March 7, 1944. F. LOBL 2,343,512

ICE BAG AND CLOSURE THEREFOR

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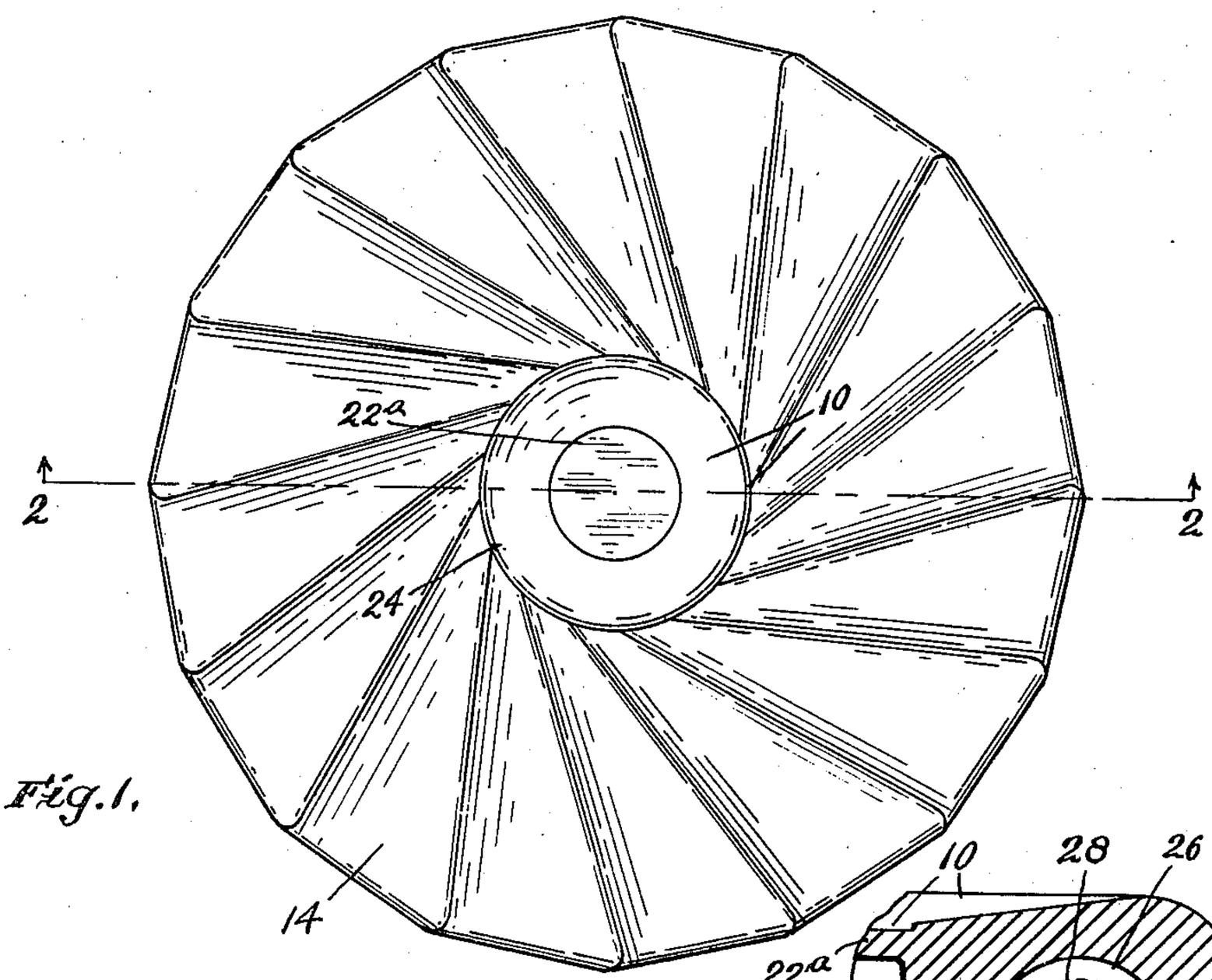

Fig. 1.

