No. 669,330. Patented Mar. 5, 1901.

C. H. THURBER.

APPARATUS FOR FORMING ARTICLES OF HOLLOW WARE MADE OF PYROXYLIN COMPOUNDS.

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

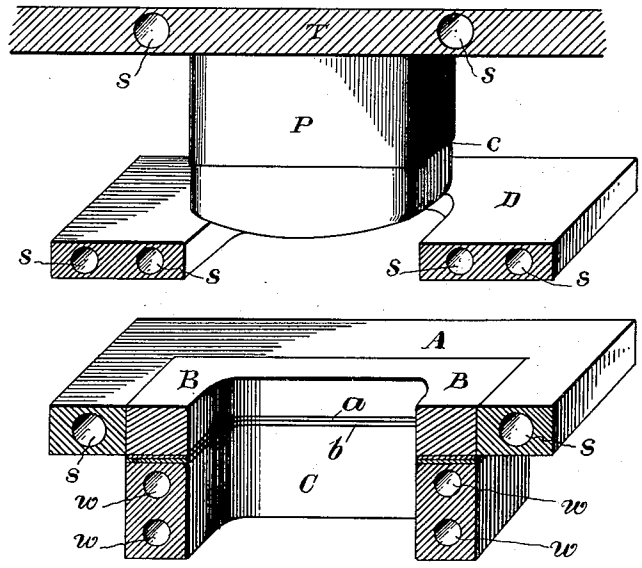
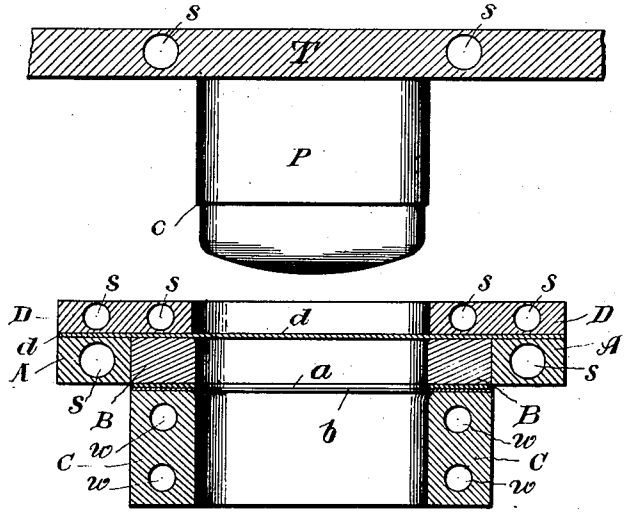


Fig. 2.



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(No Model.)

2 Sheets—Sheet 2.

Fig. 3.

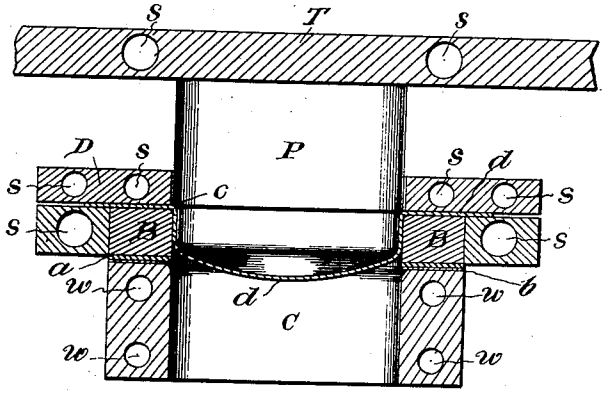
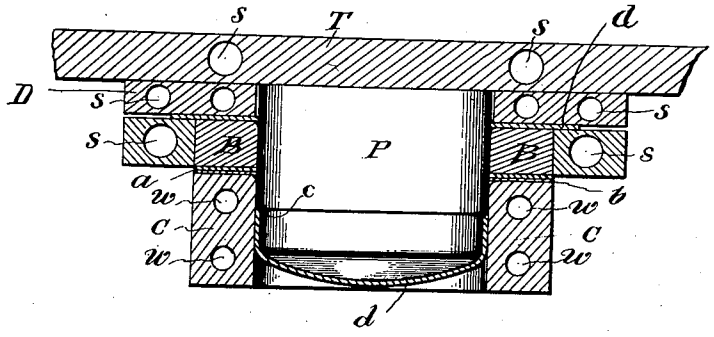


Fig. 4.



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APPARATUS FOR FORMING ARTICLES OF HOLLOW WARE MADE OF PYROXYLIN COMPOUNDS.

SPECIFICATION forming part of Letters Patent No. 669,330, dated March 5, 1901.

Application filed November 28, 1900. Serial No. 37,999. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. THURBER, a citizen of the United States, residing in East Orange, county of Essex, and State of New Jersey, have invented a new and useful Improvement in Apparatus for Forming Articles of Hollow Ware Made of Pyroxylin Compounds Similar to Celluloid, of which the following is a specification, reference being had to the accompanying drawings for purposes of illustration.

Heretofore in the manufacture of boxes or other articles of hollow ware made from these compounds it has been the practice to form them into the desired shape by means of dies, the female die being closed at the bottom and into which the male die or plunger pressed in forming the article. This necessitates the withdrawal of the plunger after each operation and lifting the article out of the female die before another article can be formed.

The object of my invention is to provide an apparatus by which the process of forming such articles is practically continuous and saves the time required to lift the article out of the female die, as heretofore.

My apparatus is illustrated in the accompanying drawings, in which similar letters of reference refer to similar parts throughout the several views, and in which—

Figure 1 is a view, partly in perspective and partly in section, of the device before the sheet or blank of the material to be formed into the article has been placed in position. Fig. 2 is a sectional view of the device after the sheet or blank of material has been placed in position and when the plunger is about to descend. Fig. 3 is a sectional view of the device after the plunger has descended to a point a little below the draw-plate and is about to cut the article from the sheet. Fig. 4 is a sectional view of the apparatus when the plunger has descended to the full limit of its stroke.

