

April 17, 1928.

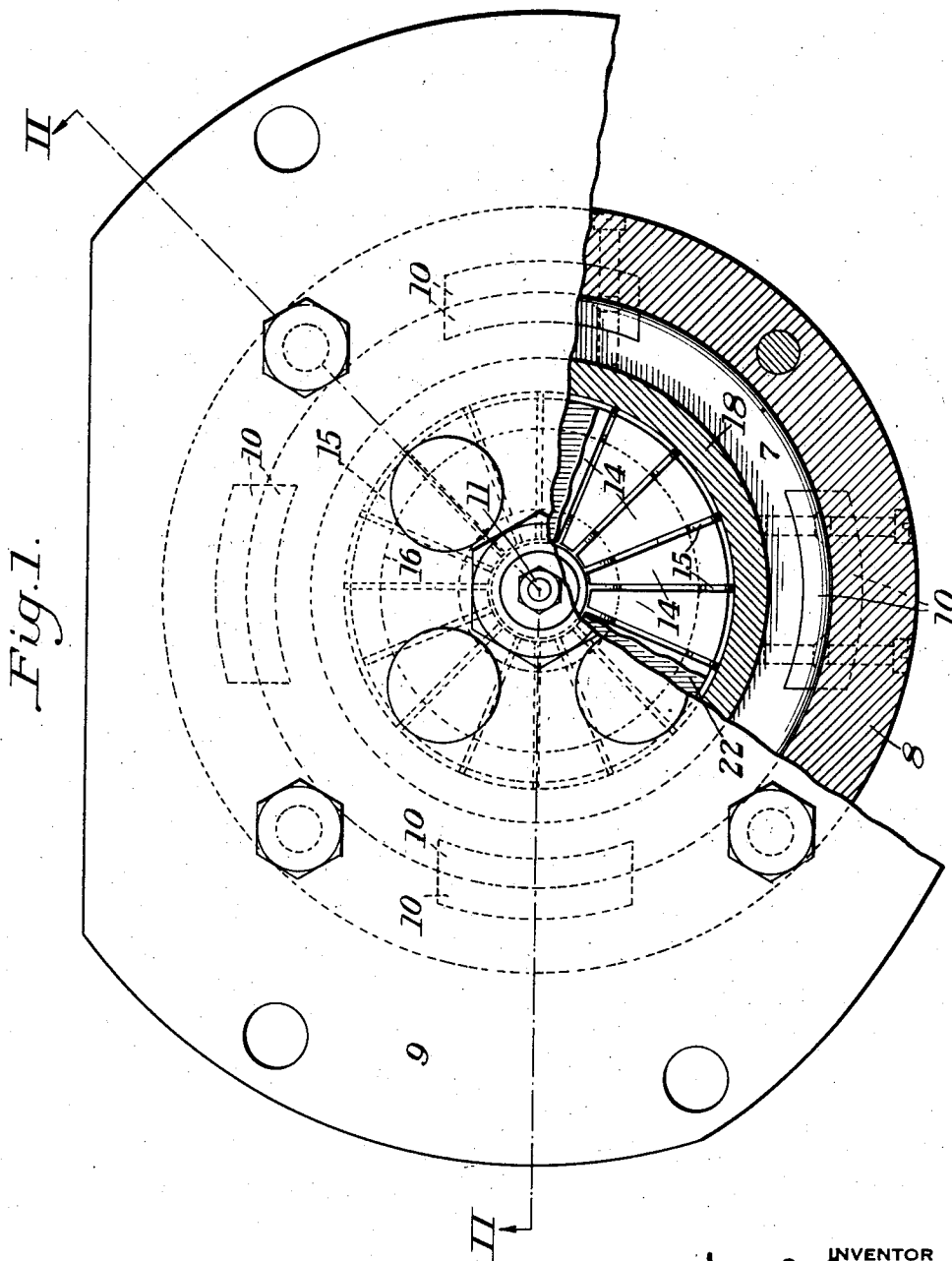
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METHOD AND APPARATUS FOR MAKING FIBROUS CONTAINERS

