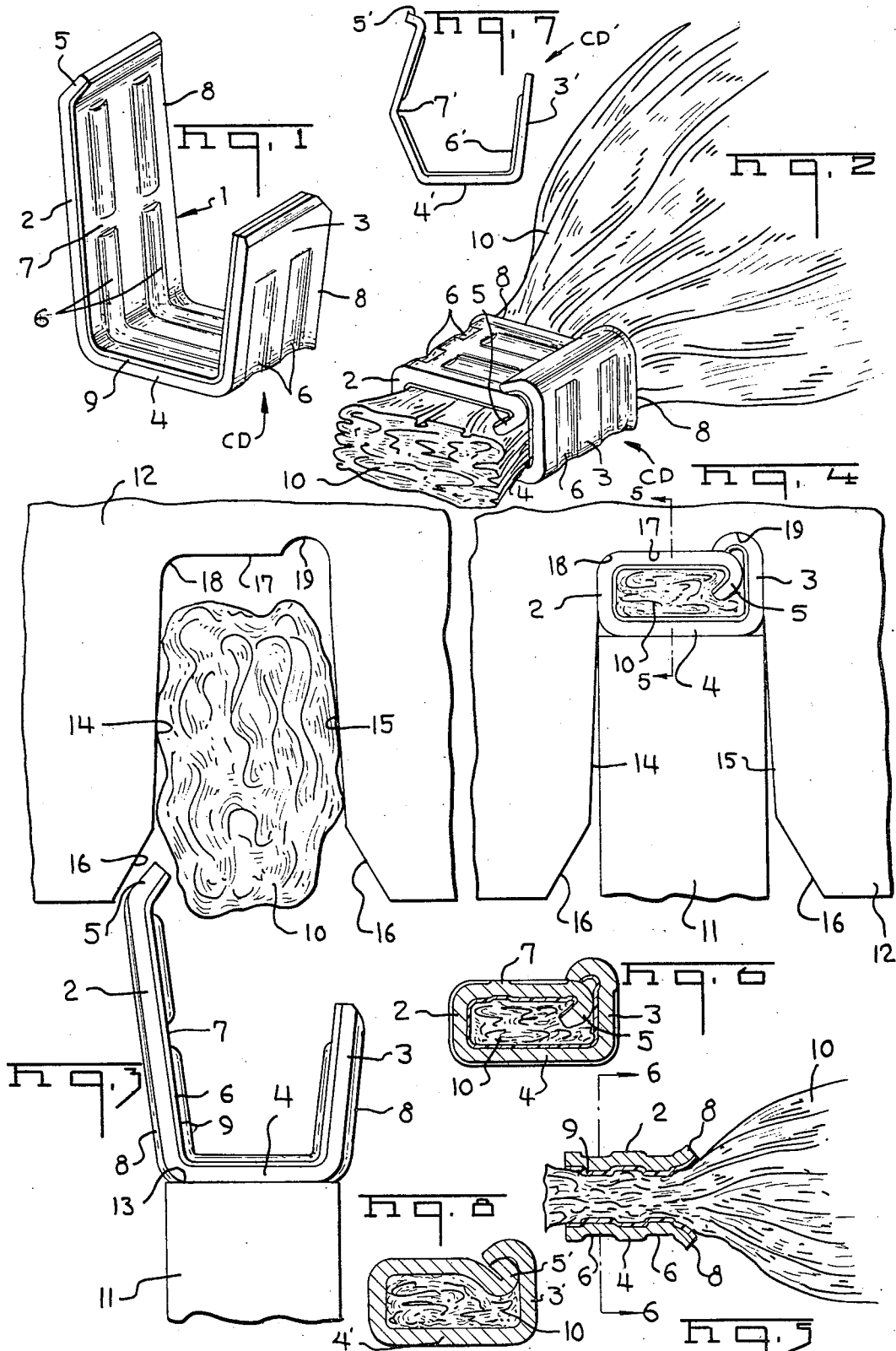


March 31, 1970

E. L. SEITZ, JR., ET AL
METHOD FOR APPLYING A CLOSURE DEVICE TO AN END OF A
FLEXIBLE CONTAINER
Original Filed Aug. 22, 1966

3,503,119



1

2

3,503,119

METHOD FOR APPLYING A CLOSURE DEVICE TO AN END OF A FLEXIBLE CONTAINER

Edward Lamonte Seitz, Jr., Petersburg, and Allen Edwin Travis, Harrisburg, Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Original application Aug. 22, 1966, Ser. No. 574,091, now Patent No. 3,369,277, dated Feb. 20, 1968. Divided and this application Dec. 22, 1967, Ser. No. 692,866

