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CLOSURE AND ACTUATING MECHANISM THEREFOR

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2 Sheets-Sheet 2

Fig. 2.

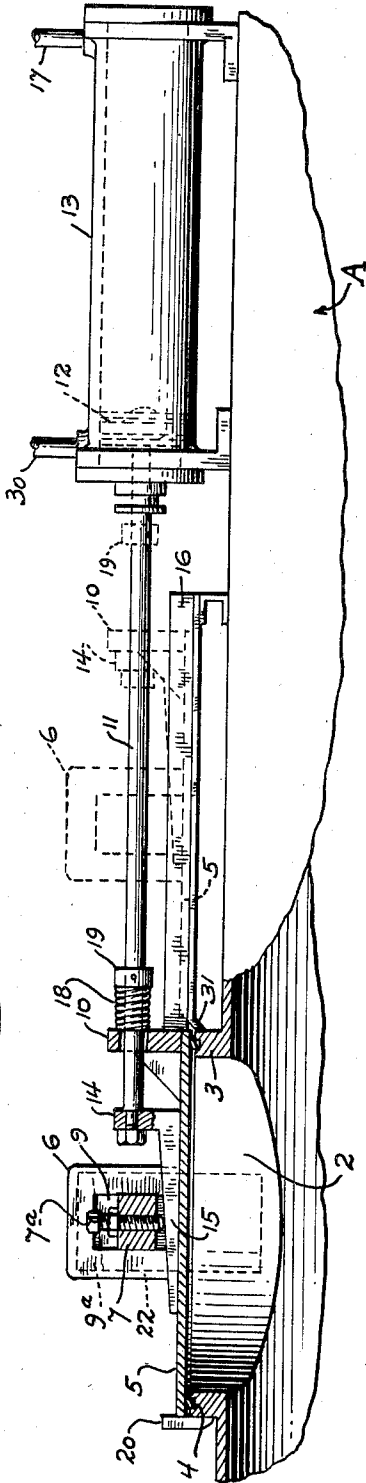


Fig. 3.

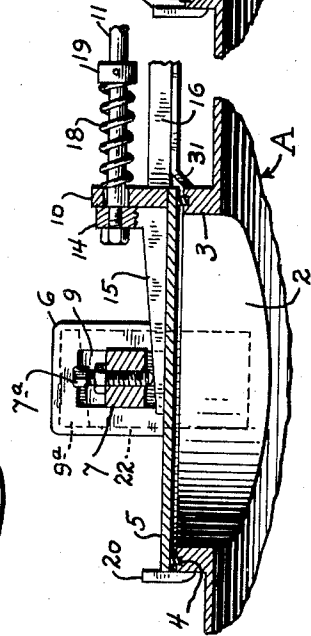
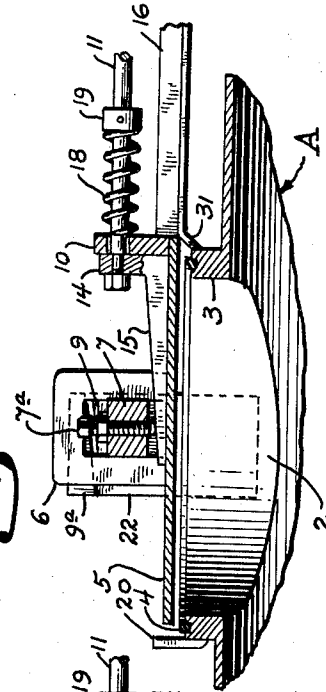


Fig. 4.



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CLOSURE AND ACTUATING MECHANISM THEREFOR

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9 Claims. (Cl. 220—57)

This invention relates to concrete guns and similar devices, and more particularly to a closure for the tank or container in which the concrete is deposited and later discharged by the action of compressed air.

In an apparatus of the character described, it is essential that the container in which the concrete is deposited be alternately filled and discharged as rapidly as possible in order that a given number of cubic yards of concrete per hour may be economically handled. The container must be opened to permit a charge of concrete to be introduced and then closed to permit discharge thereof, as high pressure air is applied during the discharging operation; hence, a cover and an actuating mechanism therefor must be employed which permits rapid opening and closing and which will move the cover to a position where it will form no obstruction during the filling or discharging operation. Means must be employed for securing and sealing the cover against the high pressure air applied during the discharging operation to avoid leakage of air, and in addition to the above, the cover and actuating mechanism should be readily accessible for cleaning, as it will otherwise stick or jam, due to the gradual accumulation of spilt concrete.

The object of the present invention is to generally improve and simplify the construction and operation of mechanism of the character described; to provide a closure together with a mechanism for opening and closing the same which is pneumatically operated; to provide a closure and mechanism for operating the same which is mounted on the exterior of the container and which is readily accessible for cleaning, inspection and repair; to provide a strong-back arm and a cooperating wedging mechanism whereby the cover may be securely held in place when in closed position; to provide a pneumatically actuated operating mechanism whereby the cover may be almost instantly moved from open to closed position or vice versa; and further, to provide an operating mechanism which moves the cover or closure a considerable distance away from the filling opening when concrete is to be introduced so as to leave said opening free and unobstructed and at the same time materially reduce chances of accumulating spilt concrete on the cover and operating mechanism which would have a tendency to impair operation.

