June 2, 1942. A. C. HUSTON 2,284,740

DEVICE FOR CAPPING CONTAINERS

Filed Dec. 19, 1938

FIG. 1.

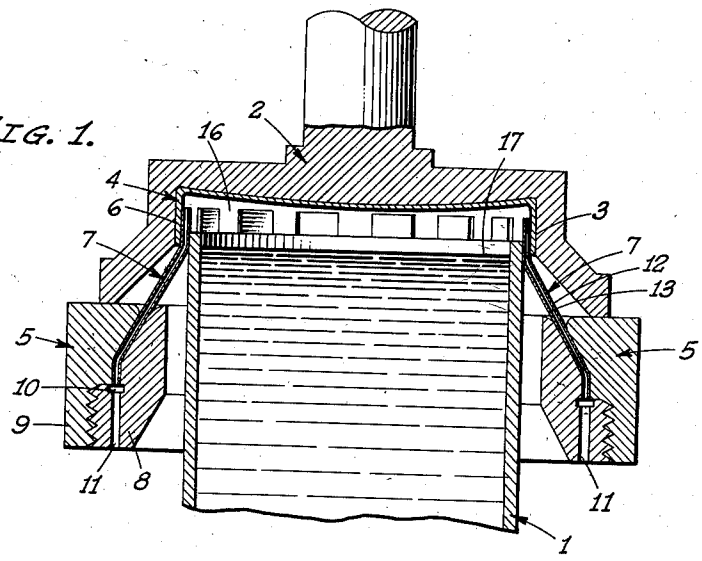


FIG. 3.

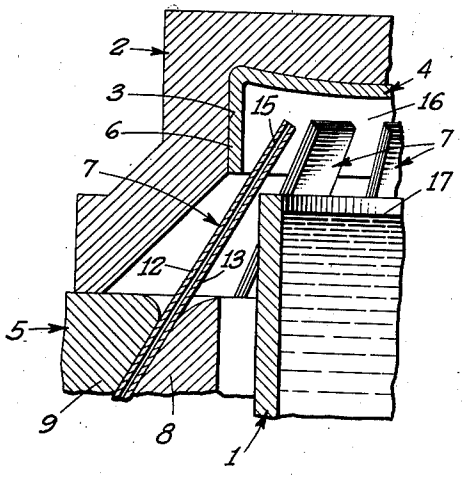


FIG. 2.

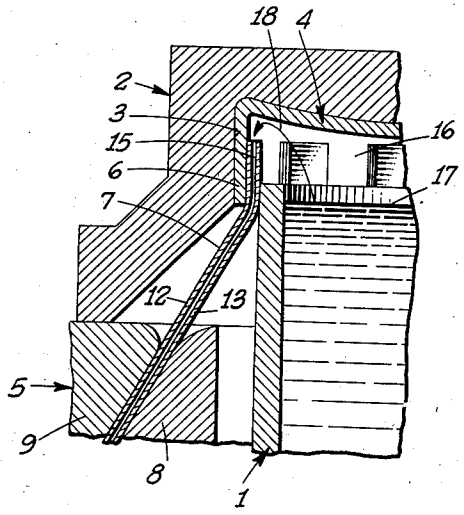
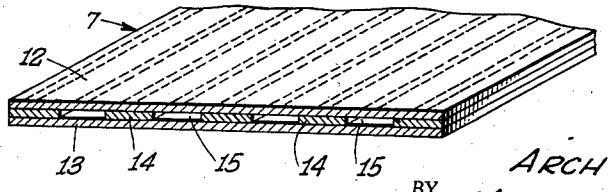


FIG. 4.



INVENTOR.
ARCH C. HUSTON
BY Harold W. Mattingly
ATTORNEY.

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DEVICE FOR CAPPING CONTAINERS

Arch C. Huston, Los Angeles, Calif.

Application December 19, 1938, Serial No. 246,630

7 Claims. (Cl. 226—80)

My invention relates to a device for capping containers and has particular reference to a device for applying cup-shaped paper or fiber caps to tubular paper containers.

