June 26, 1956 A. NERGAARD 2,752,082

PROTECTIVE CLOSURE SHELL AND FUNNEL

Filed Feb. 18, 1953

Fig. 1

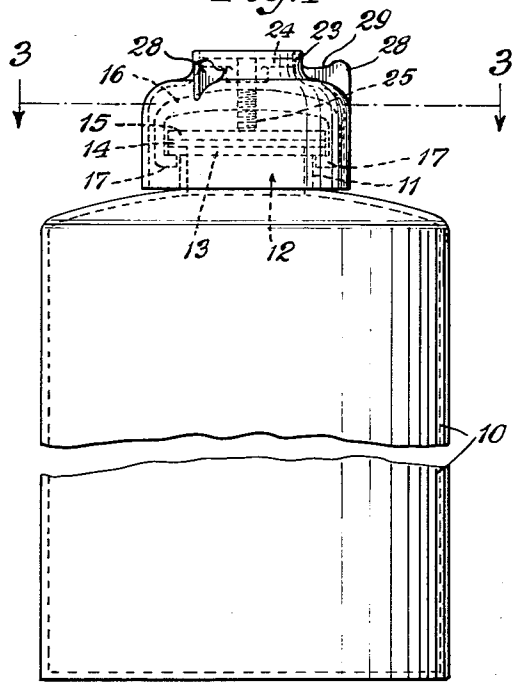


Fig. 2

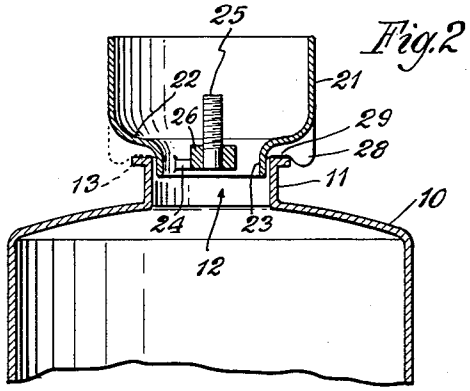


Fig. 3

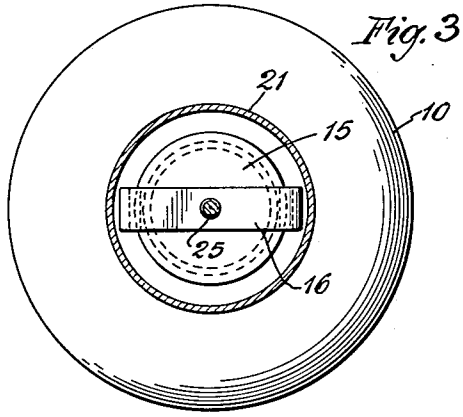


Fig. 4

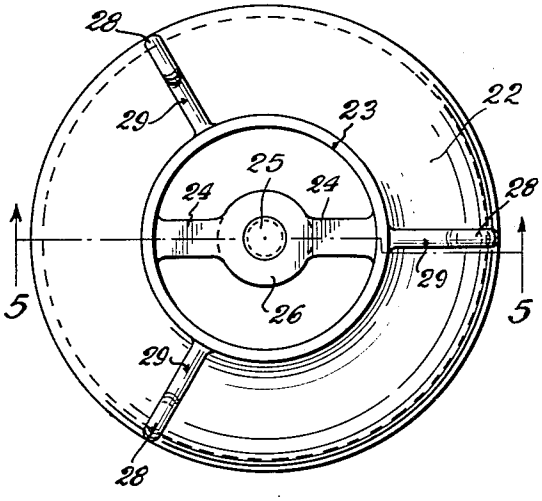
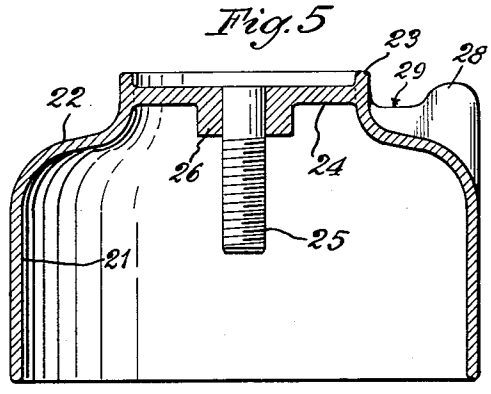


Fig. 5



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PROTECTIVE CLOSURE SHELL AND FUNNEL

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7 Claims. (Cl. 226—31)

The present invention relates to equipment for base-exchange water-softening, and in particular to that portion of its tank which provides an opening and a closure therefor which opening is used to introduce solid sodium chloride for the regeneration process.

When a bed of water softening material in certain systems is exhausted, it is necessary to open the tank and insert solid sodium chloride. The tank is then closed and a cycle of water-flow through the tank ensues. In consequence, the tank is designed to be opened and closed with the minimum of effort.

The present invention pertains to a portion of the closure structure which is so formed that it may be inverted to serve as a funnel for introducing the salt into the tank.

It is the general object of the invention to provide a structure capable of functioning as a part of the closure and also as a funnel.

It is a particular object of the invention to provide a protective housing in the form of a tightening screw for the closure end of a construction which is suitable as a funnel when inverted for the opening which its screw keeps closed.

Various other and ancillary objects and advantages of the invention will be apparent from the following description and explanation of the presently preferred embodiment of the invention as set forth in the accompanying drawing, in which:

Fig. 1 represents a tank with its closure housing, showing certain parts in dotted lines.

Fig. 2 shows the closure housing of Fig. 1 in inverted portion for use as a funnel.

