July 24, 1956 J. G. O'NEIL 2,755,712

APPARATUS FOR OPERATING ON CONTAINER

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FIG 1

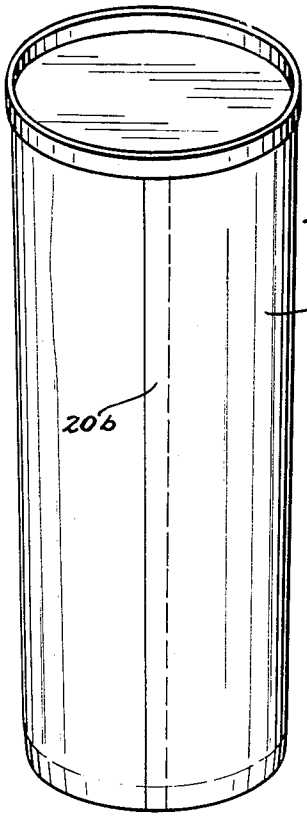


FIG 2

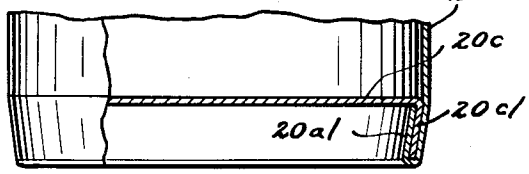
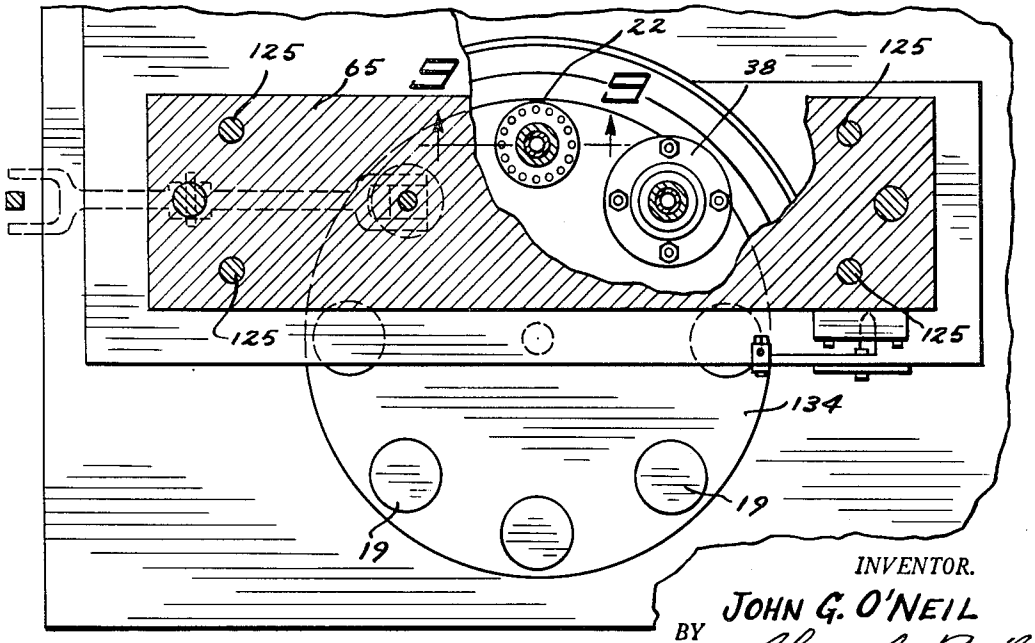


