

Nov. 12, 1929.

E. A. HOFFMANN

1,735,683

CLOSURE FOR TANK OPENINGS

Filed Nov. 26, 1928

Fig:1

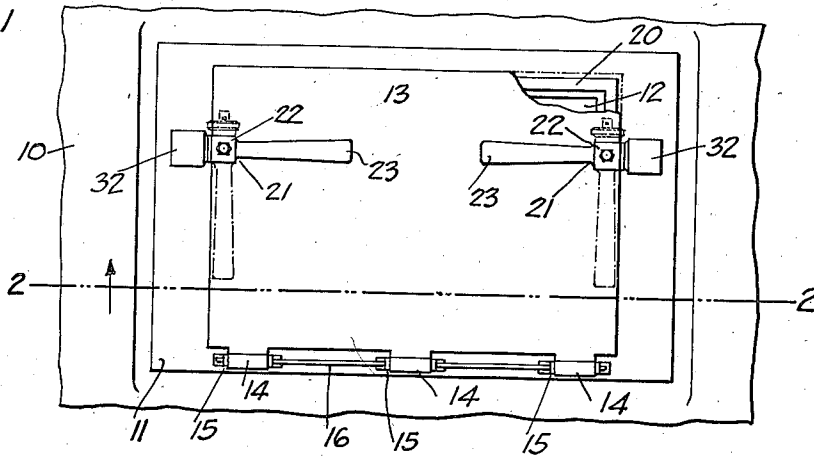


Fig:2

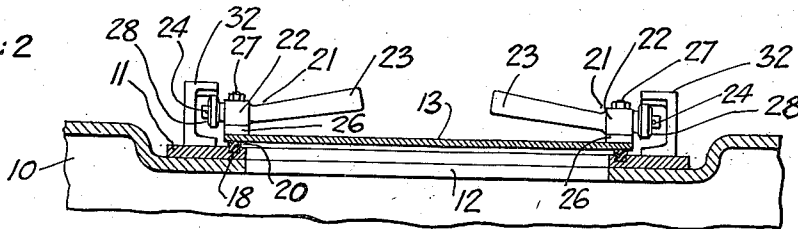


Fig:3

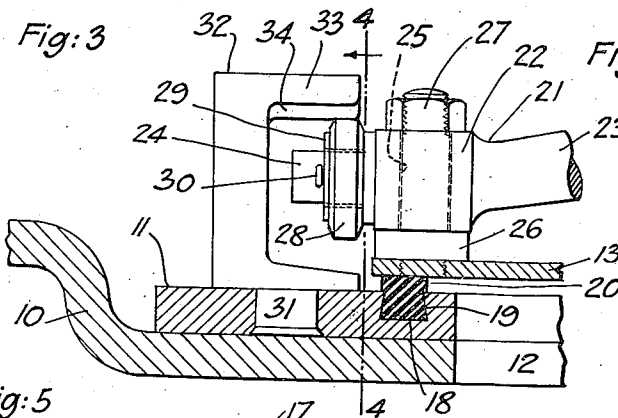


Fig:4

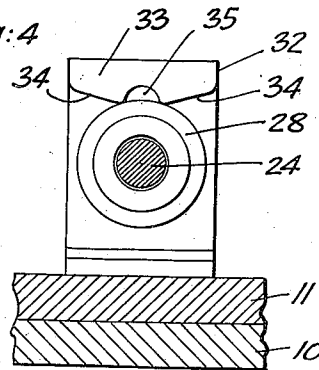


Fig:5

Fig:6

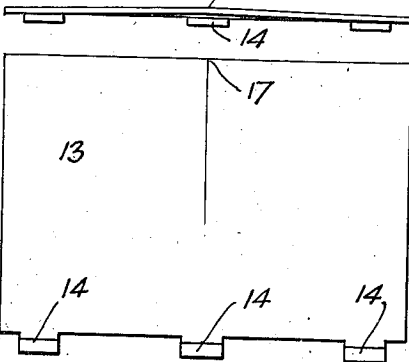
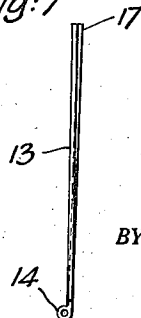


Fig:7



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CLOSURE FOR TANK OPENINGS

Application filed November 26, 1928. Serial No. 322,051.