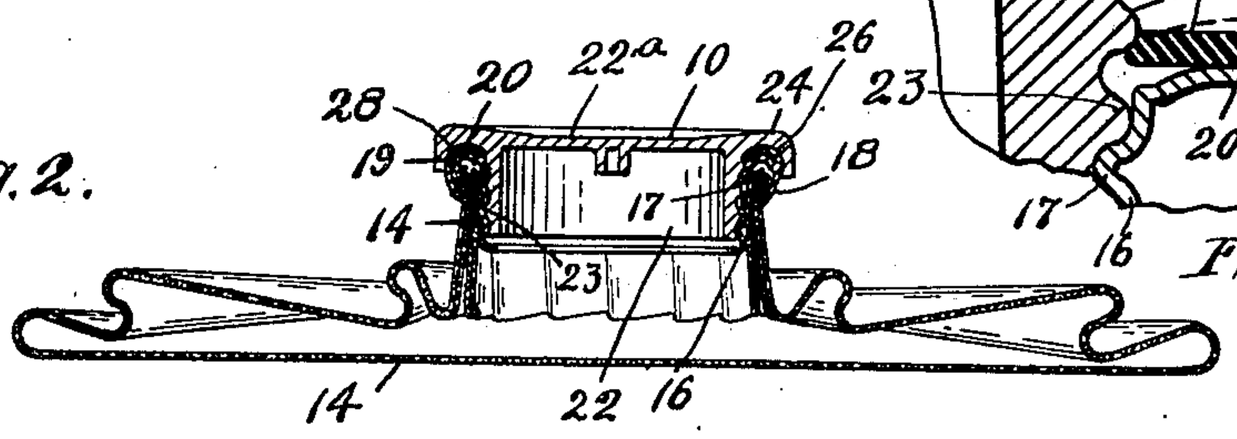

Fig. 2.

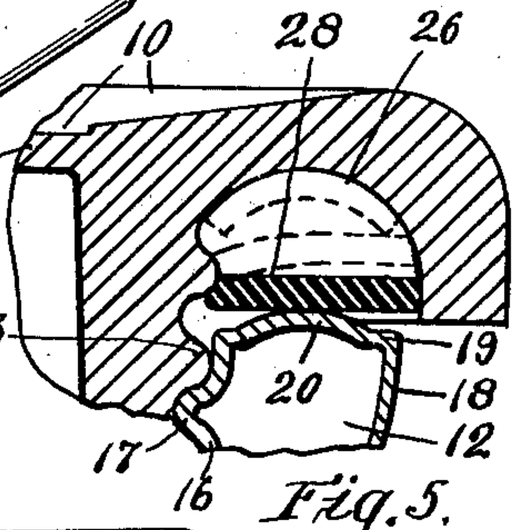

Fig. 5.

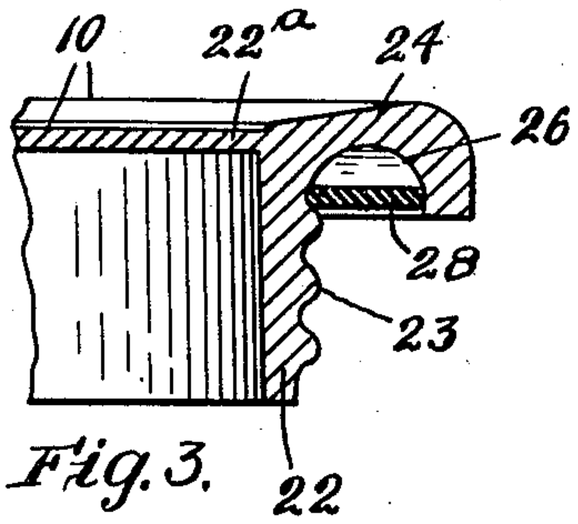

Fig. 3.