FIG 3



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FIG 4

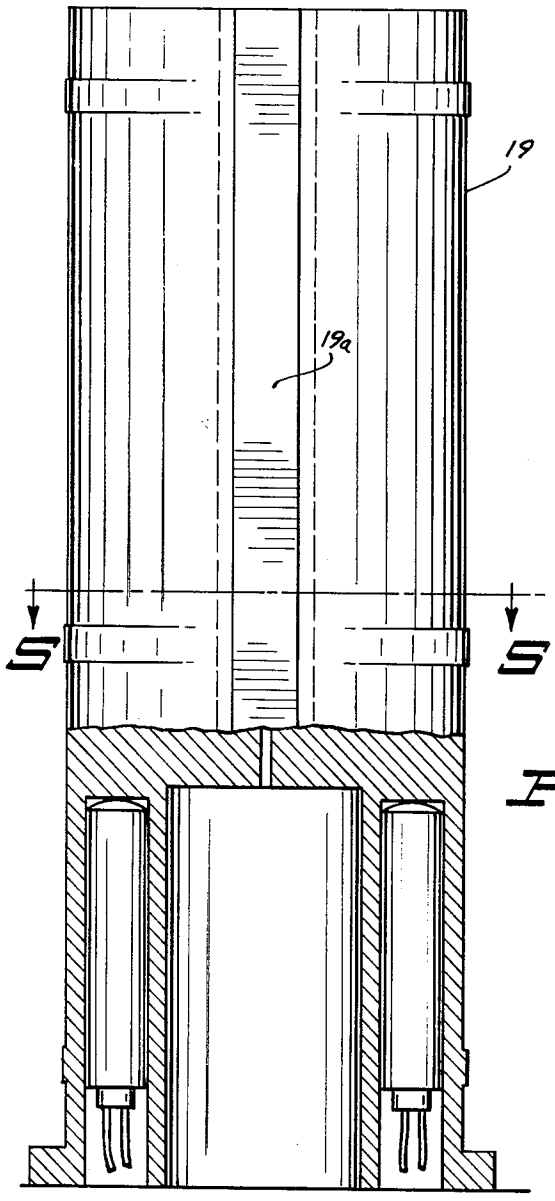


FIG 5

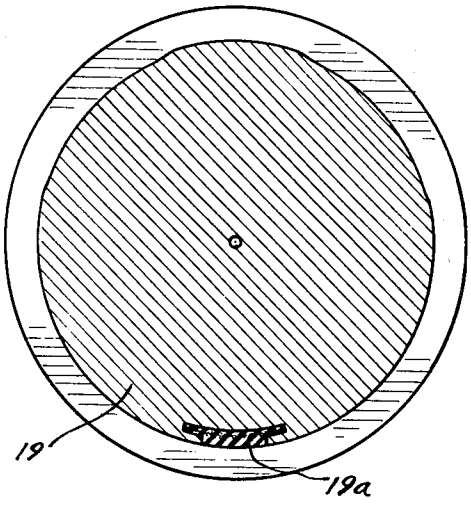


FIG 7

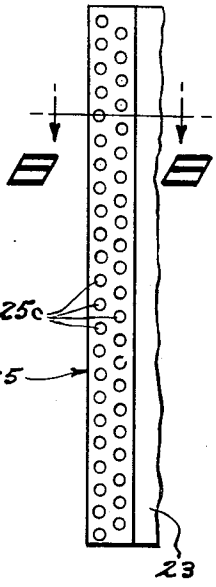
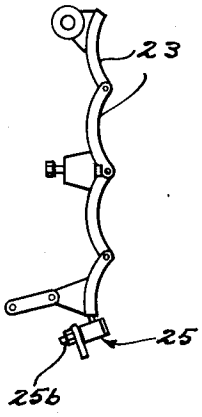