Filed July 17, 1926

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

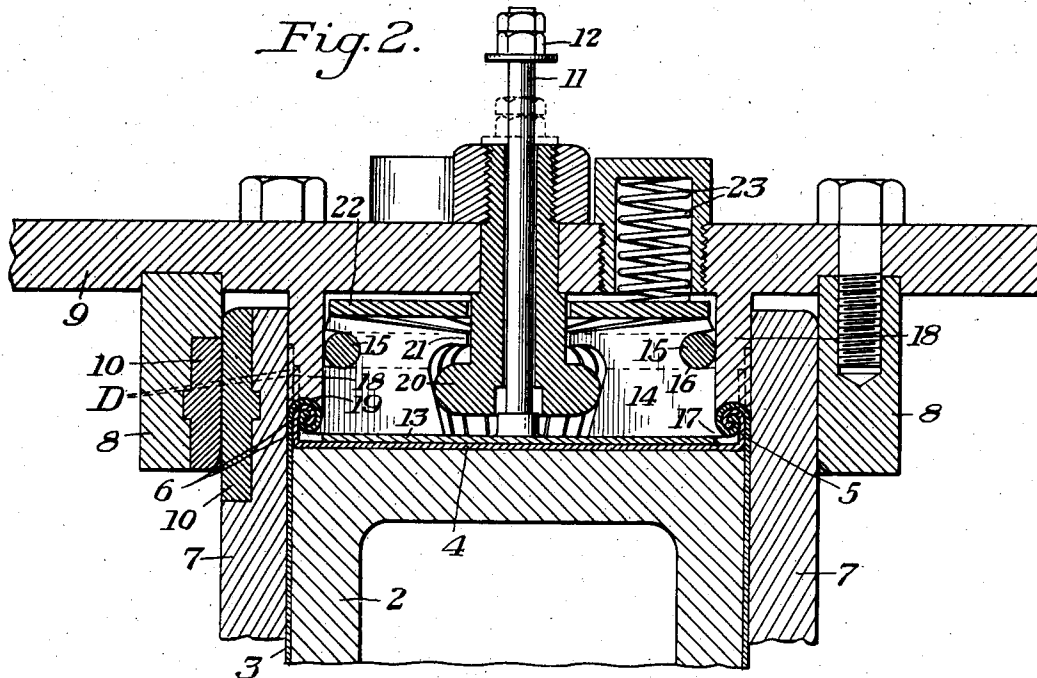


Fig. 7.

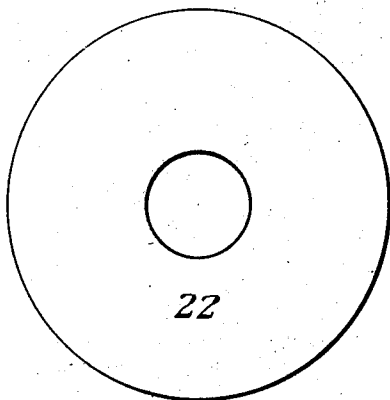


Fig. 5.

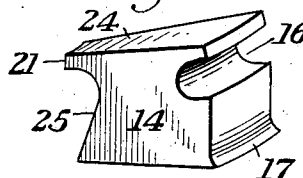
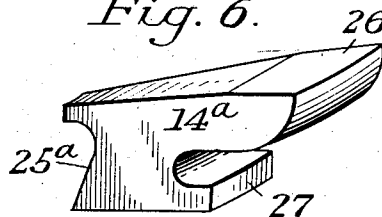


Fig. 6.



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Fig. 3.

