May 27, 1930. L. STEVENS 1,760,288

APPARATUS FOR MAKING CONTAINERS

Original Filed May 28, 1923 2 Sheets-Sheet 1

Fig. 1.

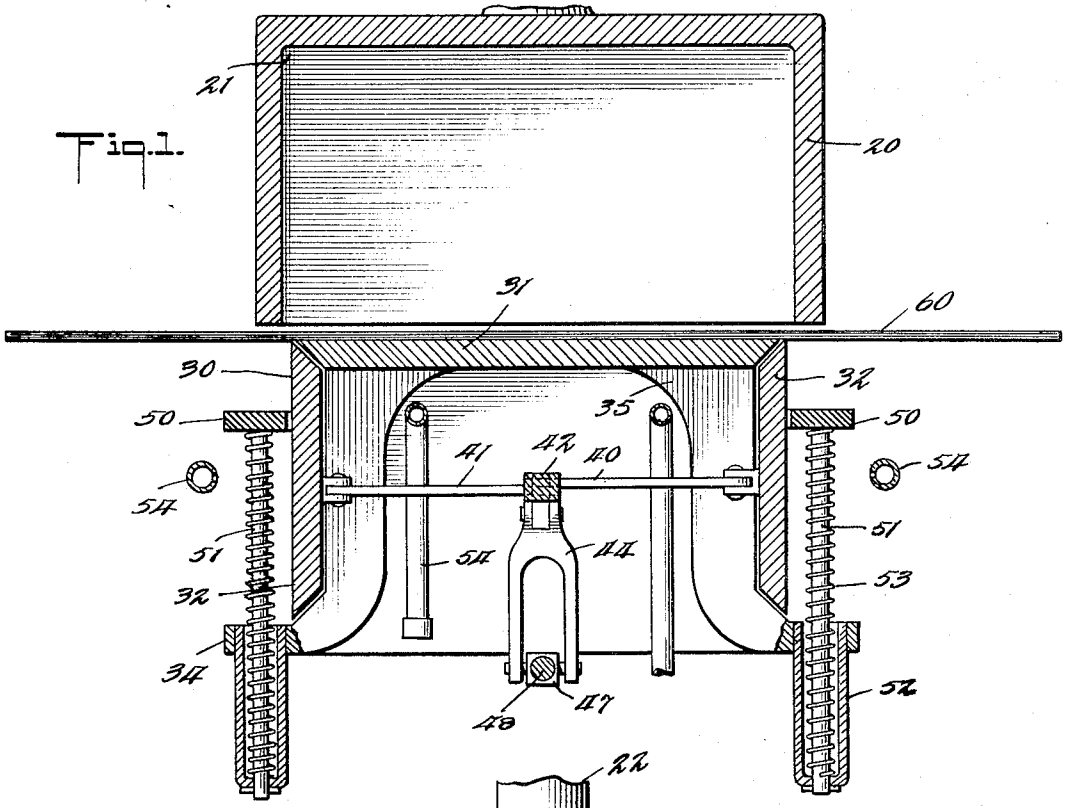
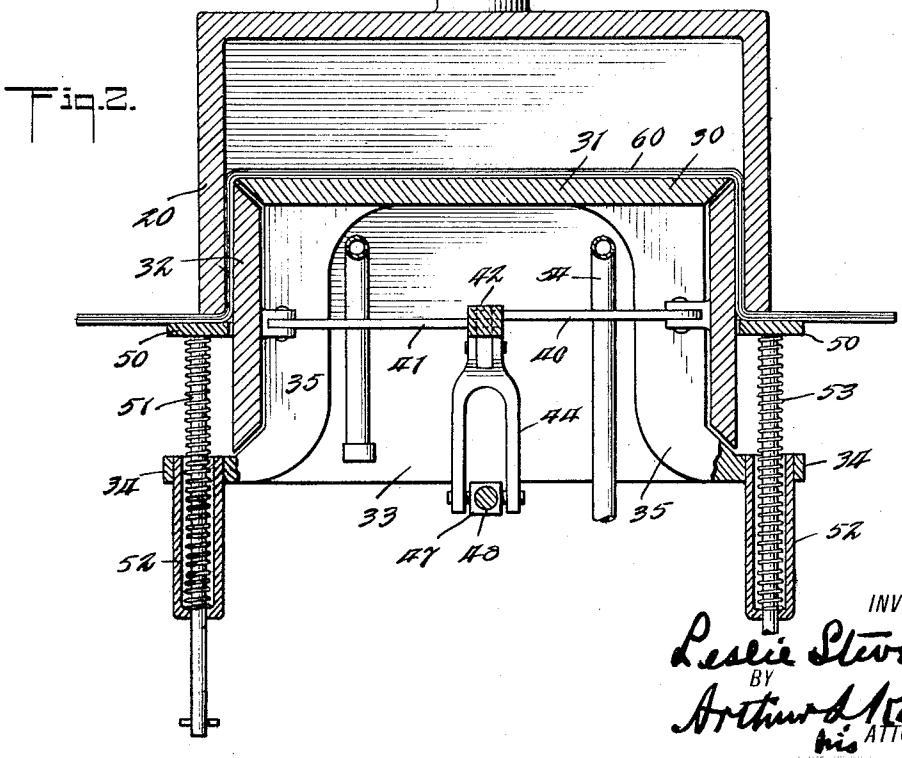


