a little before the two shoulders *a* and *b* come together.

d is a passage drilled through the body of the lower part of the abutment E, through

which water may be forced by means of a force-pump, or its equivalent, into the space between the shoulders *a b*, whereby the cylinder A may be driven upward.

G is a piston-head fitted to work in the upper end of the cylinder A. Upon this piston-head rests a male die, H, the two being secured, preferably keyed, together, as shown. The interior diameter at this upper end of the cylinder A is greatly enlarged for a distance downward a little greater than the depth of the die G, the said enlargement extending diametrically, so as to leave only a rim, A′, only a few inches thick around the outside of the enlargement. Into this enlargement is fitted a ring, I, that rests on a number of set-screws, (preferably four,) two of which, *d d′*, appear in Fig. 1, which work in screw-holes made in the cylinder, and by which the said ring may be adjusted to just the required distance below the upper surface of the cylinder A.

e e′ are set-screws which work in screw-holes made through the wall of the upper end of the cylinder A, that take against the perimeter of the ring I. The design of these screws is to secure the ring rigidly in place after it is adjusted to the proper height in the cylinder by means of the screws *d*, when the latter may be turned up and pressed forcibly against the ring, thereby preventing the movement of the said screws *d* by the jarring of the machine in its operation, whereby the adjustment of the ring I might be disturbed.

f is a passage in the abutment E, which extends horizontally through the base *c* to the interior of the abutment, and thence vertically up through the same to an opening into the space between its upper end and the piston G. Through this passage water is to be forced by a pump or its equivalent, to force the piston G upward, carrying with it the die H. Suitable packings are provided on the shoulders *a* and *b*, which may consist of rings of leather or some other suitable material placed on the said shoulders, with metal rings laid over the leather. Preferably the metal should be of less diameter than the leather rings, with the outer edges of the leather ring on the shoulder on the abutment, and the inner edge of that lying against the shoulder in the cylinder A turned over around said metal rings. A similar arrangement of metal and leather rings or plates may be adopted, and the leather turned over around the outer edges of the metal rings between the upper end of the abutment A and the lower end of the piston G, as shown in Fig. 1.

J is a female die proportioned to receive the tapering male die H, with sheet metal between them.

K is a plunger fitted to work in a hole made through the head B of the frame, and carrying on its lower end a disk or head, which, when the plunger is forced upward, as it will be by the raising of the die H into the die J, may retire into a recess, *h*, formed in the bottom of J. The upper end of the plunger passes through a hole in the cross-bar L, that is supported on posts M M′ that rise from the upper face of the head B.

N is a coiled spring placed on the said upper end of the plunger, the upper end impinging against the cross-bar L, and the lower end against a collar, *i*, on the plunger. The spring thus acts to force the plunger downward.

In operating this press, the parts being in the position shown in Fig. 1, the ring I is adjusted so that its upper face is below the face of the upper end of the cylinder A a distance equal, or preferably a little more than equal, to the thickness of the sheet-metal blank *l* intended to be operated upon. The blank then being placed down upon the said ring, water is forced through the passage *d*, whereby the cylinder A is driven upward carrying with it the die H, and of course the piston G, which is keyed or made fast, the said die resting partly on said cylinder, as shown, until the upper face, *j*, of the cylinder strikes against the lower face, *j′*, of the die J, when the motion of the cylinder is arrested with an outer rim of the blank *l* lying loosely between the ring I and the lower face of the body of the die J. At the same time that water is forced through passage *d* a foot-valve connected with the passage *f* is opened and allows water to flow in and fill the space between the upper end of the abutment and the piston G, when the latter rises with the cylinder. More water is then forced through the passage *f*, whereby the piston G, with the die H, is forced upward and the dishing of the blank is effected, the rim of the blank being held between the ring I and the face of the die J, so that it cannot buckle, while it is yet not pinched by the said faces, so as to prevent its being easily drawn out from between them, as may be required by the draft of the die in the dishing process, an article of hollow ware being thus formed with a plane flat rim. The operation of dishing being completed the water is discharged both from below the piston G and from between the shoulders *a* and *b*, the cylinder and piston return to their first position, when the spring N acts to force the dished article from the die J.

In order to obviate pressure of the upper face of the cylinder against the die J by the hydraulic force of the water against the shoulder *b*, an overflow, provided with a safety-valve connected with the inlet-passage *d*, may be employed.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a hydraulic press, the combination of a fixed cylindrical abutment or core, the diameter of the lower portion of which is greater than that of the upper portion, thus forming a shoulder between the two portions, a hollow cylinder having two corresponding

internal diameters and a corresponding shoulder, and a piston fitted in the upper smaller part of the said cylinder to reciprocate therein, together with water-passages leading from outside of the said abutment respectively to the space between said shoulders and the space between the said abutment and the piston, as and for the purpose described.

2. In a hydraulic press, the combination, with the abutment E and cylinder A, of the adjustable ring I, fitted loosely into the upper end of the said cylinder, together with the piston G and the dies H and J and the described water-passages for conducting water into said cylinder, as and for the purposes described.

3. In a hydraulic press, the combination of the cylinder A, ring I, and set-screws *d* and *e*, as and for the purpose described.

4. In a hydraulic press, the combination of the cylinder A and abutment E, provided with the described water-passages, the piston G, dies H and J, and the spring-actuated plunger K, as and for the purpose described.

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Witnesses:

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