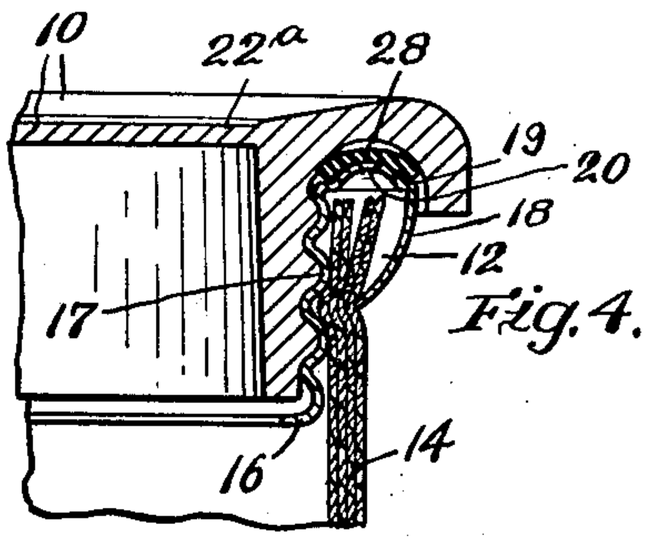

Fig. 4.

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ICE BAG AND CLOSURE THEREFOR

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Application March 17, 1942, Serial No. 434,999

2 Claims. (Cl. 150—8)

The present invention relates generally to receptacles adapted to contain ice, hot water, or other fluids, and as illustrated herein, relates more particularly to a closure construction for the filling opening of a waterproof bag or other receptacle containing crushed ice.

Ice bags are in common use in hospitals and other places for the care and treatment of sick persons. The closure or cap for the filling opening of such a bag must at all times effectively seal the filling opening to insure against leakage of the fluid contents of the bag.

Since ice bags and the like are ordinarily used in the care and treatment of sick persons, it is obvious that these bags are ordinarily handled by women whose hands, while not weak, however, usually are not strong enough to exert a heavy turning pressure to a screw cap to tightly seal the filling opening and to unscrew the cap after it has been screwed on tightly. It is desirable, therefore, to provide a closure or cap which will effectively provide a fluid tight seal with the minimum of physical effort and also one wherein the resistance to sealing movement more gradually increases than is the case of the usual seal, wherein a rubber ring is compressed between two opposing surfaces of the bag and cap. An improved form of such a seal especially adapted for use with manufacturing material now available under conditions of restrictions of materials constitutes an object of the present invention. Such a cap must be easily screwed into sealing position and must be easily unscrewed when it is desired to remove the contents of the ice bag.

In my prior Patent No. 1,640,508, granted August 30, 1927 there is described and claimed a cap or closure for ice bags which fulfills the above requirements as to function and has gone into extensive commercial use but is formed of metal which, under present conditions, is difficult to obtain.

Thus one object of the present invention is to provide an improved cap or closure member for ice bags or other fluid tight receptacles which can be screwed into sealing position without the exercise of any particular physical effort and which is effective to seal the filling opening over a relatively long range of movement into sealing position and of which the cap can be molded in one piece of an available artificial resin and wherein the resilient sealing or packing disc is readily replaceable. To this end, and as illustrated, one feature of the invention resides in an ice bag provided with a closure member having an outwardly radially extending annular recess overlying the end face of the neck of an ice bag or other receptacle, said recess having seated therein a resilient sealing or packing member or ring which normally engages only the side walls of the recess a substantial distance from the bottom thereof so that the recess underlies practically the entire radial dimensions of the ring. By the use of this construction, sealing of the filling opening is accomplished by flexing the resilient packing ring by the neck as the cap is screwed therein and since the recess is relatively deep as compared with the thickness of the washer, flexing of the packing ring without compressing any portion of the ring against the bottom of the recess will take place over a relatively long extent of axial movement of the cap or closure member as it is screwed into sealing position. With the above construction, it is apparent that a fluid tight joint between the neck and the closure member can be obtained within a minimum amount of physical effort by the elasticity of the bent ring.

A further object of the invention is to improve generally upon the construction of receptacles for ice, hot water or other fluids especially as used for therapeutic purposes.

