

May 8, 1928.

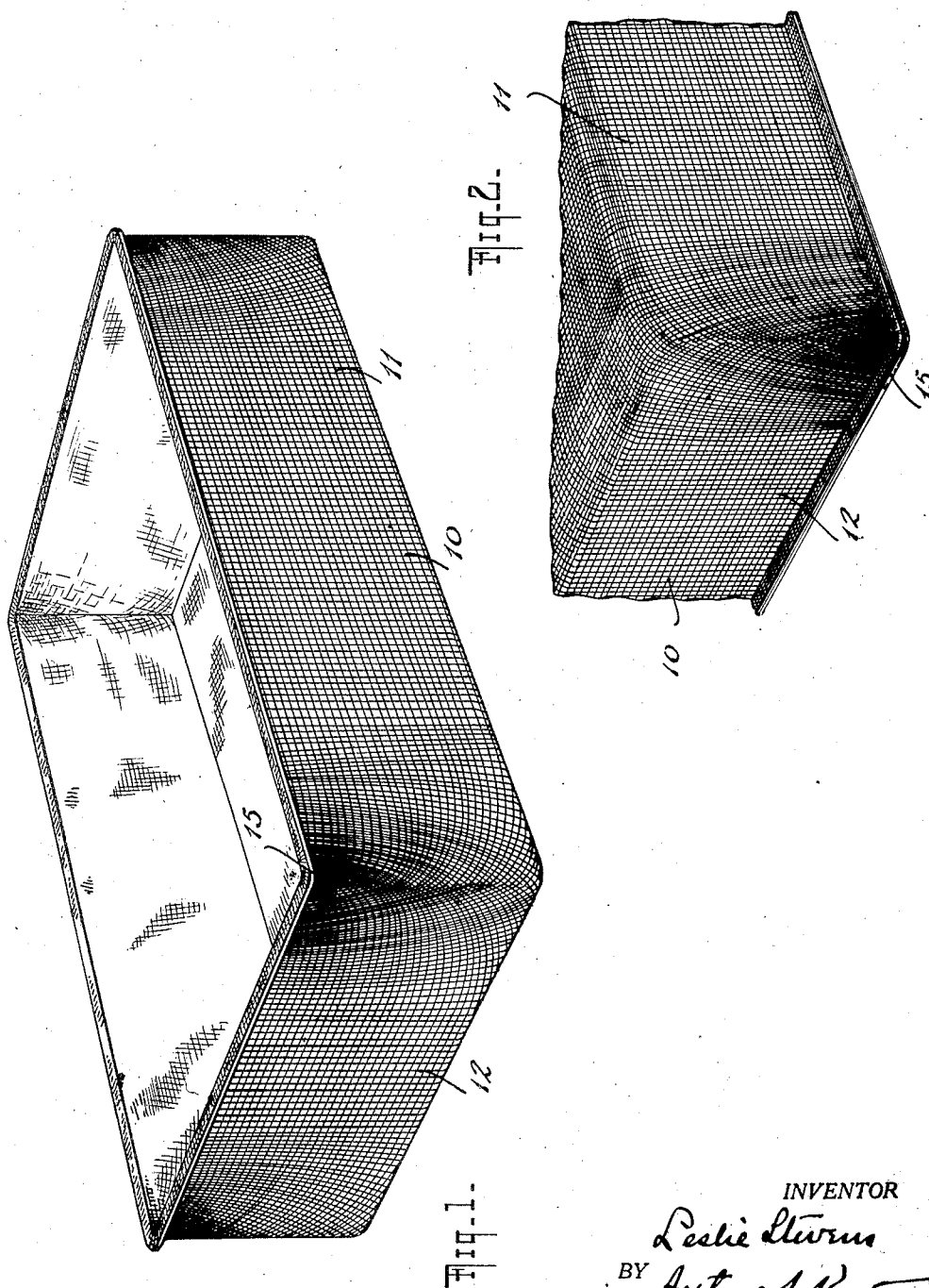
L. STEVENS

1,669,266

CONTAINER AND METHOD OF MAKING SAME

Filed May 28, 1923

3 Sheets-Sheet 1



INVENTOR  
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