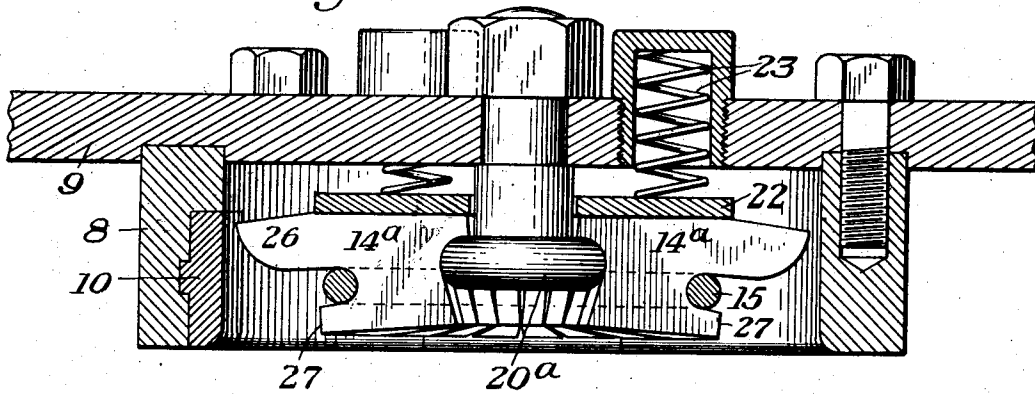
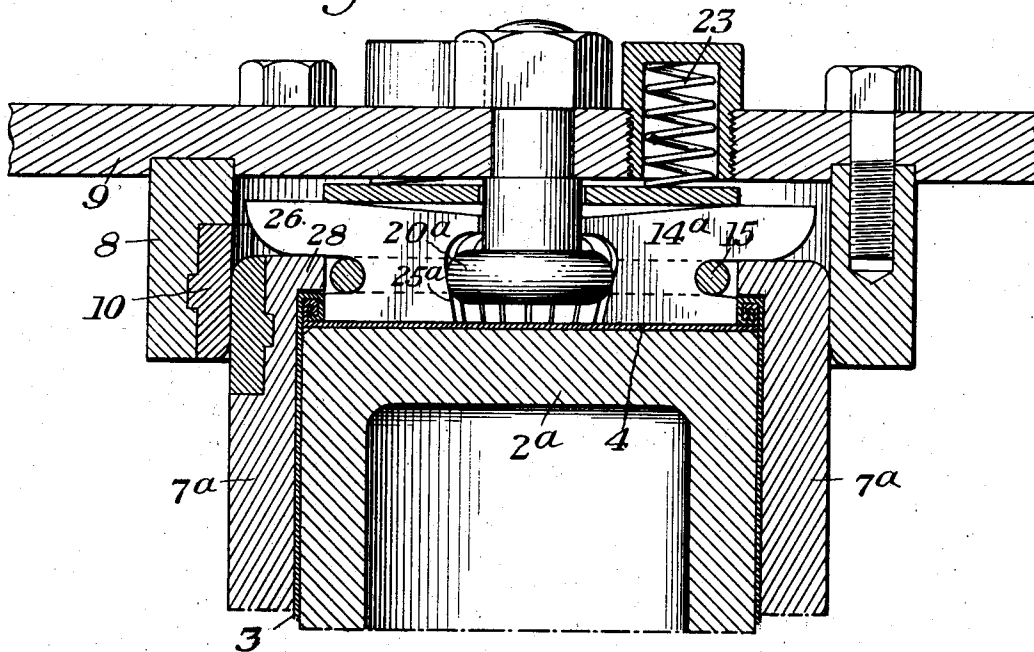


Fig. 4.



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METHOD AND APPARATUS FOR MAKING FIBROUS CONTAINERS.

Application filed July 17, 1926. Serial No. 123,049.

This invention relates to a method and apparatus for making fibrous containers, and particularly to containers formed by uniting two or more container parts, as, for example, a body portion and a cap therefor, by rolling the edge portions of the container parts together.

Heretofore the rolling or curling operation has been carried out by suitably supporting the container parts and subjecting them to the action of a so-called "curling ring", which is a plunger having a working face grooved in such manner that the edge portions of the container parts are caused to curl when engaged by such plunger. This method has been in use for some time, and while it is effective for curling the two parts, it is slow, and some times the roll produced by it is not as close and tight as it should be. In order to eliminate the possibility of loose joints and to materially increase the speed of the operation, I provide for positively guiding the edge portions of the container parts during a major portion of the curling operation. Preferably, this is done by placing a guide in such position that the edge portions being joined are accurately guided in contact with a smooth metal surface after leaving the direct contact with the curling ring.

It is desirable to continue the guide so far around that the edges are directed completely into the joint, but this makes it difficult to remove the guide from the finished container because of interference of the joint itself. I therefore provide a segmental guide, the various portions of which may be moved out of contact with the completed joint. In the accompanying drawings, illustrating the present preferred embodiment of my invention,—

Figure 1 is a top plan view, partly broken away, of a closure mechanism embodying the invention;

Figure 2 is a vertical section taken on the line II—II of Figure 1;

Figure 3 is a view similar to Figure 2 but showing a different form of mechanism for a subsequent step in the operation;

Figure 4 is a view similar to Figure 3 but showing the parts in a different position;

Figure 5 is a perspective view of the guide segment used in the guide illustrated in Figures 1 and 2;

Figure 6 is a similar view showing a guide segment used in the guide illustrated in Figures 3 and 4; and

Figure 7 is a top plan view of a pressure ring used to control the segments.