FIG 6



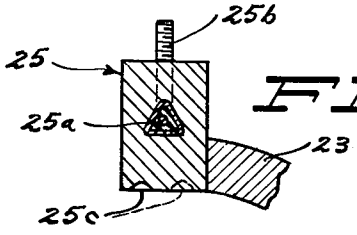


FIG 8

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FIG 9

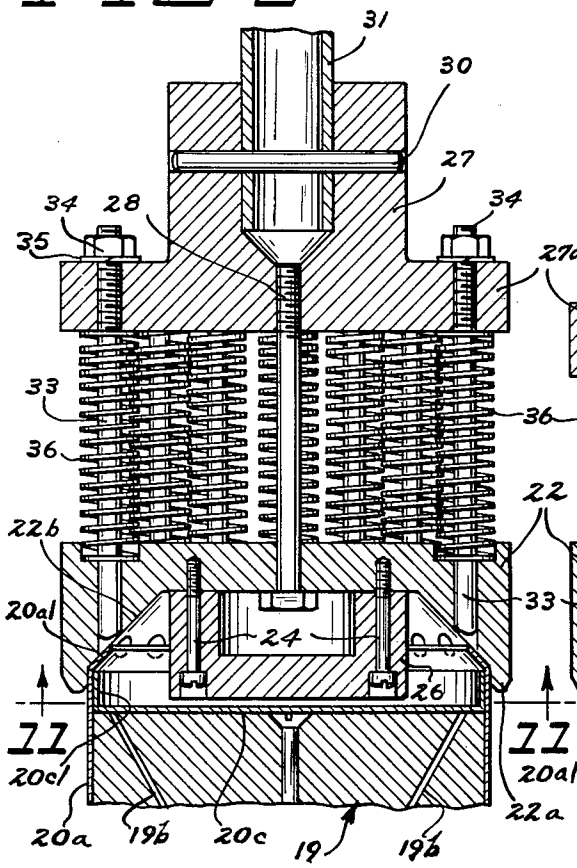
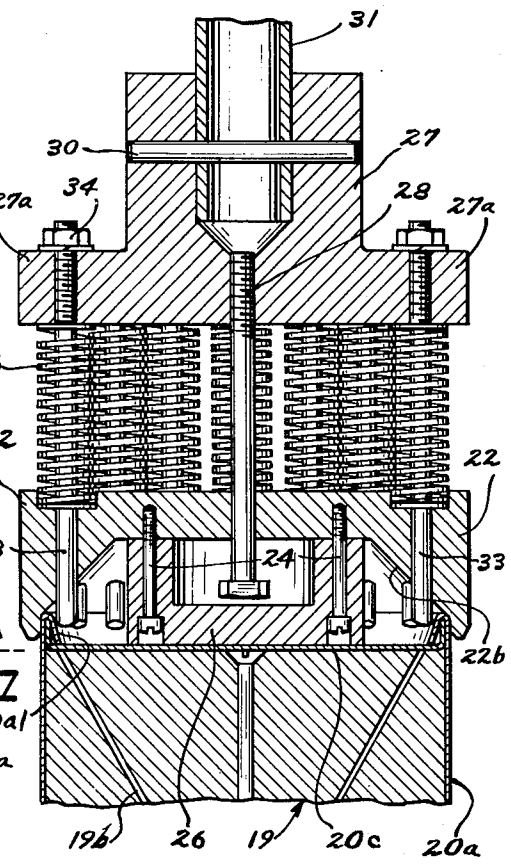


FIG 10



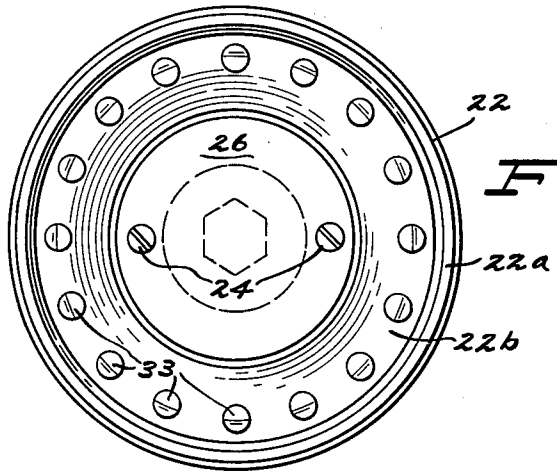


FIG 11

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2,755,712

APPARATUS FOR OPERATING ON CONTAINER

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Application November 30, 1951, Serial No. 259,184

2 Claims. (Cl. 93—39.2)

This invention relates to an apparatus for operating on a container, which container is made of sheet material which may be heavy paper or light cardboard. Said apparatus acts principally on the lower end portion of said container for closing and sealing the same.

It is an object of this invention to provide a novel apparatus for acting on the end portion of a container made of flexible material, such as heavy paper or light cardboard, said apparatus acting to close the end of said container and seal the same.

It is a further object of the invention to provide an apparatus for operating on a container made of sheet material such as heavy paper or light cardboard, and comprising a shell with a continuous periphery, a cup-shaped member having a peripheral flange disposed in and adjacent one end of said container, said apparatus comprising a mandrel adapted to fit in said shell, and a die for bending the end portion of said shell inwardly and downwardly over and around said flange.

It is also an object of this invention to provide such an apparatus as set forth in the preceding paragraph, said die having an upwardly and inwardly inclined surface for initially bending said portion of said shell inwardly and also having a plurality or multiplicity of pins movable downwardly for bending said end portion of said shell over and around said flange.

It is still another object of the invention to provide an apparatus for operating on a container of sheet material, which container has overlapping portions coated with a suitable lacquer or other suitable substance which will form an adhesive when heated, which apparatus includes a novel electrode for applying pressure and heat to said overlapping portions.