Fig. 2.



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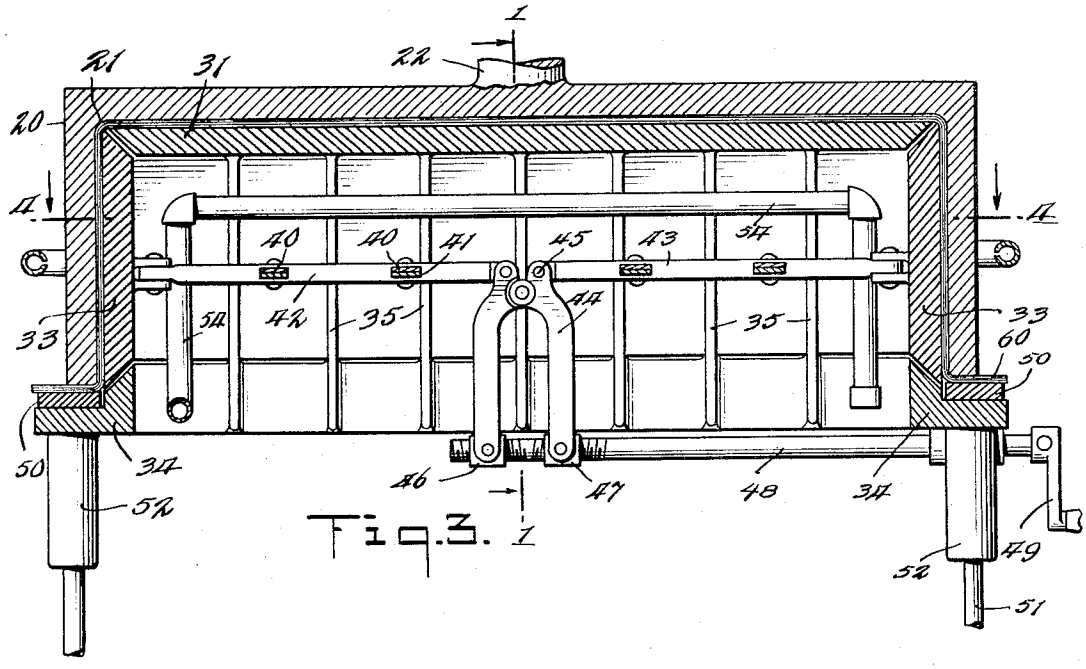

Fig. 3.