The invention is shown by way of illustration in the accompanying drawings, in which—

Fig. 1 is a perspective view of the upper portion of a container, said view showing the closure or

cover and a portion of the actuating mechanism;

Fig. 2 is a side elevation partially in section of the upper portion of the container, the removable closure or cover, and the pneumatic actuating mechanism;

Fig. 3 is a section similar to Fig. 2 showing the wedge 15 in released position; and

Fig. 4 is a section similar to Fig. 2 showing the position of the cover at the moment that it engages the inclined portions of the tracks or guideways.

Referring to the drawings in detail, and particularly to Figs. 1 and 2, A indicates a suitable tank or container in which is formed an opening 2, through which concrete or any other material may be introduced to fill the container. Around the opening is formed a flange 3, having a gasket 4, and adapted to be seated thereon is a cover member 5.

The matter forming the subject of this application is the mechanism for removing and replacing the cover and for forcing it against the gasket when in position. Formed on the cover (see Fig. 1) are a pair of yoke members 6—6. Extending through the yokes and crosswise of the cover is a strong-back arm 7. This arm rests on pads 8—8, welded or otherwise secured to the cover, and the upper and outer ends of the arm are provided with cam or wedge surfaces 9—9. Formed rearwardly of the yoke members 6 is a bearing lug 10. Extending therethrough is a piston rod 11 which is connected with a piston 12 mounted in a cylinder 13, and secured on the inner end of the rod, by means of a lug 14, is a wedge 15 which passes under the arm 7 and which functions in a manner hereinafter to be described.

Disposed on top of the container are a pair of angle bars 16—16 which form tracks or guides for the cover 5 when it is retracted with relation to the opening 2. When the cover is to be moved to closed position, air is applied to the end of the cylinder, indicated at 17, and the piston is forced forward. A spring 18 is interposed between the bearing lug 10 and a nut 19 on the rod. This spring is maintained under sufficient compression to push the cover forward between the guides 16 when the piston moves forward, and thus moves the cover from the position shown in Fig. 1 to the position shown in Fig. 3, further movement of the cover at this point being prevented by the front edge of the cover engaging a stop-lug 20.

As the cover reaches closing position, the wedge ends 9 of the strong-back arm pass in under lugs 9a formed on brackets 22 disposed at opposite sides of the filling opening. These lugs cooperate

with the wedges 9 to force the cover down against the gasket. The piston 12 will, however, continue its forward movement after engagement has been made between the wedges 9 and 9a and as the

5 wedge 15 is secured on the front end of the rod, this wedge will crowd in under the strong-back arm and apply further downward pressure to force the cover against the gasket, the final position of the wedge being shown in Fig. 2.

10 By referring to Figs. 2 to 4, it will be noted that arm 7 carries an adjusting screw 7a and that wedge 15 engages the lower end of this screw. This is important, as gradual wear on the gasket, wedge, and other parts of the mechanism may be

15 compensated for from time to time by merely readjusting the screw.

When the cover is to be moved to open position, air is admitted to the cylinder through pipe 30 and the piston reverses its stroke. This reversal first of all pulls the wedge out from under the arm 7 so that the wedge will assume the position shown in Fig. 3. At this point the wedge engages the bearing lug 16 secured on the cover, and as the piston continues to travel in the direction

25 specified, a pull is exerted directly on the cover, and as the cover engages cams 31 at the beginning of the guideways 16—16, it will be raised sufficiently to clear the gasket 4 and relieve it of excess wear. Continued movement will bring the

30 cover to the position shown in Fig. 1. In this position the filling opening 2 is entirely unobstructed and clear, and concrete or other material may again be poured in to fill the container.

35 By employing a strong-back arm which moves with the cover, and by employing two independently actuated wedging actions which are automatically operated by movement of the piston and rod, it becomes possible to rapidly open

40 and close the cover and at the same time to force it, by means of the second or last operated wedge, with so great a pressure against the gasket that leakage of air is positively prevented when high pressure air is applied to discharge the concrete.

45 By employing a comparatively long piston stroke, and long guide tracks, the cover may be retracted sufficiently far to leave the filling opening free and unobstructed to receive the next charge of concrete; this removal of the cover to

50 some distance away from the filling opening is of further importance as it materially reduces chances of spilt concrete falling and accumulating on the cover and the mechanism carried thereby, as gradual accumulations of this character would

55 soon jam the mechanism or prevent proper seating of the cover.

The mechanism shown is exceedingly simple in construction and the parts employed may be as heavy or substantial as operating conditions and

60 rough usage may demand. All parts of the mechanism are, at the same time, readily accessible for cleaning, inspection and repair, and as the strong-back arm is provided with an adjustable take-up screw, wear may be taken up from

65 time to time.