With the above and other objects and features in view the invention will now be described with reference to the accompanying drawing in which—

Fig. 1 is a plan view of an ice bag embodying the present invention;

Fig. 2 is a view in section taken along the line 2—2 of Fig. 1;

Fig. 3 is an enlarged sectional view illustrating the sealing or packing ring in normal or unflexed position in the recess of the cap or closure member;

Fig. 4 is a sectional view on an enlarged scale similar to Fig. 3, but illustrating the filling neck of the ice bag in a sealing position against the packing ring; and

Fig. 5 is a sectional view on an enlarged scale illustrating successive positions of the washer or packing ring as sealing pressure is applied therethrough by turning the cap or closure member.

Referring now to the drawing, it will be noted that the ice bag construction includes generally three elements, namely, the cap or closure member 10, the metal neck 12, into which the cap or closure member 10 is screwed, and the waterproof fabric 14 or other waterproof material which forms the body of the bag. The metal neck is formed with an inner cylindrical leg 16 that has internal screw threads 17 and is spaced from

and is generally parallel with an outer cylindrical and shorter leg 18. The legs are integrally connected at the top by a connecting section 19 which has an annular dome 20 projecting beyond the joined ends of the legs. The waterproof fabric 14 is usually formed of textile material coated on its inner surface with a waterproof coating such, for example, as rubber. To retain the fabric 14 in bag form, the edge thereof is gathered into pleats and inserted in the space between the two legs of the metal neck 12 and the outer leg 18 is spun inwardly to pinch the pleats together between the legs to form a water tight joint between the body 14 and the neck 12.

The closure member 10 is preferably formed of one integral molded piece of a suitable available artificial resin or other suitable plastic material. The closure 10 is provided with an axially extending cylindrical flange 22 projecting away from the top or cover portion 22*a* of the closure or cap. The upstanding portion 22 is formed with external screw threads 23 which fit into the internal screw threads 17 of the metal neck member 12. The closure 10 is also provided with an outwardly radially extending annular flange 24 at one end of the threaded cylindrical flange 22 and which is arranged to overlie the end of the neck member 12. The flange 22 in that face thereof that confronts the end of the metal neck member is provided with an annular recess 26 or groove of substantial radial width which is substantially semi-circular in cross-section and into which the external screw threads 23 extend. The recess 26 is sufficiently wide to receive the end of the neck 12 loosely and to permit a flat resilient ring or packing member 28 which is located entirely within and spans the recess to be flexed inwardly of the recess by the movement of the neck inwardly of the recess until the ring abuts against the base of the recess 26.

The ring 28 is preferably formed of rubber but it is apparent that it could be formed of other suitable resilient material if so desired. The ring 28 is relatively thin and hence has a thickness which is materially less than the depth of the recess 26 but sufficient to be resilient to span the recess without sagging. The ring 28 preferably has an internal diameter which is somewhat less than the outer diameter of the upstanding cylindrical flange 22 or at least conforms closely thereto when thereabout. The outer diameter of the ring 28 in its normal unstressed condition is equal to or slightly less than the diameter of the outer edge of the semi-circular groove or recess 26. The thickness of the ring and the arrangement of the groove is such that preferably the ring is located in the groove not appreciably above the face of the flange containing the groove. Thus, as shown in Fig. 3, the packing ring 28 spans the open end of the recess 26 and is supported by the cap only at its inner and outer peripheries, which peripheries are seated in a sealing manner on the inner and outer walls or ledges of the recess the body of the ring spanning the groove and being out of contact with the underlying wall thereof.

It is apparent that when the cap or closure 10 is screwed into the metal neck 12 so that the dome or annular projection 20 of the neck bears against approximately the mid portion of the washer 28, the washer 28 will be flexed downwardly, as shown best, for example, in Fig. 4. Thus, the side edge portions of the washer are seated firmly against the side walls of the recess 26 and the mid portion of the washer is seated firmly against the dome 20 of the filling neck 12 and is held there by the resiliency of the bent disc to provide a fluid tight joint between the disc and dome.

