(No Model.)

R. P. CHAPMAN.

APPARATUS FOR ORNAMENTING HOLLOW WARE.

No. 442,246. Patented Dec. 9, 1890.

Fig. 1

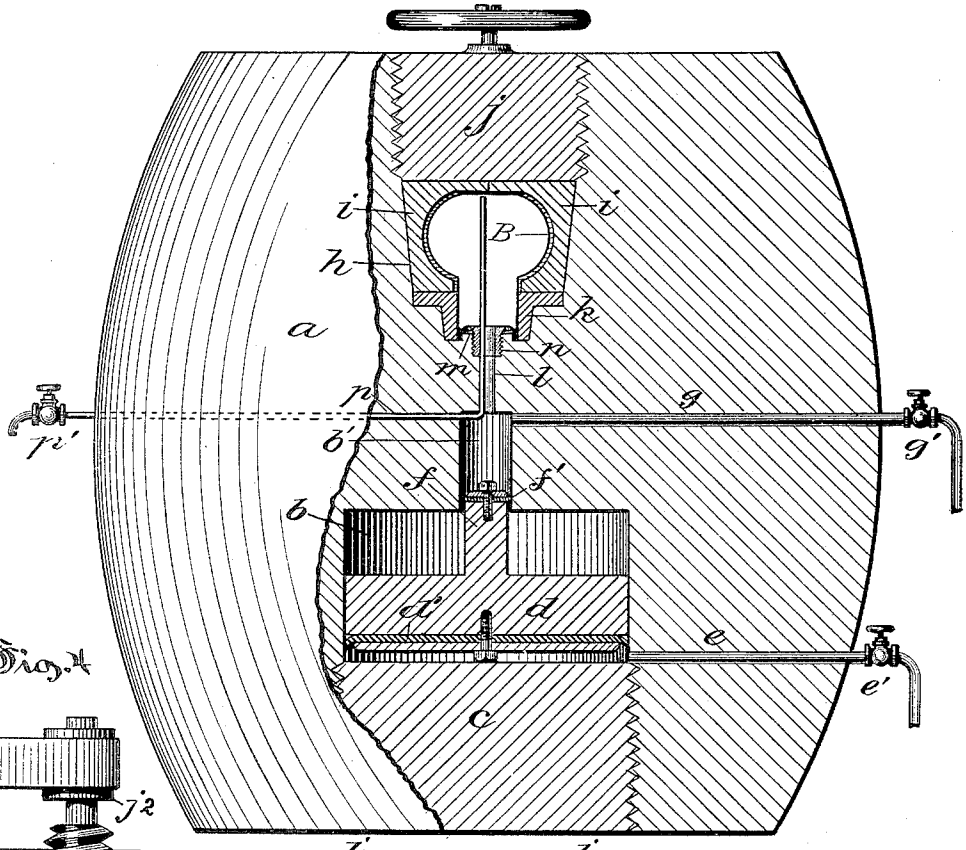


Fig. 4

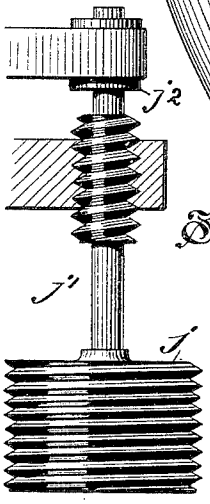


Fig. 2

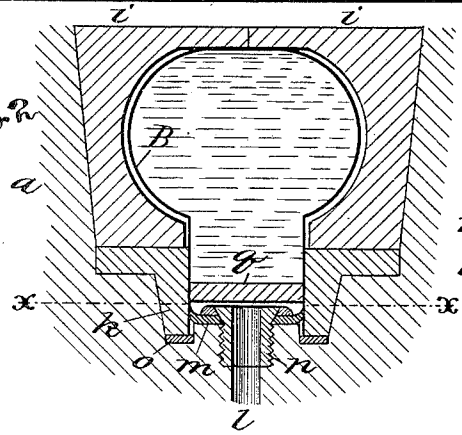
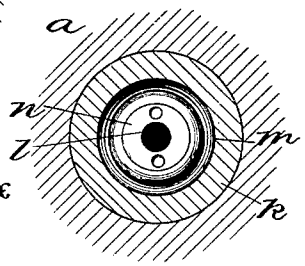


