

No. 669,331.

Patented Mar. 5, 1901.

C. H. THURBER.

PROCESS OF MANUFACTURING ARTICLES OF HOLLOW WARE FROM SHEETS OF PYROXYLIN COMPOUNDS.

(Application filed Nov. 28, 1900.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

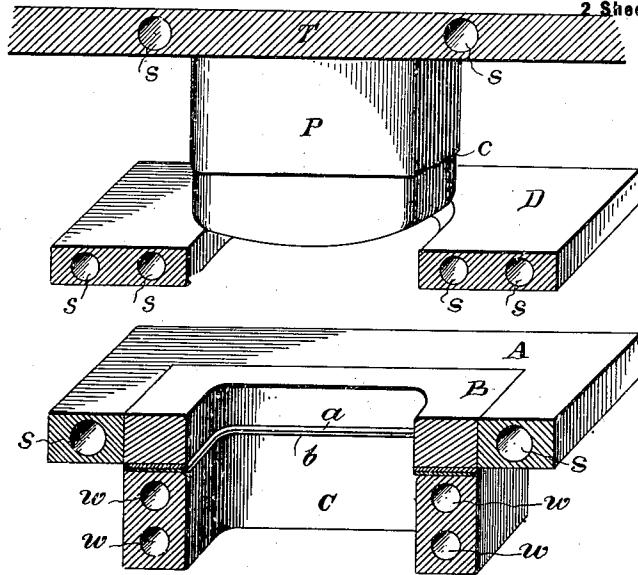
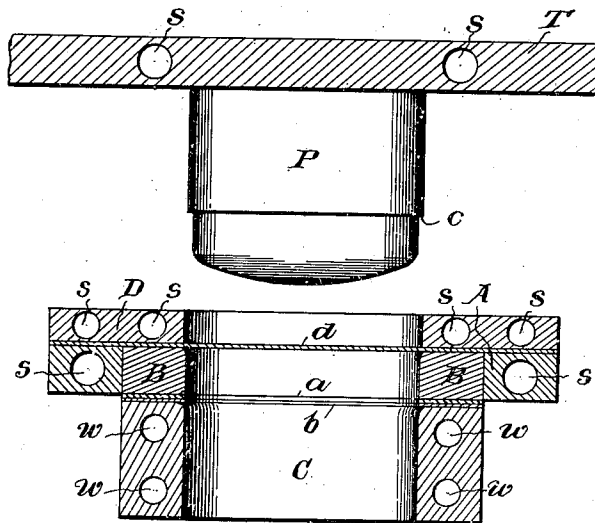


Fig. 2.



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2 Sheets—Sheet 2.

Fig. 3.

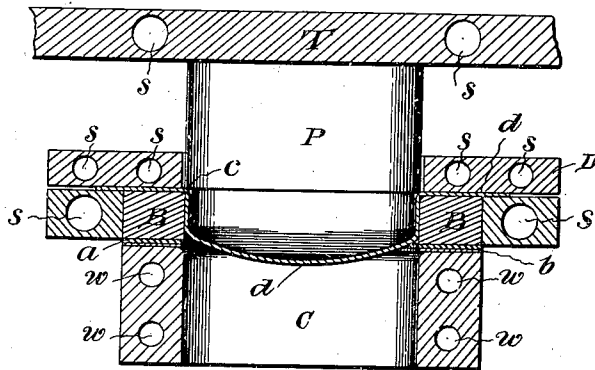
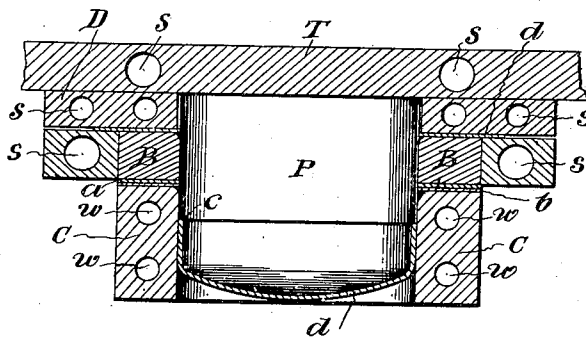


Fig. 4.



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PROCESS OF MANUFACTURING ARTICLES OF HOLLOW WARE FROM SHEETS OF PYROXYLIN COMPOUNDS.

SPECIFICATION forming part of Letters Patent No. 669,331, dated March 5, 1901.

Application filed November 28, 1900. Serial No. 38,000. (No specimens.)

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 Processes of Manufacturing Articles of Hollow Ware Made from Sheets or Blanks of Pyroxylin Compounds Similar to Celluloid, of which the following is a specification.

Heretofore in the manufacture of boxes and 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 a process of forming such articles which is practically continuous and saves the time required to lift the article out of the female die, as heretofore.

My process consists in subjecting a sheet or blank of material from which the article is formed to the action of a heated plunger whose acting end is shaped like the interior of the article to be formed, whereby the sheet or blank of material is pressed by said plunger through an open and continuous channel which corresponds in shape to the exterior contour of the article to be formed, the sides of the first part of said open continuous channel being heated to render the material plastic and the succeeding portion of said open continuous channel being cooled, so as to chill and "set" the article after it has been shaped by the heated plunger within the heated portion of said open channel.

One form of apparatus suitable for performing my process is illustrated in the accompanying drawings, in which similar letters of reference refer to similar parts throughout the several views, although it will be understood that my invention may be practiced by other forms of apparatus than that specifically described herein.

Referring to the drawings, Figure 1 is a

view, partly in perspective and partly in section, of the device before the sheet or blank of 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 molded 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 the 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 farther 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 or blank of material 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 heated sufficiently 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. The herein-described process of making articles of hollow ware from sheets or blanks of a pyroxylin compound which consists in forming the blank into the desired shape by forcing it into a confined space the boundaries of which are heated during the formation of the article, and then forcing the shaped article into a continuation of said confined space the boundaries of which are cooled and insulated from the heated boundaries.

2. The herein-described process of making articles of hollow ware from sheets or blanks of a pyroxylin compound which consists in first heating the blank, then forming it into the desired shape by forcing it into a confined space the boundaries of which are heated during the formation of the article, and then forcing the shaped article into a continuation of said confined space the boundaries of which are cooled and insulated from the heated boundaries.

3. The herein-described process of making articles of hollow ware from sheets or blanks of a pyroxylin compound which consists in forming the blank into the desired shape by forcing it into a confined space the boundaries of which are heated during the formation of the article, cutting the blank from the sheet, and then forcing the shaped article into a continuation of said confined space the boundaries of which are cooled and insulated from the heated boundaries.

4. The herein-described process of making articles of hollow ware from sheets or blanks of a pyroxylin compound which consists in first heating the blank, then forming it into the desired shape by forcing it into a confined space the boundaries of which are heated during the formation of the article, cutting the blank from the sheet, and then forcing the shaped article into a continuation of said confined space the boundaries of which are cooled and insulated from the heated boundaries.

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Witnesses:

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