Further movement of the cap inwardly of the neck of the bag depresses the packing ring further into the recess, as illustrated in Fig. 5, but without greatly increasing the resistance of the cap to such movement. The pitch of the engaged screw threads is relatively fine so that a relatively large rotational movement of the cap is necessary to increase the depression of the ring. This action increases the tightness of the seal by increasing the pressure between the bent resilient ring and the contacting parts of the cap and neck and the area of contact therewith but without offering great resistance to rotation. When the cap has been screwed so far into the neck that the dome 20 presses the bent ring against the bottom part of the recess, as illustrated in Fig. 5, then the resistance to rotation of the cap is greatly increased. For effective sealing, however, such extreme flexure of the ring is not necessary.

It is apparent that the resistance to screwing on of the cap or cover 10 is not deleteriously increased by the flexing of the ring 28 since the ring is not pinched between the dome and the side walls of the recess and hence the cap or closure member 10 may readily be turned into the neck 12 until the pressure produced by the flexure of the disc 28 is sufficient to form a fluid tight joint between the neck 12 and the cap 10.

If the packing ring 28 is damaged to such an extent that a fluid tight joint between the neck and the cap cannot be obtained without the use of excessive pressure, it is a relatively simple matter to remove the worn or damaged ring 28 and to substitute therefor a new ring. Because the ring 28 fits snugly about the upstanding cylindrical flange 22 the ring 28 cannot be accidentally or inadvertently removed and hence is retained in sealing position at all times.

Having thus described my invention what I claim as new and desire to secure by Letters Patent of the United States is:

1. A closure seal for two rotatably interengaging members comprising a convex annular abutment on one of said members facing the other member, and an annular groove in said other member open toward said annular abutment and deeper and radially wider than the depth and width of said abutment and adapted to receive said abutment therein, and a normally flat ring of resilient material materially thinner than the depth of the groove and having radial extent approximately equal to the radial width of said groove fitting within the entrance of said groove above the bottom thereof and movably bridging said groove from side wall to side wall thereof and having its inner and outer edges only seated on the inner and outer side walls of the groove and positioned in the path of movement of said abutment, the groove walls being convergent toward the mid part of the groove and being smoothly continuous at least in substantial part to the bottom of the groove so that a seated edge of the ring is free to slide along the wall with increasing transverse flexure thereof when the ring is forcibly engaged by said abutment, and means interengaging said members being arranged upon relative rotation of the members to gradually draw the members together to force the top of said abutment against the mid part of said ring and to flex said ring about its inner

and outer edges into the groove with decreasing radial width of the ring and increasing resistance to flexure, said resilient ring simultaneously maintaining sealing pressure between said abutment and spaced apart surface portions of said groove by reason of the flexed condition of said resilient ring, the relative dimensions of said groove, ring and abutment being such that the ring is pushed bodily deeper and deeper into the groove with increased flexure of the ring and is free of pinching against the side walls of the groove.

2. A receptacle having a screw-threaded neck, a closure cap rotatable on the screw threads, and sealing means between the neck and cap comprising a pair of concentric, radially-spaced annularly continuous wall-members forming outer and inner walls of a wide deep groove, a resilient normally flat sealing ring in and bridging said groove and having its annular inner and outer edge parts only seated on said wall-members and capable of being bent annularly about its inner and outer edges and transversely of its width against its inherent resiliency into said groove while maintaining its edge parts seated on spaced apart surface portions of said groove, said wall members being convergent toward the mid part of the groove and smoothly continuous at least in substantial part to the bottom of the groove so that a seated edge of said ring is free to slide along the wall members with increasing transverse flexure, and a continuous annular projection radially narrower than the groove between said wall members upstanding from the end of said neck located midway between said wall-members and arranged to engage the mid part of said ring between said wall-members and depress said ring into said groove, said projection being sufficiently radially narrower than said groove so that the projection can enter the groove and progressively bend the ring a substantial amount into the groove upon rotation of the cap without pinching the ring against the wall-members.

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