Fig. 3 is a plan view in cross section taken on the line 3—3 of Fig. 1.

Fig. 4 is an enlarged plan view of the closure housing as shown in Fig. 1.

Fig. 5 is a vertical cross section taken on the line 5—5 of Fig. 4.

It is to be understood that the invention may be made in other forms, and that the illustration in the drawing is not to be construed as a limitation of the invention.

In the drawing the numeral **10** represents a conventional tank with extending neck **11** providing a wide opening **12**.

The neck has a flat ring horizontal flange **13** for a gasket **14** between it and a disc cover **15** which is forced down on the gasket. A yoke **16** spans the disc **15** and has fingers **17** underlining the flange **13**. A threaded bolt **25** is the conventional means threaded into the yoke to press the disc **15** into sealing position.

The present invention provides a protective shell or bell-like housing over the yoke and neck and carries the tightening bolt as an integral part thereof so that by turning the housing, the bolt is threaded into place. The relatively large diameter of the housing compared to the bolt permits the housing to substitute for a wrench conventionally used on the conventional small-headed bolt, for which function it is preferably a form of revolution about the axis of the bolt. The housing is specially constructed so that it may be inverted and used as a funnel.

Fig. 5 shows the preferred structure in cross section in its protective position. It has a major skirt portion of appreciable length preferably cylindrical as designated by the numeral **21**. The skirt portion tapers inwardly as a hip portion **22** which then terminates in a relatively shorter coaxial cylindrical waist portion **23**. Both ends of the structure are open and unobstructed except for bolt-mounting means integral with the inner wall, such as a cross bar **24** in which the conventional bolt **25** is fixedly carried in coaxial position at an enlargement **26** of the bar **24**. The said cross bar is shown as carried by the side wall inside the shell and is located in the vicinity of the smaller end of the structure so that the bolt **25** projects toward the larger end.

The hip portion **22** may have vertical wings **28** to facilitate turning the shell in threading the bolt **25** into the yoke **16**. The form and locations of the wings are such that the waist portion is unobstructed to a limited extent at its exterior side wall, for entering the waist portion in the opening **12** in using the structure as a funnel. When wings are provided, they may be so formed and located that they provide a rest for the funnel on the flange **13**. Accordingly, the preferred wings are at least three in number and have a substantially horizontal portion **29** corresponding in general to the width of the flange **13** on which they rest, as shown in Fig. 2 wherein the structure is positioned for its use as a funnel.

The invention is not limited to the specific embodiment illustrated and described and may be changed in numerous respects without departing from the spirit and scope of the invention as set forth in the appended claims.

I claim:

1. A funnel-like structure having a side wall of revolution about an axis and open ends, one end being large and tapering therefrom toward the other end to a smaller opening, bolt-mounting means integral with and extending from the interior wall toward the axis of the structure in the vicinity of the smaller end, and a coaxial bolt fixedly carried by said means projecting toward said larger end.

2. A funnel-like structure having a side wall of revolution about an axis and open ends, one end being large and tapering therefrom toward the other end to a smaller opening, a bar integral with said structure and crossing said smaller opening, and a coaxial bolt fixedly carried by said bar projecting toward said larger end.

3. A funnel-like structure having a side wall of revolution about an axis and open ends, one end being large and tapering therefrom toward the other end to a smaller opening, said smaller opening being defined by a cylindrical wall unobstructed at its exterior for a short distance from the open end toward the larger end, bolt-mounting means integral with and extending from the interior wall toward the axis of the structure in the vicinity of the smaller end, and a coaxial bolt fixedly carried by said bar projecting toward said larger end.

4. A funnel-like structure having two open-ended coaxial cylindrical portions of relatively larger and smaller diameters connected by an integral wall structure, the larger portion being axially the longer to serve as the upper part of the structure when used as a funnel, bar means integral with said structure and within said funnel in the vicinity of the smaller end, and a threaded bolt coaxially and fixedly mounted in said means projecting toward the larger end.

5. A bell-shaped structure adapted for use as a funnel when inverted, and comprising a skirt portion, a hip portion, and a waist portion, said waist portion hav-

ing at least a short extent downwardly from its top unobstructed for insertion in an opening, bolt-mounting means within and integral with the structure in the vicinity of the waist portion, and a bolt fixedly mounted in said means extending toward the skirt end.

6. A bell-shaped structure as a form of revolution about an axis adapted for use as a funnel when inverted, and comprising a skirt portion, a hip portion, and a waist portion, said waist portion having at least a short extent downwardly from its top unobstructed for insertion in an opening, bolt-mounting means in the vicinity of the waist portion integral with the interior side wall and extending at least to the axis, and a coaxial bolt rigidly carried by said means extending toward the skirt end.

7. In combination with a tank having in one position a vertically projecting neck with an opening therein, outwardly projecting means on the exterior of said neck, a cover for closing said opening, a yoke having arms spanning said cover and having means to engage the underside of said projecting means, said yoke having a threaded opening therein for receipt of a vertically disposed bolt, a bell shaped body open at both ends, said body having a relatively larger and relatively longer

skirt portion of size to house said yoke, having also a relatively smaller and relatively shorter neck portion of size to enter the opening in said tank neck when positioning the bell shaped body to function as a funnel into the tank, a bolt fixedly secured within said body in position to thread into said threaded opening while spanning said yoke when said body is inverted from funnel position, and means extending from an interior wall of the body for fixedly mounting said bolt, whereby said body in one position serves as a bolt head to tighten the yoke in clamping position for the cover, and whereby on removal of the yoke and cover and upon inversion to a second position the said body serves as a funnel into the tank.

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