These and other objects and advantages of the invention will be fully set forth in the following description made in connection with the accompanying drawings in which like reference characters refer to similar parts throughout the several views and in which:

Fig. 1 is a perspective view of the finished container;

Fig. 2 is a vertical diametrical section of the bottom portion of said container;

Fig. 3 is a horizontal section taken through a portion of the machine involving this invention;

Fig. 4 is a view partly in front elevation and partly in central vertical section of a mandrel used;

Fig. 5 is a horizontal section taken on line 5—5 of Fig. 4 as indicated by the arrows;

Fig. 6 is a top plan view of a portion of a folding mechanism used;

Fig. 7 is a view in front elevation of an electrode used;

Fig. 8 is a horizontal section on line 8—8 of Fig. 7, as indicated by the arrows;

Fig. 9 is a vertical diametrical section through a die used for closing the bottom of said container;

Fig. 10 is a view similar to Fig. 9 showing the parts in different positions; and

Fig. 11 is a horizontal section taken on line 11—11 of Fig. 10, as indicated by the arrows.

Referring to the drawings, a container **20** is shown in Fig. 1 which comprises a body portion **20***a*, and in the embodiment of the invention illustrated this body portion is shown as cylindrical. Said body portion is made from strong flexible paper-like material, such as heavy paper or light cardboard, the same preferably having a smooth surface. Said body portion or shell **20***a* is made from a rectangular sheet which is rolled into cylindrical form with overlapping edge portions **20***b*. Both sides of the said sheet are coated with a thin plastic or lacquer, and while various lacquers or materials might be used, a lacquer formed of pigmented vinol has been found very satisfactory in practice. The overlapping edge portions of the body or shell **20***a* are pressed between heated dies and very tightly connected and sealed by the said lacquer which acts as an adhesive. Said lacquer forms a waterproof coating so that the shell **20***a* is thus waterproofed both on its interior and its exterior.

The rectangular sheet referred to is rolled about a mandrel **19**, shown in Figs. 5 and 6. Mandrel **19** is shown as having a strip **19***a* inserted therein which will be made of some metal forming a good conductor of heat, such as bronze or copper. A member **21** underlies strip **19***a* and is preferably made of a sheet of insulating material. The said sheet is rolled about mandrel **19** by a series of articulated or connected members **23**. The forming of the container about the mandrel is disclosed and claimed in applicant's co-pending application, S. N. 191,967, filed October 25, 1950, for "Method and Apparatus for Producing Container," now U. S. Patent No. 2,725,001. A plurality of said mandrels **19** are carried in spaced relation on a table **134** which is intermittently rotated to different positions, as disclosed in said co-pending application. Member **23** has at one end an electrode **25** which in the operation of the machine is brought opposite electrode **19***a*. Electrode **25** has extending longitudinally therethrough a heating element **25***a* which will be supplied with current from suitable conductors secured to a binding post **25***b*. The overlapped portions of the sheet overlie the electrode **19***a* and the electrode **25** is then brought against the other side of the overlapped portions. The heat applied causes the lacquer on the sheet to act as an adhesive and the overlapped portions are very tightly connected. It has been found in practice that much better results are secured with the electrode **25** by having the face thereof engaging the overlapped portions of the shell provided with a multiplicity of small depressions **25***c*. Any tendency of the electrode to stick to the shell is overcome. In practice the face of the electrode is about ⅝ of an inch in width and the diameter of the depressions **25***c* is approximately ⅛ of an inch. Electrode **25** is pressed against said overlapped portions with considerable pressure.

A bottom closure is provided for said container and this includes an inverted cup-shaped member **20***c* having a flat central portion and a peripheral flange **20***cl* extending downwardly substantially at right angles thereto. Member **20***c* and its flange fit snugly in the shell **20***a* and are disposed therein adjacent the bottom edge of said shell. Said shell and portion **20***c* are disposed upon a mandrel **19** shown in Figs. 9 and 10, which mandrel has a flat top surface engaged by the bottom of member **20***c* or the side thereof which is upward in the finished container. Mandrel **19** has a diameter which fits snugly in the body or shell **20***a*.