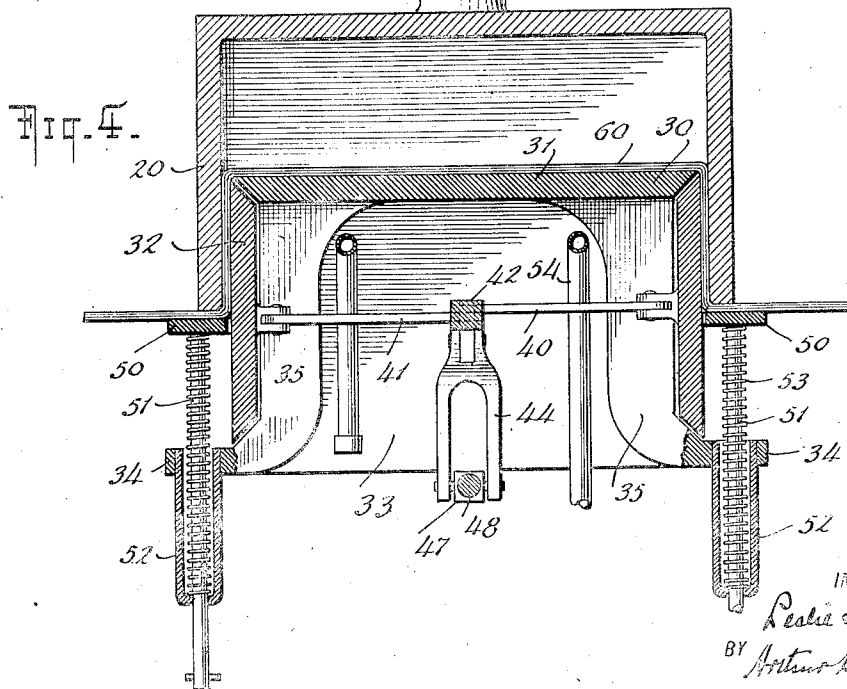
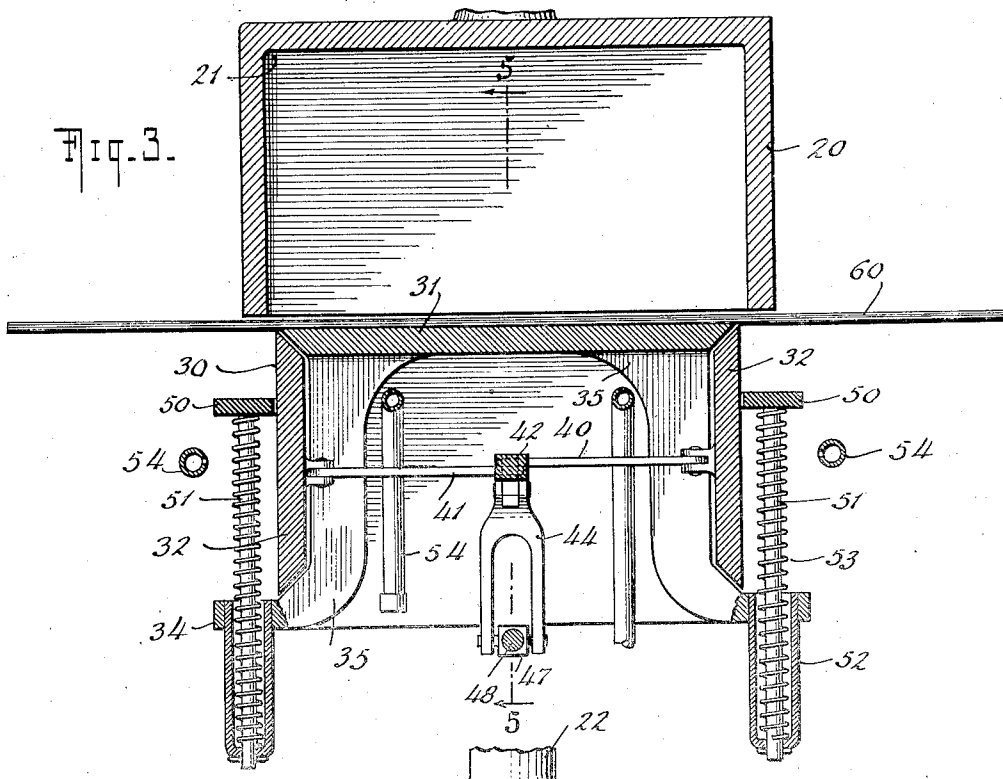
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### CONTAINER AND METHOD OF MAKING SAME