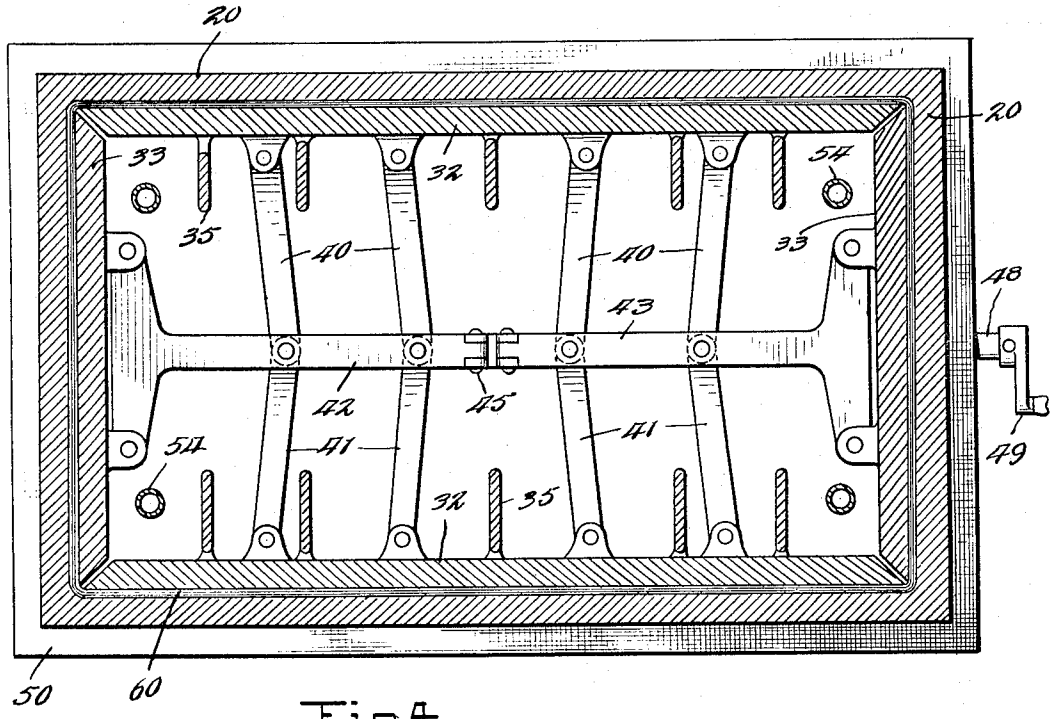

Fig. 4.

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UNITED STATES PATENT OFFICE

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APPARATUS FOR MAKING CONTAINERS

Original application filed May 28, 1923, Serial No. 641,983. Divided and this application filed January 14, 1928. Serial No. 246,880.

This invention relates to apparatus for making containers.

The invention aims to provide an improved apparatus for making seamless and lapless containers such as are described and claimed in my application Serial No. 641,983, filed May 28, 1923, of which this application is a division.

The invention comprises an apparatus especially intended for forming from a continuous piece of flat woven fabric of one or more layers a seamless container having a bottom wall and side and end walls extending at right angles to the bottom wall, said walls being compressed and of substantially uniform thickness.

In order that the invention may clearly be understood, I will describe in detail a specific apparatus embodying the invention. The apparatus is illustrated in the accompanying drawings, in which:

Fig. 1 is a transverse section of an apparatus according to the invention, taken on the line 1—1 of Fig. 3 but showing the position of the parts of the apparatus ready to begin the operation of making a container;

Fig. 2 is a similar view showing the position of the parts of the apparatus when the container is partially formed;

Fig. 3 is a longitudinal section of the apparatus taken on the line 3—3 of Fig. 1 but showing the position of the parts of the apparatus on completion of the forming or shaping of the container; and

Fig. 4 is a top view of the apparatus sectioned on the line 4—4 of Fig. 3 and showing the parts in the same position as in Fig. 3.

The apparatus as shown comprises an upper external form 20 and a lower internal form 30 which are mounted on any known type of press in such manner that the external form may be forced down over the internal form. The external form 20 is rectangular, as shown, having sharp corners 21 at the intersection of its sides, ends, and top. It is shown as provided at its top with a bar 22 by means of which it may be connected to the upper member of a press.

The internal form 30 has a top plate 31, and side plates 32 and end plates 33 all mounted for movement with respect to the top plate. The base frame 34 of the internal form is mounted on the lower member of a press. The top plate 31 is supported from the base frame by means of brackets 35, which may be made integral with the top plate and base frame, as shown. The edges of the top plate 31 are beveled, and the upper edges of the side plates 32 and end plates 33 are also beveled so that they fit closely against the beveled edges of the top plate.

Mechanism is provided for forcing the two side plates 32 and the two end plates 33 outwardly. In the construction shown, this mechanism includes a number of pairs of toggle levers 40, 41 pivotally connected at their outer ends to the side plates 32 and having their inner ends pivotally connected to thrust bars 42 and 43, the outer ends of which are connected directly to the end plates 33. The thrust bars 42, 43 may be forced endwise apart by means of a pair of pivotally connected levers 44 having short upper ends 45 connected to the inner ends of the thrust bars 42 and 43 and long lower ends pivotally connected to nuts 46 and 47. These nuts are threaded in opposite directions and mounted on corresponding threads on a shaft 48 which may be turned by means of a handle 49 to move the nuts toward or away from each other according to the direction in which the shaft is turned. When the nuts are moved toward each other the levers 44 are operated to move the thrust bars endwise apart, thereby forcing the end plates 33 outward and also operating the toggle levers to force the side plates outward. Movement of the nuts apart operates the levers 44 to draw the thrust bars inward, thereby moving the end plates inward and operating the toggle levers to move the side plates inward. It is apparent that the apparatus described provides means for thrusting the two side plates and the two end plates apart with great force.

A rectangular frame 50 surrounds the internal form 30. This frame is mounted on the upper ends of rods 51 whose lower ends pass through sleeves 52 secured in the base frame 34. Compression springs 53 urge the frame

50 upward so that it normally occupies the position shown in Fig. 1.