The caps with which the device of my invention is particularly useful are ordinarily formed out of sheet fiber or paper by turning a lip or flange downwardly from the plane of the sheet so as to provide a flat circular cover portion and a downwardly depending lip portion extending substantially at right angles to the plane of the cover portion and being substantially tubular in form. In some of these caps the diameter of the cap at the edges of the recess is made so nearly equal to the diameter of the tube for which the cap is intended that it is extremely difficult to slide the cap over the tube without distorting or damaging the cap.

Inasmuch as the containers to which these caps are ordinarily applied may be used for the containing of liquids or finely divided powders, it is essential that the cap be secured to the tube with an essentially liquid-tight joint. This is normally accomplished by securing the cover portion of the cap to the end of the cylindrical tube by means of glue or similar adhesive which will completely seal the cap upon the tube.

Mechanisms have been devised for simplifying the placing of caps upon these containers and for deriving a liquid-tight joint between the cap and the container by providing a guiding device or "spoon" for guiding the cap into place on the container top. It has been found, however, that these mechanisms while guiding the cap into place on top of the container do not allow the escape of air which is trapped between the cap and the container during the capping operation so that unless the cap is held in position until the glue or other adhesive hardens, the pressure of the trapped air within the container will force the cap upwardly and cause a faulty sealing between the cap and the container and cause the cap to be disposed at an unsightly angle.

Attempts have been made heretofore to reduce this effect to a minimum by reducing the amount of air trapped in the container. It has been found, however, that even a minute amount of trapped air will cause the cap to rise slightly but sufficiently to break the adhesive seal between the cap and the container and destroy that which was intended to be a liquid-tight joint.

It is therefore an object of my invention to provide a capping device for applying paper or fiber caps to tubular shaped containers which includes a guide means for guiding the cap into place on the container, together with a means for allowing the escape of air trapped in the container during the capping operation.

It is also an object of my invention to provide a capping device of the character set forth in the preceding paragraph which may be used to acquire a liquid-tight seal between the cap and the container by relieving the air pressure within the container tending to destroy such seal.

It is an additional object of my invention to provide a capping device of the character set forth in the preceding paragraphs in which horn or finger portions of a guiding member are provided with conduits for communicating between the space within the container and the atmosphere during a capping operation to allow the escape of air trapped within the container during said operation.

It is a further object of my invention to provide a capping device of the character set forth in the preceding paragraphs which may be employed to cap containers and seal the cap in place by applying an adhesive between the lip portions of the cap and the side walls of the container in contradistinction to current practice of applying an adhesive between the cover portion of the cap and the end of the container and by this means derive an improved liquid-tight seal.

Other objects and advantages of my invention will be apparent from a study of the following specifications, read in connection with the accompanying drawing, wherein:

Fig. 1 is a fragmentary vertical section illustrating the guiding member of my invention in operative relationship with a container and a cap applying device;

Fig. 2 is an enlarged fragmentary view similar to Fig. 1 but illustrating the details of construction of the guiding member of my invention and the manner in which it operates to allow the escape of air from within the container during a capping operation;

Fig. 3 is a view similar to Fig. 2 but showing the relationship of the parts at the initiation of a capping operation; and

Fig. 4 is a fragmentary perspective view partly in section to show additional details of construction of the finger portions of the guiding member of my invention.

Referring to the drawing, I have illustrated in Fig. 1 the preferred embodiment of my invention as applied to a type of capping device which may be similar in construction to the capping device illustrated in my aforementioned co-pending ap-

plication, Serial No. 233,233 and which may include a base member (not shown) supporting a tubular paper container 1 in an upright position, and a capping member 2 which is provided with a flared recess 3 into which is inserted a paper or fiber cap 4 for the container 1. A guiding member 5 is provided which cooperates with the capping member 2 and the cap 4 to guide a downwardly depending lip portion 6 of the cap 4 over the upper edges of the container 1 as the capping member 2 is forced downwardly to move the cap 4 into place.