Fig. 3



Witnesses:

A. F. Langdon

W. B. Jenkins.

Inventor,

Rush P. Chapman, by

Harry P. Williams, Atty.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

RUSH P. CHAPMAN, OF HARTFORD, CONNECTICUT.

APPARATUS FOR ORNAMENTING HOLLOW WARE.

SPECIFICATION forming part of Letters Patent No. 442,246, dated December 9, 1890.

Application filed July 2, 1890. Serial No. 357,535. (No model.)

To all whom it may concern:

Be it known that I, RUSH P. CHAPMAN, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Apparatus for Ornamenting Hollow Ware, of which the following is a full, clear, and exact specification.

The invention relates to the class of apparatus for embossing and reproducing by hydraulic pressure repoussé raised or engraved designs on hollow ware, as tea and coffee pots, sugar-bowls, cream-pitchers, and the like; and the object of the improvement is to provide a simple, substantial, efficient, and easily-operated apparatus wherein blanks may be placed and subjected to the force of liquid under great pressure, whereby they are expanded and made to conform to all the details of the design.

Referring to the accompanying drawings, Figure 1 is a side elevation of the apparatus with part cut in central vertical section. Fig. 2 is a detail enlarged sectional view of a portion of the apparatus. Fig. 3 is a horizontal section of a portion on plane denoted by the broken line $x\ x$ of Fig. 2. Fig. 4 is a detail view of the plug used to cover the dies, showing a modified means for removal.

In the views, the letter a indicates the bed of the apparatus, which is cast of metal to any desirable shape which will give the requisite strength to sustain the severe pressure to which it is subjected. In the chamber b, formed in the lower part of the bed and closed at the bottom by a plug c, is placed a piston d, which has on its lower side a suitable packing d' to make it tight and on its upper side a hub f of much less diameter, with a packing f', that fits a reduced portion b' of the chamber b. A duct e, provided with a stop-cock e', leads from the force-pump through the bed to the chamber below the piston, through which liquid may be pumped into the chamber to raise the piston, and leading from the pump through the bed into the chamber above the piston is a duct g, having a stop-cock g'.

In the upper part of the bed is a die-chamber h for holding the dies i, in the faces of which the pattern of the ornamentation to be reproduced is formed. A portion of the wall of this chamber is preferably tapering, so that the dies may be easily removed, and a portion is formed to receive the plug or cover j, which is screwed down upon the tops of the dies to hold them in place. This plug may be turned into place by a hand-wheel, as shown in Fig. 1, or it may be provided with a shaft j' and pulley j^2, that can be driven by a belt to screw in or out the plug. A portion of the shaft may be provided with a thread of the same pitch as the thread on the hub, and this thread may travel in a bracket, so as to raise the hub away from the top of the bed when removing or inserting the dies. An annular bushing k of the proper diameter, having a flange which extends beneath the dies, is placed around the neck of the blank B to fill the bottom of the chamber and make it tight, and, if desired, a packing o may be placed beneath the bushing to prevent the leakage of liquid back of the bushing and dies.

A small passage l is made from the reduced portion b' of the chamber b to the die-chamber h, and the bottom of the die-chamber around this passage is provided with a removable outwardly-expanding packing m, of a size that fits the interior of the neck of the blank, so that when the liquid is forced into the blank this packing seals the neck and prevents leakage. This packing is preferably held in place by a centrally-perforated screw n, the opening through which coincides with the passage l. A pipe p, provided with a stop-cock p', leads from the outside of the bed to the top of the interior of the blank through the passage l to permit the escape of air when the blank is being filled with liquid.