The operation of making a container with the aid of the apparatus described, is as follows:—A piece 60 of loosely woven fabric, best of several layers, is saturated with sizing and, while still moist, is placed over the top plate 31 of the internal form 30 in the position shown in Fig. 1. The piece of fabric 60 is of such size that it extends beyond the edges of the top plate by a distance greater than the width of the side plates 32 and the end plates 33. The external form 20 is then forced down, drawing the fabric over the upper portion of the internal form. When the external form has descended a short distance, the extending portions of the fabric are pressed between the lower edge of the form and the frame 50, as seen in Fig. 2. As the downward motion of the upper frame continues, the extending portion of the fabric is drawn in between the lower edge of the upper form and the frame 50. As the fabric is drawn between these two parts, all folds or creases are ironed out of it, so that it is flat and smooth when it comes against the side and end plates of the lower form.

After the outer form 20 has been forced down to the position shown in Fig. 3 in which it completely encloses the lower form and the portion of the material 60 forming the bottom of the container is pressed between plate 31 and the top plate of the outer form, the handle 49 is turned to force the side plates 32 and the end plates 33 of the inner form outwardly to compress the fabric between these plates and the sides and ends of the outer form. The flatwise outward movement of these side plates and end plates is very slight causing only a slight separation of the edges of these plates, as will be evident from the drawings. Consequently, the fabric 60 is forced not only against the sides and ends of the upper form, but also into the corners between the sides and ends of the upper form. The side and end walls and the bottom of the container will thus be positively pressed between opposed surfaces and a smooth or other surface corresponding to the pressing surfaces will be given to the walls of the container.

The steps above described complete the shaping of the container. Before the upper and lower forms are separated and the container is removed, the sizing with which the fabric was impregnated is completely dried. The drying may be accelerated by heating the form, as, for example, by means of gas burners 54.

After the sizing is dried, the handle 49 is turned to move the side plates and end plates of the lower form inwardly so as to loosen their grip upon the fabric, and the external form 20 is then raised and the completed container is removed.

It should be noted that the container thus made in the apparatus shown is rectangular in form. It has at its edge an external flange formed by the portion of the fabric held under the lower edge of the external form at the end of the descent of this form. This flange may be trimmed down to any desired extent or may be entirely cut off.

What is claimed is:

1. In an apparatus for making a seamless container, the combination with a rectangular internal form; of means for drawing and shaping a continuous piece of sheet material against said internal form, comprising a rectangular external form of such relative size that the space between its side and end walls and the side and end walls of the internal form is only slightly greater than the thickness of the sheet material to be shaped between the forms, the edge of the side and end walls of the external form being adapted to guide the material smoothly into the space between said walls and the walls of the internal form, and means for causing a relative approaching forming movement between said forms, whereby as the external form moves over the internal form a piece of material which has been placed on the top of the internal form is drawn smoothly in between the side walls and end walls of the two forms; and means for causing a slight relative flatwise approaching movement between the side and end walls of the two forms to press the shaped material between said walls.

2. In apparatus for forming a container, an internal form having a rectangular top plate, and having a pair of side plates and a pair of end plates movable flatwise relatively to said top plate, a pair of thrust bars extending longitudinally of said container and having their outer ends connected to said end plates respectively, toggle levers connecting said bars to said side plates, and means for forcing said thrust bars endwise outwardly to cause them to press the end plates apart and to move the toggle levers to press the side plates apart.

3. Apparatus for making a seamless container from a continuous piece of sheet material, comprising a rectangular internal form, a rectangular external form, means for causing a relative approaching movement between said forms, the space between the side and end walls of the two forms being only slightly greater than the thickness of the sheet material to be shaped between the forms, whereby as the external form moves over the internal form the piece of material is drawn in between the side walls and end walls of the two forms, and a yieldably supported frame surrounding said internal form and adapted to press the material against the edge of the external form during such approaching movement.

4. Apparatus for making a seamless article from a piece of sheet material, comprising an internal form, an external form, means for causing a relative approaching movement between said forms to shape the material against the internal form, and a yieldingly supported frame surrounding the internal form and adapted to press the material against the edge of the external form during such approaching movement, whereby the material is held flat and smooth as it is drawn inward and shaped against the internal form.

5. Apparatus for making a seamless article from a piece of sheet material, comprising an internal form, an external form, means for causing a relative approaching movement between said forms to shape the material against the internal form, and means for yieldingly gripping the material to hold it flat and smooth as it is drawn inward and shaped against the internal form.

In testimony whereof, I have hereunto set my hand.

LESLIE STEVENS.