This invention relates to closing devices for hermetically sealing tanks or the like, and is particularly applicable for use in connection with rotary containers of the kind described in my co-pending applications for Letters Patent, Serial Number 262,789 and Serial Number 315,150, filed, respectively, March 19, 1928 and October 26, 1928.

While not necessarily limited to containers of that kind, they represent a typical application of my invention. In such devices which are used to transport mixed concrete, it is of prime importance that the container, after having been charged with concrete, be closed air and water tight to maintain uniform hydration and mixing of the ingredients of the concrete without loss of the hydrating element therefrom, and without the admission of air into the container, if the contents of the container, while being revolved, are under a vacuum as explained in the last named copending application.

It is the principal object of the invention to provide a closure for charging openings of tanks which is simple in operation, easily manipulated, economical to manufacture, and one which hermetically seals the opening. Other objects will become apparent as the nature of the invention is better understood after the perusal of the following specification and the inspection of the accompanying drawings, in which

Fig. 1 is a fragmentary plan view of a tank showing a closure with its cover plate partly broken away, embodying the principles of my invention;

Fig. 2 is a longitudinal sectional view of the same, taken along the plane of line 2—2 in Fig. 1;

Fig. 3 is an enlarged elevational view of one of the fastening devices for the closure;

Fig. 4 is a cross-sectional view of the same, taken along the plane of line 4—4 in Fig. 3;

Fig. 5 is an elevational end view of the cover plate proper, drawn in the same scale as Figs. 1 and 2;

Fig. 6 is a plan view, and

Fig. 7 is a side view of the same.

Like characters of reference denote simi-

lar parts throughout the several drawings and the following specification.

10 is a portion of a cylindrical tank. 11 is a frame, preferably, welded around a rectangular opening 12 in the tank. 13 is a cover plate substantially rectangular in shape, having hinge projections 14 at one end thereof, fitted between small angles 15 which are suitably fastened to the frame 11. 16 is a rod passing through hinge projections 14 and angles 15, thereby hinging plate 13 to the frame 11. The center of the plate 13 is bellied slightly at its center, as shown in Figs. 5, 6 and 7, at 17. 18 is a groove in the top of frame 11, rectangularly disposed, somewhat smaller than the plate 13 and equidistant from its edges. This groove is dovetailed at its sides at 19. A rubber washer 20 is fitted within the groove 18. The washer is thicker than the depth of groove 18 and projects therefore somewhat above the top of the frame 11. Being pressed into the groove, it is held there tightly by virtue of its dovetailed walls. 21 are two locking bars, each consisting of a hub 22, a handle 23, and a lateral shaft extension 24. The hub is bored out to pivotally fit over a stud 25 having a collar 26. Stud 25 is screwed into the plate 13, one on each side thereof and nearer to its open end than its hinged portion. 27 is a nut holding the locking bar in pivotable position upon the stud 25. Rotatably mounted upon shaft extension 24 is a roller 28, held there against lateral movement by a washer 29 and a cotter pin 30. Riveted at 31 to the top of frame 11, opposite each locking bar 21, is a latch 32 of substantially U-shape. Its mouth faces the roller 28. The top branch 33 of the latch has its lower side tapered downwardly at 34 from both ends toward its center, this center being recessed at 35, as clearly shown in Fig. 4.