Int. Cl. B21d 39/00; B23p 11/00

U.S. Cl. 29—509

3 Claims

ABSTRACT OF THE DISCLOSURE

A method for applying a U-shaped closure device to an end of a flexible container comprises bending a long leg of the U-shaped closure device after the end of the flexible container has been placed in the closure device until an outer section thereof is substantially parallel with the bight of the closure device, and bending a free end of a short leg of the closure device into an arcuate configuration with the free end being in engagement with the outer section of the long leg.

CROSS REFERENCE TO A RELATED APPLICATION

This application is a division of U.S. application, Ser. No. 574,091, filed Aug. 22, 1966, now Patent No. 3,369,277.

This invention relates to a closure device and more particularly to a closure device for closing an end of a flexible plastic container or a container having the characteristics of flexible plastic.

The use of flexible plastic containers to carry material therein such as, for example, food, motor oil, explosives, etc. in an air-tight and water-tight environment is on the increase and, to all intents and purposes, is likely to keep on increasing. The plastic containers generally take the form of a bag filled with the desired material and having one end closed or of a continuous supply flexible container material having a desired length fed to station whereat one end of the desired length is closed to form a container member, material is placed within the container member and the other end of the container member is closed. Other ways of supplying containers of flexible material, filling them and closing them are known. Such containers are very economical, easy to ship and readily disposable.

Closing the end or ends of the flexible containers to effect air and water-tight closures is an important part in using these containers, and it has to be done quickly, easily, cheaply and effectively. Many types of closure members used heretofore have not been satisfactory since they frequently do not provide an effective seal even though they can be applied quickly, easily and cheaply.

An object of the invention is to provide a closure device to close the ends of flexible containers in a quick, easy, cheap and effective manner.

Another object is the provision of a closure member that is crimpable onto ends of flexible containers.

A further object is to provide a closure member having inwardly-directed ribs defining spaced sealing areas.

An additional object is the provision of a closure member having inwardly-directed ribs of different heights.

Still a further object is to provide a closure member having a plastic coating on the surface to engage the ends of flexible containers to be sealed.

A still additional object is the provision of a closure member having locking means to lock the closure member in place.

Other objects and attainments of the present invention will become apparent to those skilled in the art upon a reading of the following detailed description when taken in conjunction with the drawings in which there are shown and described illustrative embodiments of the invention; it is to be understood, however, that these embodiments are not intended to be exhaustive nor limiting of the invention but are given for purposes of illustration in order that others skilled in the art may fully understand the invention and the principles thereof and the manner of applying it in practical use so that they may modify it in various forms, each as may be best suited to the conditions of a particular use.

The foregoing and other objects are achieved by a preferred embodiment of a closure member of flexible but stiff metal comprising a body member having a first leg, a second leg and a bight connecting the legs together as a unitary member, the first leg having a length about twice that of the second leg, a free end of the first leg having a bent area, and inwardly-directed ribs means extending along substantially the length of the body member.

In the drawing:

FIGURE 1 is a perspective view of a closure device; FIGURE 2 is a perspective view of a closure device of FIGURE 1 in position on the end of a flexible container member;

FIGURE 3 is a front elevational view of the members to effect the closure of the closure device onto the end of the container member;

FIGURE 4 illustrates the crimping dies in a closed position with the closure device crimped onto the end of the container member;

FIGURE 5 is a view taken along lines 5—5 of FIGURE 4;

FIGURE 6 is a view taken along lines 6—6 of FIGURE 5;

FIGURE 7 is a perspective view of an alternative embodiment of the closure device; and

FIGURE 8 is a cross-sectional view of the closure device of FIGURE 7 in a crimped position onto the end of a container member.

Turning now to the drawings and especially FIGURES 1 through 6, a closure device CD is illustrated which comprises a body member 1 having a first leg 2, a second leg 3 and a bight or base 4 connecting the legs together as a unitary structure. As can be discerned, leg 2 is equal to or about twice the length of leg 3. The free end of leg 2 has a bent area 5 which is bent inwardly at an angle of from 45° to 90° with respect to leg 2. Inwardly-directed ribs 6 extend substantially along the length of body member 1 in a spaced and parallel manner. Ribs 6 terminate inwardly from the free end of leg 3 and at bent area 5 in leg 2. Also, ribs 6 are interrupted at an area 7 in leg 2. The height of one of the ribs is slightly larger than the height of the other of the ribs. Section 8 in legs 2 and 3 and bight 4 is bent in an outward manner. The highest rib is preferably located adjacent sections 8. As can be seen from FIGURE 3, legs 2 and 3 form two obtuse angles with respect to bight 4 prior to being crimped onto the end of a container member.