In the manufacture of an ordinary paper can, there is usually provided a cylindrical body portion and a flanged cap adapted to fit into the end thereof. The flange projects outwardly and lies close to the wall of the cylindrical body so that there are two thicknesses of paper appearing at the end of the can at this stage of the operation. It has heretofore been customary to unite the container body and the cap by holding the parts in proper relation with one another and then pressing an annular plunger or curling ring against the upstanding edge portions, so as to roll them inwardly and form a joint. However, as above stated, this joint has frequently been found to be looser than is desirable and it is difficult or impossible to secure closures of high quality at high speeds.

Referring to Figure 2, there is illustrated a plug or base 2 adapted to receive a cylindrical can body 3, into the end of which is fitted a flanged head or cap 4. The cap 4 is provided with an outwardly projecting flange 5, and the container body 3 has an edge portion 6 lying alongside this flange. Initially, the flange 5 and the edge portion 6 both lie substantially parallel to the axis of the container.

The container body is clamped by jaws 7 which are relatively movable toward and away from the plug 2 and they hold the parts in place for the curling operation. The clamping of the jaws is effected by an anvil ring 8 secured to a head 9 which is movable up and down with respect to the plug 2. In Figure 2 the head is shown in its lowest position, but it will be understood that at the beginning of the operation the head 9 is raised and the anvil ring 8 is out of engagement with the jaws 7. When the head is lowered, the anvil ring is the first part thereof to come into operation, and therefore the container body is clamped by the jaws 7 with the parts 5 and 6 still upstanding. Hardened working portions are provided for minimizing wear between the anvil ring and the joint.

Slidably mounted in the head 9 is a rod

11 having a stop 12 for limiting its movement. When the head is in its topmost position the stop 12 occupies the dotted line position of Figure 2. Mounted on the lower end of the rod 11 is a plate 13 on which is supported a segmental guide. The guide comprises a plurality of segments 14 adapted to rest upon the plate 13 and held in assembled position by a metal ring 15 fitting in the groove 16 formed in the segments. Each of the segments is provided with an outwardly projecting lip 17 which forms a guide for the container parts as they are being rolled.

For purposes of description, it may be assumed that the head 9 has been lowered to a point where the plate 13 lies on the cap 4 of the container and with the segments 14 in the position shown in Figure 2, but with the head still materially above such position. The flange 5 and the edge portion 6 of the container body will at this time lie in the dotted line position D, ready for curling to form a joint.

It will be noted that with the parts in such position there is an annular space between the segmental guide and the jaws 7, and that the parts to be curled lie within this annulus. There is provided upon the head 9 a curling ring 18 which fills this annulus and is provided with a recessed working face 19 adapted to engage the upstanding container portions and roll them over to form a joint. As the head moves downwardly, this action takes place and a curled joint is formed as best shown in Figure 2.

It will be observed that the lips 17 on the guide segments 14 fit in under the rolled joint and serve as a positive guide for the joint portions after they leave the direct contact of the curling ring. It is found by actual experience that these guide portions are effective for forming a tight joint at high speeds, so that a material increase in production and quality is secured by their use.

With the joint completely formed as in Figure 2, it is next necessary to remove the container from the head, and to effect such removal the head is next moved upwardly. The curling ring 18 first moves away from the joint proper, but by reason of the fact that the rod 11 slides in the head there is no movement of the segmental guide or the plate 13. However, continued upward movement of the head 9 causes a button 20, which is fixed to the head, to engage inwardly projecting fingers 21 on the segments 14, tending to rotate each of the segments individually around the ring 15. A plate 22 lies on top of the several segments and is pressed against them by springs 23. With the parts in the position shown in Figure 2, the plate 22 engages the segments only near their outer edges, and as the button 20 moves upwardly the segments are rotated around the

ring 15 until their upper faces 24 lie against the plate 22. This movement is effective for withdrawing the lips 17 to such an extent that the segment, as a whole, may be removed from the container without disturbing the joint. The button 20 then lifts the entire segmental guide upwardly, further rotation of the parts around the ring being prevented by the sides of adjacent segments coming into contact with one another. Very shortly after this the stop 12 again reaches its dotted line position and the plate 13 is lifted upwardly. The anvil ring 8 then releases the jaws 7 and the container may be removed from the machine.