The present invention resides in the construction of the guiding member 5 which may accordingly include a plurality of extremely thin and flexible spring finger members 7 secured to an inner ring 8 by means of an outer ring 9 adapted to clamp the plurality of spring fingers 7 between the rings 8 and 9. Spring fingers 7 are clamped in a position such that they extend upwardly and slope inwardly toward the axis of the container 1 to provide a truncated cone-shaped portion upon which the cap 4 may rest. The spring fingers 7 operate to force the lip portion 6 of the cap outwardly against the side walls of the capping member 2 as the cap is forced downwardly toward the container 1 and guide this lip portion exteriorly of the container.

In order that air which is trapped within the container 1 during this capping operation may be conducted to the atmosphere, I prefer to construct the spring fingers 7 in such a manner that a conduit is provided within each of the fingers. Air may be conducted from the lower ends of the spring fingers 7 to the atmosphere through an annular recess or passage 10 which is provided at the junction between the ring portions 8 and 9 and arranged to communicate between the conduits formed in the spring fingers 7 and one or more bleeder ports 11 extending between the atmosphere and the annular recess 10.

The spring fingers 7 are preferably formed of extremely thin and flexible material so that they may flex as they move from their position, as illustrated in Fig. 3, at the start of the capping operation to the positions illustrated in Figs. 1 and 2 as the capping operation approaches completion without spacing the lip 6 an appreciable distance from the container 1. In order that the spring fingers 7 may be made extremely thin and flexible and yet include within them conduits for conducting the air within the container to the atmosphere, I prefer to form the spring fingers 7 of an upper sheet 12 and a lower sheet 13 spaced apart by a plurality of spacer members 14, one such arrangement being illustrated in Fig. 4.

The spacer members 14 extend longitudinally of the spring fingers 7 and are spaced from each other so as to provide one or more conduits 15 between the upper and lower plates 12 and 13 and between adjacent spacer members 14. The upper and lower plates 12 and 13 and the spacer member 14 are preferably manufactured from extremely thin material which, if of metal, may be what is commonly known as "shim-stock" of a thickness from .001 of an inch to .003 of an inch so that the thickness of the assembled finger 7 need not be greater than .01 of an inch and may be as small as .003 of an inch.

The upper and lower sheet members 12 and 13 and the various spacing members 14 may be secured to each other by means of a suitable adhesive interposed between adjoining surfaces of these members or, if desired, these members may be secured to each other in other suitable manners such as by soldering or by spot-welding. It may be found desirable to secure these members to each other only at the upper ends thereof and to depend upon the securing action provided by the clamping rings 8 and 9 to maintain the lower ends in their proper relative locations.

The manner in which the device operates to relieve the air pressure within the container during a capping operation may be readily observed in Fig. 2 which illustrates the position of the various members as the capping operation nears completion. At this stage in the capping operation a considerable amount of air is trapped within a space 16 between the cap 4 and an upper surface 17 of a liquid or other material contained by the container 1. As the cap 4 is moved downwardly over the container 1 during the capping operation the air space 16 becomes progressively smaller so as to compress the air within this air space. This increase in pressure causes air to flow in the direction indicated by arrow 18 in Fig. 2 and downwardly through the multiplicity of conduits 15 provided by the plurality of spring fingers 7 and to be discharged through the recess 10 and ports 11.

During this capping operation, glue or other suitable adhesive may be applied between the upper portion of the sides of the container 1 and the inner surfaces of the lip 6 to secure the cap in place. It will be observed that this adhesive prevents the escape of air between the lip 6 and the side of the container 1 so that all of the air must be conducted through the conduits 15. When the spring fingers are removed at the end of the capping operation the fluid adhesive will then flow to fill the space left by each of the fingers 7 and complete the sealing of the cap to the container in a water-tight fashion.

It will be observed that had the air within the space 16 not been removed by the method just described, the pressure of said air resulting from the capping operation would immediately force the cap upwardly as soon as the capping member 2 was removed from the cap 4 and thus destroy the intended seal, and the neat appearance of the capped container.