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3 Sheets-Sheet 2



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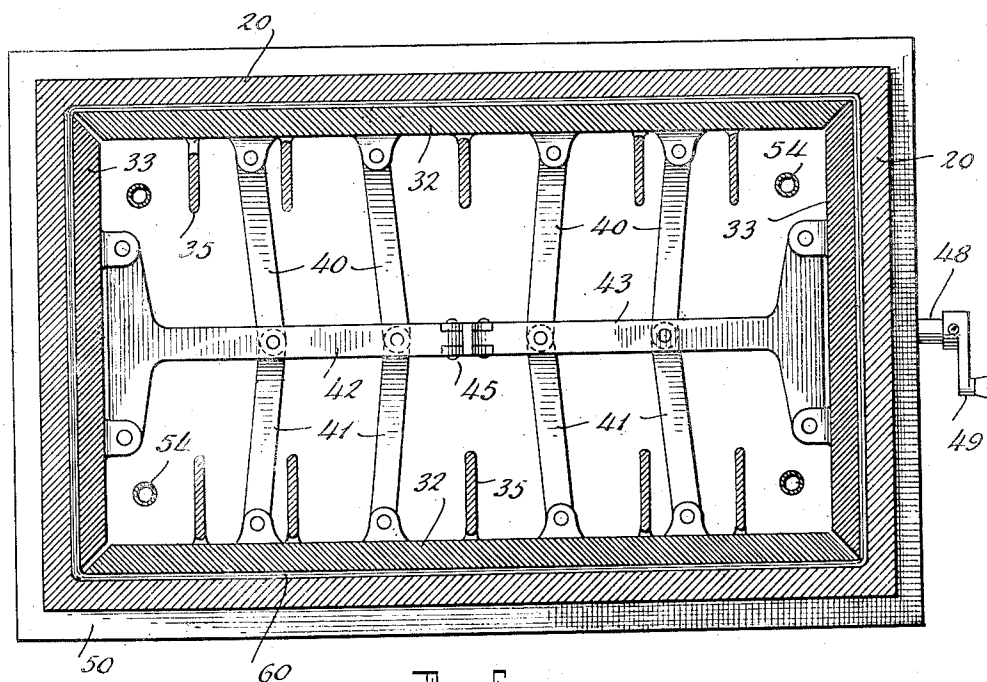
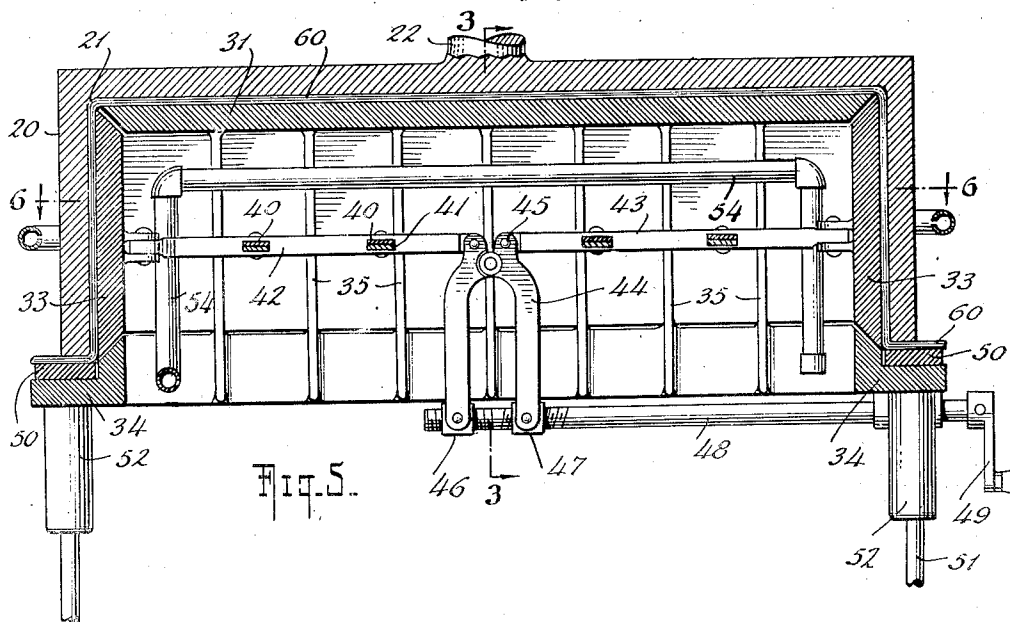
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CONTAINER AND METHOD OF MAKING SAME

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3 Sheets-Sheet 3



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## UNITED STATES PATENT OFFICE.

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## CONTAINER AND METHOD OF MAKING SAME.

Application filed May 28, 1923. Serial No. 641,983.

This invention relates to containers, and to methods of making the same.

The invention aims to provide a seamless and lapless container of great strength, suitable for use in making suit cases and other sorts of baggage and cases or containers for many other purposes; and a method of making such containers at relatively small cost.

A container embodying the invention may be rectangular in form, having a bottom, sides and ends which meet in approximately square corners. The walls of the container are of substantially uniform thickness throughout and are formed of a single piece of loosely woven fabric stiffened with sizing, or of a number of layers of such pieces.

In accordance with the invention, the container is formed from the fabric by a stretching and pressing method hereinafter described in detail.

In order that the invention may clearly be understood, I will describe in detail a specific container embodying it, a specific apparatus for making the container, and a method of making the container. The container and apparatus are illustrated in the accompanying drawings, in which:—

Fig. 1 is a perspective view of a container embodying the invention;

Fig. 2 is a broken perspective view showing the bottom and side walls at one corner of the container.