Referring to Fig. 1, T is the top steam-table of the press, to which the plunger P is secured and which reciprocates back and forth through the action of mechanism which it is not necessary to describe, as it is well understood and forms no portion of my invention. The plunger P is provided with the cutting edge *c* in the usual manner to cut the article from the sheet during the descent of the plunger.

D is the diaphragm steam-table and which also reciprocates back and forth in the usual manner by mechanism not shown.

A is the bed of the press, in which is inserted the draw-plate B, the opening through this draw-plate corresponding in shape to the periphery of the article to be formed.

C is the chilling-plate, the opening in which also corresponds in shape to the periphery of the article to be formed and which is separated from the draw-plate B and the bed A by a sheet of asbestos *a* or other material which is a non-conductor of heat and also, preferably, by the stripping-plate *b*, preferably placed below the sheet *a*.

The steam-table T, the diaphragm D, and the bed A of the steam-table press are provided with steam-passages *s* to heat them in the ordinary manner, and the chilling-plate C is provided with the cold-water passages *w* in the customary manner.

The sheet or blank *d* of material to be formed is shown in Fig. 2 in its position before the plunger descends and in Figs. 3 and 4 after the plunger has descended.

The operation of my device is as follows: When the apparatus is in the position shown in Fig. 1, the sheet or blank of material is placed upon the bed A of the steam-table press and across the opening in the draw-plate B. The diaphragm D then descends and holds the sheet or blank of material *d* in position, as shown in Fig. 2. The plunger P then descends upon the heated sheet or blank *d* and forces it through the heated draw-plate B into the position shown in Fig. 3 of the drawings. At this point the cutting edge *c* cuts the heated article from the sheet or blank, and the further descent of the plunger carries the article thus formed down into the opening through the chilling-plate C, where it is chilled and "set," as shown in Fig. 4 of

the drawings. This opening in the chilling-plate C has no bottom, and as the plunger P rises the article *d*, which has been cooled by the chilling-plate, drops out of the apparatus, which is now ready to repeat its operation upon another portion of the sheet of material or upon a new blank, which is placed upon the bed of the press over the draw-plate.

The stripping-plate *b* (illustrated in the drawings) is designed to strip the formed article from the plunger as the plunger rises, and I prefer this construction of the apparatus; but it is not essential, for ordinarily the friction between the formed article and the sides of the barrel in the chilling-plate C will be sufficient to strip the article from the plunger as the plunger rises. I have illustrated the opening in the draw-plate B as having a rounded upper edge in order to prevent tearing the sheet of material or blank as the plunger descends, and I have illustrated the opening in the chilling-plate C as having a rounded upper edge to facilitate the action of the stripping-plate in stripping the article from the plunger, and I prefer such construction, although it is not essential to the operation of my device. The length of the barrel in the chilling-plate C should be varied according to the thickness of the sheet or blank of material to be formed or the depth of the article, a thicker sheet of material or a deeper article requiring greater length of barrel in the chilling-plate to cool it than is required with a thinner sheet or blank of material or shallower article.

I have described and illustrated the plunger P as provided with a cutting edge, whereby the cutting of the article from a larger sheet or blank of material and its formation are performed by a single downward stroke of the plunger; but it is obvious that this cutting edge may be omitted and that blanks of material previously cut to the size required to make the article may be successively placed upon the table of the press over the opening in the draw-plate and formed into articles by the action of the plunger in forcing the blank through the barrels in the draw-plate and chilling-plate.

It will be readily perceived that if the formed article should not drop through the barrel of the chilling-plate by its own weight after the withdrawal of the plunger subsequent descent of the plunger in forming a successive article will force it out. In some cases, where the article is formed from very thin sheets or blanks which are sufficiently heated by the bed or where the article is very shallow, I can omit the diaphragm of the press.

It is apparent that the apparatus need not be arranged to act vertically, but may be arranged to operate horizontally or otherwise.

Having thus described my invention, what I claim is—

1. In an apparatus for forming articles of hollow ware made of pyroxylin compounds, the combination of, first, a heated plunger having its acting end shaped like the interior of the article to be formed; second, a heated draw-plate having an open channel shaped like the exterior contour of the article to be formed; and, third, a chilling-plate having an open channel shaped like the exterior contour of the article to be formed; arranged and operated substantially as described.

2. In an apparatus for forming articles of hollow ware made of pyroxylin compounds, the combination of, first, a heated plunger having its acting end shaped like the interior of the article to be formed; second, a heated diaphragm; third, a heated draw-plate, and, fourth, a chilling-plate, said diaphragm, draw-plate and chilling-plate each having an open channel shaped like the exterior contour of the article to be formed, arranged and operated substantially as described.

3. In an apparatus for forming articles of hollow ware made of pyroxylin compounds, the combination of, first, a heated plunger having its acting end shaped like the interior of the article to be formed; second, a heated draw-plate; third, a stripping-plate; and, fourth, a chilling-plate; said draw-plate, stripping-plate, and chilling-plate each having an open channel shaped like the exterior contour of the article to be formed; arranged and operated substantially as described.

4. In an apparatus for forming articles of hollow ware made of pyroxylin compounds, the combination of, first, a heated plunger having its acting end shaped like the interior of the article to be formed; second, a heated diaphragm; third, a heated draw-plate; fourth, a stripping-plate; and, fifth, a chilling-plate; said diaphragm, draw-plate, stripping-plate, and chilling-plate each having an open channel shaped like the exterior contour of the article to be formed, arranged and operated substantially as described.

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Witnesses:
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ALBERT W. HARRIS.