The closure device is susceptible to mass production by automatic machinery and is conveniently formed by shaping a sheet metal blank or strip of a suitable metal such as copper, brass, bronze, aluminum or the like in successive forming steps. The metal is sufficiently hard and resilient to impart thereto a spring-like character yet it is sufficiently malleable to permit crimping of the closure device onto the end of a flexible container.

A coating or liner 9 is applied to the inner surface of closure device CD and this coating can be polyvinyl chloride, Teflon, polypropylene, polyethylene or any other

suitable material that will accomplish the desired result. Coating 9 can be applied in any conventional manner such as by spraying, gluing, vacuum deposition or the like. The coating is preferably applied to the metal before the metal is subjected to the stamping operation to form the closure device in strip form.

As shown in FIGURE 2, a flexible container 10 of any suitable plastic such as, for example, polyethylene, polyvinyl chloride or other synthetic material or natural flexible material, such as intestine, weasand, or paper, is closed and sealed by gathering the material comprising the neck of the flexible container into a tight compression and surrounding it with closure device OD which is deformed into position on the end of the flexible container by die members 11 and 12 illustrated in FIGURES 3 and 4 to deform the closure device into a substantially rectangular configuration in cross section.

Die member 11 comprises flat surface 13 on which bight 4 rests as illustrated in FIGURE 3. Die member 12 comprises side surfaces 14 and 15. Side surfaces 14 and 15 merge into beveled surfaces 16 at one end. An inner flat surface 17 is connected to side surfaces 14 and 15 via arcuate surfaces 18 and 19. Arcuate surface 18 merely connects side surface 14 with flat surface 17 as a radius therebetween whereas arcuate surface 19 is radiused inwardly beyond flat surface 17. Side surfaces 14 and 15 and surface 17 form three sides of a rectangle while flat surface 13 forms the fourth side of the rectangle. Side surfaces 14 and 15 from surfaces 16 to arcuate surfaces 17 and 18 are slightly tapered.

In operation, a closure device CD is placed on flat surface 13 of die member 11 and the end of container 10 is introduced within the closure device. Die member 12 is moved toward die member 11 and bent area 5 of leg 2 engages beveled surfaces 16 which moves leg 2 inwardly and as leg 2 moves along side surface 14, this tapered side surface moves leg 2 in a further inward direction. As leg 2 is moving along side surface 14, leg 3 engages beveled surfaces 16 and begins to move along side surface 15 which moves leg 3 inwardly. As leg 3 begins to move into engagement with side surface 15, bent area 5 begins to engage arcuate surface 18 and, when bent area 5 moves into engagement with inner front surface 17, leg 2 begins to bend about area 7. The upper part of leg 2 then begins to move along flat surface 17 which surface, as die member 12 continues in its movement toward die member 11, bends leg member 2 toward leg member 3 with the end of container 10 being compressed within the collapsing closure device. Flat surface 17 moves leg 2 to an almost parallel position with respect to bight 4 and bent area 5 is disposed adjacent leg 3 whereupon arcuate surface 19 begins to bend the free end of leg 3 toward leg 2, and, as die 12 moves to its final crimp height position tightly compressing the end of container 10 within the deformed closure device, leg 3 engages bent area 5 bending the bent area inwardly and the free end of leg 3 is bent into an arcuate configuration conforming to that of arcuate surface 19 and the free end of leg 3 is brought into engagement with leg 2 to apply continuous pressure thereto.

Inwardly-directed ribs 6 apply pressure sealing points at spaced locations instead of over the entire area or length of the closure device. As the crimping pressure on the end of the container is building up to its final amount, the crimping pressure is greatest within the areas delimited by ribs 6 instead of over the entire area of the closure device and the parts of the container within the areas of ribs 6 extrude longitudinally on each side of ribs 6. Thus, the areas on each side of ribs 6 define extrusion areas into which a crimped portion of the container collect to permit the crimping pressure to be properly distributed along the closure device to effect an air-tight and water-tight seal therealong.