Fig. 3 is a transverse section of an apparatus for making the container, taken on the line 3—3 of Fig. 5 but showing the position of the parts of the apparatus ready to begin the operation of making a container;

Fig. 4 is a similar view showing the position of the parts of the apparatus when the container is partially formed;

Fig. 5 is a longitudinal section of the apparatus taken on the line 5—5 of Fig. 3 but showing the position of the parts of the apparatus on completion of the forming or shaping of the container; and

Fig. 6 is a top view of the apparatus sectioned on the line 6—6 of Fig. 5 and showing the parts in the same position as in Fig. 5.

The container 10 shown in Figs. 1 and 2 consists of a piece of loosely woven fabric stretched and shaped to the form shown and having its warp and woof threads, or strands,

distorted from their normal perpendicular arrangement in the side walls 11 and end walls 12 of the container at and near the corners thereof. The horizontal threads or strands of the side walls 11 curve upwardly at each end of the side wall as they approach the corner 15 and pass around the corner and then upwardly as vertical, or transverse, strands of the adjacent end wall to the upper edge of the container. Similarly, the horizontal strands of each end wall curve upwardly as they approach the corner and pass around the corner and then extend upwardly in the adjacent side wall to the upper edge of the container. The vertical or transverse strands of the material in the end and side walls extend in parallel relation in the middle portions of the walls, but toward the end of each wall as the corner is approached the vertical strands are inclined more and more inward or away from the corner, the strands thus converging toward each other at the edge of the wall at the top or open side of the container. This converging of the strands toward the upper edge of the side and end walls at and near the corners is due to the greater number of such strands in each end portion of each wall at and near its upper edge resulting from the presence there of the horizontal strands of the adjacent wall which have turned about the corner and become vertical strands of such first mentioned wall. By such displacement of the threads of the fabric from their normal relation the fabric may be formed into a container whose sides and ends meet at substantially square corners without lapping or folding the fabric. A slight lapping or folding may occur at times at or close to the corners of a container according to the invention which will not be sufficient to affect the character of the walls of the container as substantially of uniform thickness and lapless.

The container shown in Figs. 1 and 2 may be formed by means of the apparatus shown in Figs. 3 to 6. This apparatus 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 frame 31 is supported from the base plate 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 this 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 the container shown in Figs. 1 and 2 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. 3. 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. 4. 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. 5 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 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. When the container is to be used in making a valise, it is desirable to leave a

portion of the flange as indicated in Figs. 1 and 2. For other uses the flange may be entirely cut off, giving the container the form of a rectangular box.

5 Obviously the bottom and side and end walls of containers according to the invention in its broader aspect need not meet at sharp angles as shown. The greatest difficulty, however, is in producing the container with its side and end walls at right angles 10 to the bottom and with the bottom and side and end walls meeting at approximately sharp angles, and this is an important feature of the invention.

15 In order to give the container the desired strength, it is usually advantageous to form the piece of fabric 60 from which it is made of several layers. In the claims which follow, therefore, the expression "continuous 20 piece of fabric" should be understood to include a piece consisting of one or more layers in which each layer is continuous. It will be understood from the foregoing description that the piece of fabric is not 25 shaped in weaving, but is of any suitable flat woven fabric, that is, that it is a piece of fabric adapted to be laid out flat as shown in Fig. 3.

What I claim is:

30 1. A seamless container consisting of a continuous piece of flat woven fabric made of fibrous strands, impregnated with sizing, and deformed out of its plane of weave without lapping to provide a flat bottom wall 35 and flat side and end walls extending at

right angles to the bottom wall, said walls being compressed and of substantially uniform thickness.

2. An impervious seamless container consisting of a continuous piece of a plurality 40 of layers of flat woven fabric impregnated and cemented together with sizing, said layers being deformed out of their plane of weave without lapping to provide a flat bottom wall and flat side and end walls at 45 right angles to the bottom wall, and said walls being compressed and of substantially uniform thickness.

3. A seamless and lapless rectangular container formed of a continuous piece of a plurality 50 of layers of flat woven fabric impregnated and stiffened and cemented together with sizing, the container having a bottom wall and side and end walls extending at right angles to the bottom wall and 55 to each other and extending straight to make sharp angles, and said walls being compressed and of substantially uniform thickness.

4. The method of making a seamless and 60 lapless container, which comprises impregnating a continuous piece of flat woven fabric with sizing, deforming the fabric out of its plane of weave to provide a flat bottom wall and flat side and end walls extending 65 at right angles to the bottom wall, and compressing the side and end walls.

In testimony whereof I have hereunto set my hand.

LESLIE STEVENS.