In practicing the invention a blank which has been turned or spun to approximate the final shape is placed within the cavity of the dies, the dies inserted in the die-chamber with the blank in an inverted position, and the plug screwed down upon the dies to hold them in place. With the cock e' closed and the cocks g' and p' opened, the pump is started and the blank filled with liquid through the duct g, air being allowed to escape through the pipe p. After all the air has been expelled and the blank filled with liquid the cock p' is

closed and the pressure of the liquid expands the blank, so that it partially conforms to the dies. The cock g' is then closed and the cock e' opened, and the pressure of the liquid from the pumps is exerted on the large area of the lower surface of the piston in the chamber b, which pressure is transmitted with greatly-multiplied power by the small hub f to the liquid already in the blank, causing it to further expand and conform to every detail of the ornamentation of the design in the dies. If it is desired, the blank may be filled with liquid, which is retained by a small cork q, inserted in the neck before it is placed in the dies, then it will be unnecessary to provide an outlet for the escape of air from the blank, which, on account of its elasticity, in case of the giving away of any of the parts would be followed by disastrous results. After the blank has been sufficiently expanded the plug j is unscrewed, the dies removed, a new blank substituted for the finished vessel, and the hydraulic process repeated. The blank containing the liquid is thoroughly sealed in the bed, and there is no possibility of leakage of the liquid to the exterior of the bed or behind the blank, and a separate hydraulic press to support the parts is not required, as in the prior existing apparatus for this purpose. As the blank is almost completely expanded into the ornamentation of the dies by pressure of the liquid pumped directly into it through the duct g, it requires but little more liquid to further complete the expanding. The area of the hub h as compared with the area of the piston may be very small, whereby great pressure may be obtained in the final operation with but little movement of the piston and hub.

I claim as my invention:

1. A hydraulic shaping apparatus consisting of a bed provided with a piston-chamber containing a piston, a die-chamber containing dies which inclose a blank, a passage from the piston-chamber to the die-chamber, and a duct leading from a pump to the piston-chamber below the piston, substantially as specified.

2. A hydraulic shaping apparatus consisting of a bed provided with a piston-chamber containing a piston, a die-chamber containing dies which inclose a blank, a passage from the piston-chamber to the die-chamber, and ducts leading from a pump to the piston-chamber, one above and the other below the piston, substantially as specified.

3. A hydraulic shaping apparatus consisting of a bed provided with a piston-chamber containing a piston, a die-chamber containing dies which inclose a blank, a passage from the piston-chamber to the die-chamber, a duct leading from a pump to the piston-chamber below the piston, and a pipe leading from the interior of the blank to the exterior of the bed, substantially as specified.

4. A hydraulic shaping apparatus consisting of a bed provided with a piston-chamber containing a piston, a die-chamber containing dies which inclose a blank, a passage from the piston-chamber to the die-chamber, ducts leading from a pump to the piston-chamber, one above and the other below the piston, and a pipe leading from the interior of the blank to the exterior of the bed, substantially as specified.

5. A hydraulic shaping apparatus consisting of a bed provided with a piston-chamber of two different diameters, containing a piston of two diameters, a die-chamber containing dies which inclose a blank, a passage from the smaller part of the piston-chamber to the die-chamber, and ducts leading from a pump to the piston-chamber, one below the enlarged part and the other above the smaller part of the piston, substantially as specified.

6. A hydraulic shaping apparatus consisting of a bed provided with a piston-chamber containing a piston, a removable plug closing the piston-chamber, a die-chamber containing dies which inclose a blank, the neck of which is surrounded with a removable bushing, a removable plug closing the die-chamber, a passage leading from the piston-chamber to the die-chamber, and ducts leading from a pump into the piston-chamber, one above and the other below the piston, substantially as specified.

RUSH P. CHAPMAN.

Witnesses:
HARRY R. WILLIAMS,
ARTHUR B. JENKINS.