Coating 9 also serves to distribute crimping pressure since the coating acts as a cushion and will flow out from

under the highly compressed areas which are within the areas of the ribs into the extrusion areas resulting in a redistribution and equalization of the compression throughout the closure device.

Sections 8 form a bell mouth after the closure device has been crimped into position on the end of the container to prevent a sharp edge on the closure device from cutting the container. Since the ribs are of different heights, a tapered crimp is obtained which provides areas of progressively increased compression to effect a better seal. Since ribs 6 provide sealing at spaced points over small areas, effective crimping is obtained by less crimping pressure because sealing does not have to be along the entire length of the closure device. The reduced crimping pressure does not work harden the metal of the closure device and the wear and tear on the crimping dies and machinery to operate the crimping dies is substantially reduced.

The substantially rectangular cross-section of the closure device in its crimped condition provides a more satisfactory sealing member than an arcuate surface. Any attempt of one of the corners or surfaces to withdraw or springback will cause a substantial tightening on the corresponding sides.

FIGURES 7 and 8 illustrate another embodiment of the invention which illustrates a closure device CD' similar in configuration to closure device CD except that bent area 5' is bent in an outward direction at substantially right angles with respect to leg 2', and leg 2' is also present at area 7' in which no part or ribs 6' are located so that the inner part of leg 2' from bight 4' to area 7' is bent in a direction away from leg 3' while the upper part of leg 2' is bent inwardly toward leg 3'. The inner surface of closure device CD' may have a coating in the same manner as closure device CD.

Closure device CD' is crimped onto the end flexible container by die members 11 and 12 in the same manner as closure device CD except that the free end of leg 3' is curved around bent area 5' to secure the ends of the closure device together by overlapping of the free ends of the legs thereby preventing it from being removed from the end of container 10 except by using a tool to free leg 3' from bent area 5'. The reason that leg 2' is present is to permit outwardly-bent area 5' to clear the beveled surfaces 16 of die member 12.

Die member 11 has been disclosed as stationary while die member 12 moves relative thereto, however it is obvious that the opposite action therebetween can be performed to obtain the same end result. A complete disclosure of the machine for applying the closure devices to the ends of containers is set forth in U.S. Patent application, Ser. No. 574,090 filed Aug. 22, 1966. The coating may or may not be used on the closure devices and this depends upon the application to be performed and the type of material to be used.

As can be discerned, there has been disclosed a unique and novel closure device to close the ends of flexible containers and to provide an air-tight and water-tight seal if the material of the flexible container can provide such.

It will, therefore, be appreciated that the aforementioned and other desirable objects have been achieved; however, it should be emphasized that the particular embodiments of the invention, which are shown and described herein, are intended as merely illustrative and not as restrictive of the invention.

The invention is claimed in accordance with the following:

1. A method of applying a metal closure device to an end of a flexible container, said closure device having a base and legs with one leg being about twice longer than the other and with parallel inwardly-directed ribs extending along said base and substantially along the length of said legs and transverse to a longitudinal axis of the closure device, a free end of the longer leg having a bent area, said method comprising the steps of placing the end of the

5

flexible container within the closure device, bending the long leg at an area opposite a free end of the short leg so that a first section of the long leg is disposed substantially parallel to the short leg and a second section is disposed parallel to the base, and bending said free end of said short leg into an arcuate configuration with this free end being bent into engagement with the second section of said long leg while reversely bending said free end of said long leg by engagement with said short leg so that said closure device surrounds an area of the end of said flexible container under compression and areas within said inwardly-directed ribs are under higher compression.

2. A method according to claim 1 wherein the free end of said long leg is bent inwardly.

3. A method according to claim 1 wherein the free end of said long leg is bent outwardly and said arcuately-bent free end of said short leg engages the outwardly-bent free end to lock the legs together.

5

10

15

6

References Cited

UNITED STATES PATENTS

| | | | | |
|-----------|---------|---------------|-------|-------------|
| 984,892 | 2/1911 | Dutcher | ----- | 29—243.57 |
| 1,836,497 | 12/1931 | Phelps et al. | ----- | 29—243.56 X |
| 2,886,816 | 5/1959 | Hill | ----- | 29—243.57 X |
| 2,972,791 | 2/1961 | Kelem. | | |
| 3,266,138 | 8/1966 | Tipper | ----- | 29—509 |

FOREIGN PATENTS

920,335 3/1963 Great Britain.

CHARLIE T. MOON, Primary Examiner

U.S. Cl. X.R.

24—30.5; 29—243.56, 243.57, 515