On the next operation a container body and a flanged cap are placed in the machine as before and the head 9 is moved downwardly. The jaws are first clamped against the container body, the plate 13 comes into contact with the cap, and then the collapsed segment comes into contact with the plate. Continued downward movement of the head causes the button 20 to engage the inclined faces 25 of the segments 14, causing rotation of the segments around the ring 15 and expanding the guide to the position shown in Figure 2, after which the joint is formed as heretofore described. The plate 13 effectually prevents marking of the paper cap by the guide segments.

It is frequently desirable to shape the rolled joint so that it has some cross-section other than that imparted to it by the rolling operation above described. In Figures 3 and 4 there is shown a form of apparatus wherein this shaping operation may be carried out. In this form of the invention the segments 14^a are provided with outwardly projecting arms 26 which engage the top of the anvil jaws 7^a. In this apparatus the lip 17 is dispensed with and a working face 27 is provided. The jaws 7^a are provided with overhung portions 28 which cooperate with the plug 2^a to form an enclosing space for the joint. The working faces 27 press against the rolled joint and shape it as desired. This is best shown in Fig. 4. In this form of the apparatus, the plate 13 is dispensed with as it is desired to press against the entire inner face of the joint. The button 20^a bears against the inner inclined faces 25^a of the segments 14^a and moves all of the segments outwardly to squeeze the joint tightly. If desired, some outward movement of the segments 14 in Figure 2 may be secured by suitably inclining the faces 25, but this is not so necessary as it is in the form shown in Figures 3 and 4.

This modified form of guide is shown in its collapsed position in Figure 3.

It will be understood that any desired shape may be obtained by changing the contour of the several parts as desired.

The segmental guide is preferably formed

by turning a one-piece guide out of solid metal and then cutting this into segments with a saw of the proper width to provide the required relative movement of the guide segments.

With the embodiment of the invention illustrated in Figures 3 and 4, the pressure is principally radial and a tight, hard joint is formed. The speed of the machine may be materially increased and the invention may be applied to either the formation of empty containers or to the closing of filled containers.

While I have illustrated the present preferred embodiment of my invention, it will be understood that it is not limited to the described apparatus, but it may be otherwise embodied within the scope of the following claims.

I claim:

1. Apparatus for making fibrous containers including means for curling together the edge portions of adjacent container parts, a collapsible guide adapted to lie between the roll of the joint and container proper and direct the edges into the roll, and means for collapsing the guide.

2. Apparatus for making fibrous containers having a body and a flanged cap in the end thereof, including means for rolling the edge portions of the cap and container body inwardly to unite the same, a collapsible guide for positively guiding the joint portions during a major portion of the rolling operation, and means for collapsing the guide.

3. Apparatus for making fibrous containers from a body having a flanged cap fitted into the end thereof, including means for supporting the container body and the cap, a curling ring for rolling together the edge portions of the body and the cap, and a segmental guide adapted to lie on the container cap and adjacent the container walls during the rolling operation to positively guide

the segments to collapse the guide.

4. A guide for container forming machines, comprising a plurality of guide segments, each having an outwardly extending guide portion, a holder for maintaining the segments in their relative positions, and means for rotating each segment about the holder to collapse the guide.

5. A guide for container making machines, comprising a plurality of segments uniting to form a guide of substantially the contour of a portion of the joint to be formed, and means for tilting the segments to rotate the guide portions out of contact with the joint.

6. A tool for container closing machines, comprising a plurality of segments adapted to apply substantially radial pressure to the joint of the container, a holder for the segments, and means for rotating each segment about the holder.

7. Apparatus for making fibrous containers including supporting means for a container, a head adapted for movement relative to the supporting means, means on the head for forming a joint, a movable guide, and means actuated by the relative movement of the head and the support for moving the guide.

8. Apparatus for making fibrous containers including a curling ring adapted to form a joint, and a segmental guide for guiding the container portions forming the joint after they pass out of contact with the curling ring.

9. Apparatus for making fibrous containers including a curling ring adapted to form a joint, a segmental guide for guiding the container portions forming the joint after they pass out of contact with the curling ring, and means for collapsing the guide.

In testimony whereof I have hereunto set my hand.

JAMES E. ANNEN.