While the cover and actuating mechanism here disclosed is shown and described in connection with a concrete gun, it should not be limited thereto, as it may obviously be applied wherever

70 a closure device of this character is applicable. I similarly wish it understood that while the mechanism disclosed is more or less specifically described and illustrated, changes may be resorted to within the scope of the appended claims,

75 and similarly, that the materials and finish of

the several parts employed may be such as the manufacturer may decide or varying conditions or uses may demand.

Having thus described my invention, what I claim and desire to secure by Letters Patent is: 5

1. A closure device comprising a cover, means for moving the cover into and out of register with an opening, a sealing gasket surrounding the opening, a pair of wedges on the cover, a pair of stationary wedges adjacent the opening with which the cover wedges cooperate to force the cover against the gasket when the cover is moved into register with the opening, and a third wedge and keeper on the cover operable after engagement of the first-named wedges to further secure

15 and seal the cover with relation to the gasket. 2. A closure device comprising a cover, means for moving the cover into and out of register with an opening, a sealing gasket surrounding the opening, a strong-back bar mounted on the cover and disposed crosswise thereof, a wedge on each end of the bar, a pair of stationary wedges on opposite sides of the opening with which the bar wedges cooperate to force the cover against the gasket when the cover is moved into register with the opening, and a wedge carried by the cover and disposed between the cover and the bar, said last-named wedge being operable after engagement of the first-named wedges to further force the cover against the gasket. 30

3. In a container for handling material said container having an opening formed therein, a pair of guide-tracks disposed in alignment with the opening, a cover supported and guided by the tracks, a strong-back bar on the cover, a pair of stationary lugs adjacent the opening with which the ends of the bar engage when the cover is in register with the opening, a wedge interposed between the bar and the cover, means for moving the cover, the bar and the wedge as a unit from an open position to a closed position, said means continuing to move after the cover has assumed a closed position, and means whereby the continued movement of said means is transmitted to the wedge only so as to force the cover against the container to seal the opening. 35

4. In a container for receiving material, said container having a filling opening, a pair of guide-tracks disposed in alignment with the opening, a cover supported and guided by the tracks, a strong-back bar on the cover, a pair of stationary lugs adjacent the filling opening with which the ends of the bar engage when the cover is in register with the filling opening, a wedge interposed between the bar and the cover, means for moving the cover, the bar and the wedge as a unit from an open position to a closed position, said means continuing to move after the cover has assumed a closed position, means whereby the continued movement of said means is transmitted to the wedge only so as to force the cover against the container to seal the filling opening, and inclined portions on the guide tracks to raise and lower the cover with relation to the filling opening. 40

5. In a container for receiving material, said container having a filling opening, a pair of guide-tracks disposed in alignment with the opening, a cover supported and guided by the tracks, a rod for moving the cover along the guide-tracks from an open position to a closed position or vice versa, a strong-back bar on the cover, a pair of stationary lugs adjacent the filling opening with which the ends of the bar engage when the cover assumes a closed position, 45

a wedge interposed between the bar and the cover, a yielding connection between the rod and cover whereby the cover and the bar and wedge are moved as a unit until the cover assumes a closed position, said yielding connection permitting further movement of the rod, and means whereby the further movement of the rod is transmitted to the wedge only so as to force the cover against the container to seal the filling opening.

6. A closure device comprising a cover, means for moving the cover into and out of register with an opening, a strong-back arm carried by the cover and movable therewith, a stationary lug on each side of the opening with which the ends of the strong-back arm engage when the cover registers with the opening, and a wedge carried by the cover, said wedge being forced inwardly between the cover and strong-back arm by the cover moving means after the cover registers with the opening to force the cover against the opening.

7. A closure device comprising a cover, means for moving the cover into and out of register with an opening, a strong-back arm carried by the cover and movable therewith, a stationary lug on each side of the opening with which the ends of the strong-back arm engage when the cover registers with the opening, and a wedge carried by the cover, said wedge being forced inwardly between the cover and strong-back arm

by the cover moving means after the cover registers with the opening to force the cover against the opening, and an adjustable wear taking up screw on the strong-back arm with which the wedge engages.

8. A closure device comprising a cover movable into and out of register with an opening in a container, a strong-back arm extending across the cover and movable therewith, a pair of lugs secured to the container on opposite sides of the opening with which the ends of the strong-back arm are engageable when the cover is moved into register with the opening, a wedge carried by the cover and interposed between the cover and the strong-back arm, and a common means for moving the cover into register with the opening and the strong-back arm into engagement with the lugs and thereafter imparting independent movement to the wedge to force the strong-back arm against the lugs and the cover against the opening.

9. A closure for a container opening comprising a cover member, a strong-back arm carried thereby, lugs on the container positioned to overlie the ends of said arm when the cover member is in closed position, means engageable with the cover member to move it to its closed position, and a wedge on said means adapted upon closing movement to enter between the cover and strong-back arm.

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