A die is used to bend the bottom portion of the shell **20***a* inwardly over flange **20***cl* and this comprises a member **22** having a cylindrical periphery and having a flange portion **22***a* at its bottom having an inner cylindrical surface. Member **22** has a surface **22***b* extending upwardly and inwardly at an angle of substantially 45 de-

grees from the cylindrical surface of flange 22*a*. A central cup-like member 26 is secured to the horizontal top surface of member 22, to which the surface 22*b* extends by a plurality of circumferentially spaced bolts 24 having countersunk heads. Member 22 is secured to a top member 27 by a central headed bolt 28 threaded into member 27. Member 27 has a central upstanding portion which is connected by a pin 30 to a tubular member 31 which carries the member 27. Pin 30 extends transversely and horizontally through member 31 and the central portion of member 27. Member 27 has a flange 27*a* in which are threaded a plurality of circumferentially spaced pins 33. Pins 33 are equipped with nuts 34 at their upper ends engaging washers 35, which in turn engage the top of flange 27*a*. Pins 33 extend downwardly into cylindrical holes or passages in member 22 and have their lower ends at their inner portions extending inwardly and upwardly at an angle of approximately 30 degrees to the horizontal, the outer lower portions of said pins being rounded. Compression coiled springs 36 surround the pins 33 respectively and engage the bottom of flange 27*a* at their upper ends and the bottom of cylindrical openings in the top of member 22 at their lower ends.

The shell 20*a* with the member 20*c* therein and wall of said shell extending some distance beyond flange 20*cl* is positioned on the mandrel, as shown in Fig. 9, and the members 27 and 22 are then moved downwardly. The projecting portion 20*al* of the shell is first engaged by the inclined surface 22*b* and is bent inwardly, as shown in Fig. 9. Member 26 engages the central portion of member 20*c* and upon further downward movement of member 27 against the compression of springs 36 the pins 33 are projected from member 22 and engage the bent over portion 20*al* and bend the same downwardly along the inside of the flange 20*cl*, as shown in Fig. 10. Said bent over portion 20*al* is moved into tight engagement with the top of the flange 20*cl*, as shown in Figs. 2 and 10.

It has been found that by using the circumferentially spaced pins a better operation is secured in bending over the end portion of the container and there is no drawing or crimping effect on the projecting portion of the container. Where an annular die is used for such a bending operation there is a crimping effect on the bent over portion and it is necessary to have a greater length in the portion of the container which extends beyond flange 20*cl*. By the method and apparatus just described a very smooth and uncrimped bent over portion is secured. The sealing of the shell and portion 20*c* is completed on the dies shown in Figs. 18 to 20 of said co-pending application.

The mandrel 19 is provided with passages 19*b* through which air under pressure is blown to remove the container from the mandrel.

In Fig. 3 of the drawings a view is shown somewhat similar to Fig. 2 in said co-pending application. The cross-head 65 is shown partly in section and partly broken away, which cross-head reciprocates vertically on the guides 125 and carries the upper die member. The present invention is used on the machine shown in said co-pending application and the die member comprising member 22 then replaces the member 180, as shown in Fig. 2 of said co-pending application. A crimping head 38 is shown in horizontal section in Fig. 3. This operates

on the container after the die 22. Said head forms no part of the present invention, the same being disclosed and claimed in said co-pending application.

From the above description it will be seen that I have provided a novel and very efficient apparatus for operating on a container of sheet material such as disclosed. The apparatus operates very quickly to move the parts of the container for closing and sealing the same. The container is tightly closed and sealed, and as stated, the machine or apparatus operates with great rapidity. The apparatus has been amply demonstrated in actual practice and found to be very successful and efficient and commercial production is under way.

It will of course be understood that various changes may be made in the form, details, arrangement and proportions of the parts, without departing from the scope of applicant's invention, which generally stated, consists in a device capable of carrying out the objects above set forth, in the parts and combinations of parts disclosed and defined in the appended claims.

What is claimed is:

1. An apparatus for operating on a container of sheet material having a shell with a continuous periphery and a cup-shaped member disposed in said shell adjacent one end thereof and forming a bottom for one end of said shell, said shell having an end extending vertically above said member, having in combination, a mandrel disposed in and fitting in said shell and having a flat top surface engaging the inside of said bottom, a die axially alined with said mandrel having a circumferential flange with an inner upwardly and inwardly inclined surface, a member above said die axially alined therewith and connected thereto for moving said die upwardly and downwardly, a plurality of comparatively small vertically disposed and circumferentially spaced separate pins having rounded lower ends, said pins being secured to said member and movable therewith, said pins extending through and being slidable in said die, and resilient means between said die and member whereby when said die moves toward said mandrel said upstanding wall of said container will be bent inwardly by said surface of said die and then will be engaged by said pins and moved to vertical position by said pins, said die being moved away from said member by said resilient means.

2. The structure set forth in claim 1, and a member carried by said die engaging the outer side of said bottom and holding the same against said mandrel.

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