It will be observed therefore that I have provided an improved type of capping device including a guiding member for guiding a cap into place upon a tubular container which is so constructed as to conduct the air which is trapped within the container to the atmosphere so as to allow a permanent and completely liquid-tight seal to be made between the cap and the container.

While I have shown and described the preferred embodiment of my invention, I do not desire to be limited to any of the details of construction shown or described herein, except as defined in the appended claims.

I claim:

1. In a device for guiding cup-shaped caps having a depending lip portion into place upon a tubular container with said lip encompassing one end thereof, the combination of: a supporting member; a spring finger carried by said supporting member in a position to be interposed between said lip portion and one end of said container; and a conduit enclosed within said finger for conducting to the atmosphere air trapped within said container when said cap is guided into place thereon.

2. In a device for guiding cup-shaped caps having a depending lip portion into place upon

a tubular container with said lip encompossing one end thereof, the combination of: a supporting member for encircling said container and arranged to be moved downwardly thereover; a plurality of spring fingers carried by said supporting member in a position to extend above said container and interiorly of the lip of said cap; and a conduit enclosed within each of said fingers for conducting to the atmosphere air trapped within the container when said cap is guided into place thereon.

3. In a device for guiding cup-shaped caps having a depending lip portion into place upon a tubular container with said lip encompassing one end thereof, the combination of: a supporting member; a plurality of spring fingers carried by said supporting member in a position to be interposed between said lip portion and one end of said container; and a plurality of conduits enclosed within each of said fingers for conducting to the atmosphere air trapped within said container when said cap is guided into place thereon.

4. In a device for guiding cup-shaped caps having a depending lip portion into place upon a tubular container with said lip encompassing one end thereof, the combination of: a supporting member; a plurality of spring fingers carried by said supporting member in a position to be interposed between said lip portion and one end of said container, each of said spring fingers including an upper and a lower skin member with a plurality of longitudinally extending spacer members interposed between said skin members and spaced from each other to define a plurality of conduits through which air may be conducted from within the container to the atmosphere.

5. In a device for guiding cup-shaped caps having a depending lip portion into place upon a tubular container with said lip encompassing one end thereof, the combination of: a supporting member; a plurality of spring fingers carried by said supporting member in a position to be interposed between said lip portion and one end of said container, each of said spring fingers including an upper and a lower skin member of spring metal having a thickness not exceeding 0.003 inch with a plurality of longitudinally extending spacer members also of spring metal having a thickness not exceeding 0.003 inch interposed between said skin members and spaced from each other to define a plurality of conduits through which air may be conducted from within the container to the atmosphere.

6. In a device for guiding cup-shaped caps having a depending lip portion into place upon a tubular container with said lip encompassing one end thereof, the combination of: a pair of inter-engageable supporting members, at least one of said members having a recess formed therein in such position as to define a passage communicating with the atmosphere when said members are inter-engaged; a plurality of spring fingers each having a longitudinally extending finger conduit formed therein; and means carried by each of said supporting members and actuated by engagement of said members to secure said spring fingers in a position to be interposed between said lip portion and one end of said container and with said finger conduits communicating with said passage, whereby air trapped within said container when said cap is guided into place thereon is conveyed through said finger conduits and said passage to the atmosphere.

7. In a device for guiding cup-shaped caps having a depending lip portion into place upon a tubular container with said lip encompassing one end thereof, the combination of: a pair of inter-engageable supporting members, at least one of said members having a recess formed therein in such position as to define a passage communicating with the atmosphere when said members are inter-engaged; a plurality of spring fingers each of which includes an upper and a lower skin member with a plurality of longitudinally extending spacer members interposed between said skin members and spaced from each other to define a plurality of finger conduits through which air may be conducted; and means carried by each of said supporting members and actuated by engagement of said members to secure said spring fingers in a position to be interposed between said lip portion and one end of said container and with said finger conduits communicating with said passage, whereby air discharged through said finger conduits is conducted to the atmosphere.

ARCH C. HUSTON.