The operation of closing a tank equipped with this locking device is as follows:

After the tank has been filled, the opening 12 is closed by rotating the plate 13 about its hinge rod 16 until it contacts with the rubber washer 20. In this position, before locking, that side of the plate 13 where the hinges are located, contacts with the rubber washer, and

also the central or bellied part 27 of the opposite side, while the right and left side project slightly upward. The locking bars 21 are now closed and brought from the position shown in Fig. 1 in dotted lines to the one shown in full lines. This is done by swinging them about their pivots 25. While swinging the bars 21 from the position shown in dotted lines in Fig. 1 to the closed position, the roller 28 of each bar enters the open mouth of the latch 32, and by contact with the downwardly extending first half of the top branch 33 forces the slightly upwardly extending edges of the plate 13 against the rubber washer and compresses the same, until the roller reaches a position in the center of the latch 32 when its top snaps into the recessed portion 35 in the top branch of the latch. This effectively locks the bar 21 in the closed position. A uniform pressure is now exerted against the rubber washer. The outer upwardly projecting edges at both sides of the plate 13, in a manner, are fulcrumed about the central bellied part and, by being flattened against the rubber washer, make a water and air tight seal therewith. The device is opened by simply giving each locking bar a turn sufficient to disengage the roller 28 from its latch. While the tank is open for filling, it is clearly apparent that the rubber washer cannot become accidentally disengaged from the tank, because it is held tightly within the groove 18.

It is understood that various changes in the form, proportions and minor details of construction may be resorted to without departing from the principles or sacrificing any of the advantages of the invention, as defined in the appended claims.

What I claim as new, is:

1. A closure for openings in tanks, comprising a resilient washer secured to the tank around the opening, a hinged plate adapted to contact with the washer, the said plate being slightly bellied to contact first with the washer opposite the center of its hinged side, and locking devices to straighten the plate and press the same uniformly against the washer.

2. A closure for openings in tanks, comprising a resilient washer secured to the tank around the opening, a hinged plate adapted to contact with the washer, the said plate being slightly bellied to contact first with the washer opposite the center of its hinged side, and locking devices nearer to the bellied than the hinged side of the plate to straighten the plate and press the same uniformly against the washer.

3. A closure for openings in tanks, comprising a frame around the opening having a dovetailed groove, a resilient washer forced within the groove and projecting outwardly thereof, a plate hinged to the frame adapted to contact with the washer, the said plate be-

ing slightly bellied to contact first with the washer opposite the center of its hinged side, and locking devices to straighten the plate and press the same uniformly against the washer.

4. A closure for openings in tanks, comprising a resilient washer secured to the tank around the opening, a hinged plate adapted to contact with the washer, the said plate being slightly bellied to contact first with the washer opposite the center of its hinged side, locking devices to straighten the plate and press the same uniformly against the washer, and means to lock the locking devices in such position.

5. A device for fastening a plate over a tank opening, comprising a locking bar pivotally secured to the plate, a latch of substantially U-shape fastened to the tank, its mouth facing the locking bar and its top branch having a recess at its lower side, and a roller rotatably secured to the said locking bar and being adapted to contact with the said top branch and engage the edges of its recess for the purpose of maintaining the locking bar in a locked position.

6. A device for fastening a plate over a tank opening, comprising a locking bar pivotally secured to the plate, a latch of substantially U-shape fastened to the tank, its mouth facing the locking bar and its top branch at its lower side being tapered downwardly from both ends toward a recess in its center, and a roller rotatably secured to the said locking bar and being adapted to contact with the said top branch and engage the edges of its recess for the purpose of maintaining the locking bar in a locked position.

7. A closure for openings in tanks, comprising a resilient washer secured to the tank around the opening, a hinged plate adapted to contact with the washer, the said plate being slightly bellied to contact first with the washer opposite the center of its hinged side, devices for straightening the plate and pressing the same uniformly against the washer, each of the devices consisting of a locking bar pivotally secured to the plate, a latch of substantially U-shape fastened to the tank, its mouth facing the locking bar and its top branch having a recess at its lower side, and a roller rotatably secured to the said locking bar and being adapted to contact with the said top branch and engage the edges of its recess for the purpose of maintaining the locking bar in a locked position.

In testimony whereof I have hereunto set my hand.

EDWARD A. HOFFMANN.