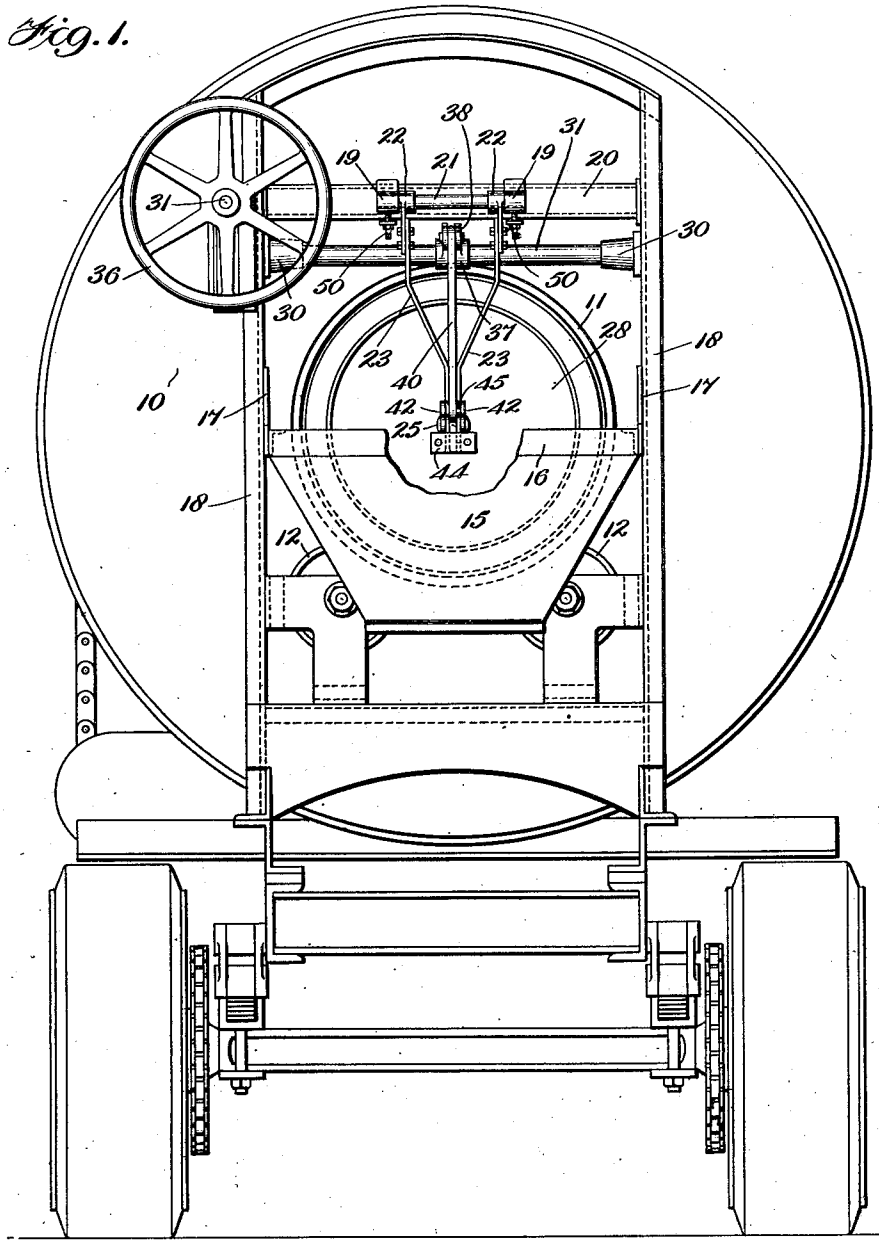
June 25, 1935. C. F. BALL 2,006,206

CLOSURE MECHANISM FOR THE DISCHARGE OPENINGS OF CONCRETE MIXER DRUMS

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Fig. 1.



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Fig. 3.

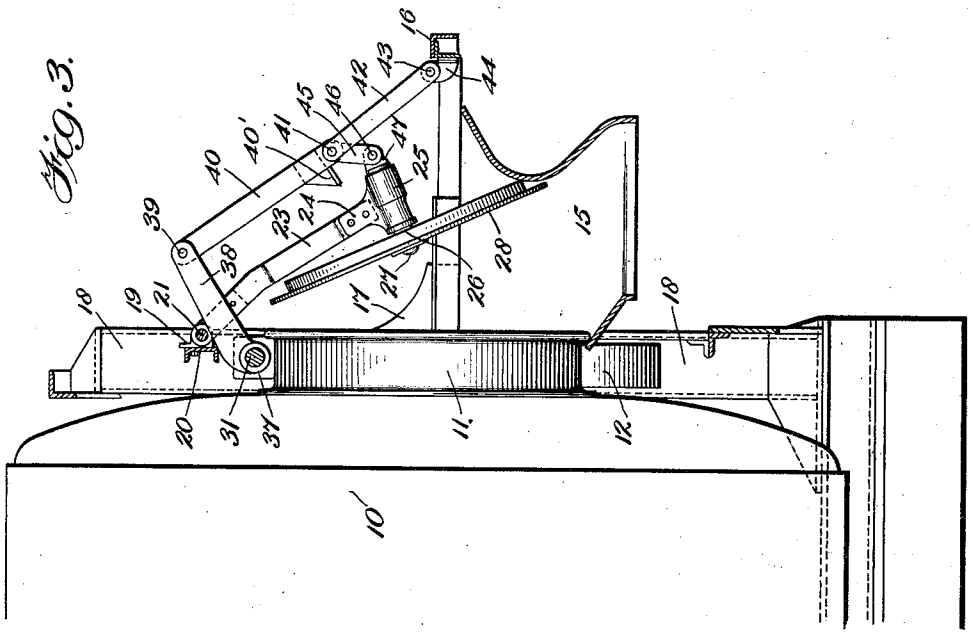


Fig. 2.

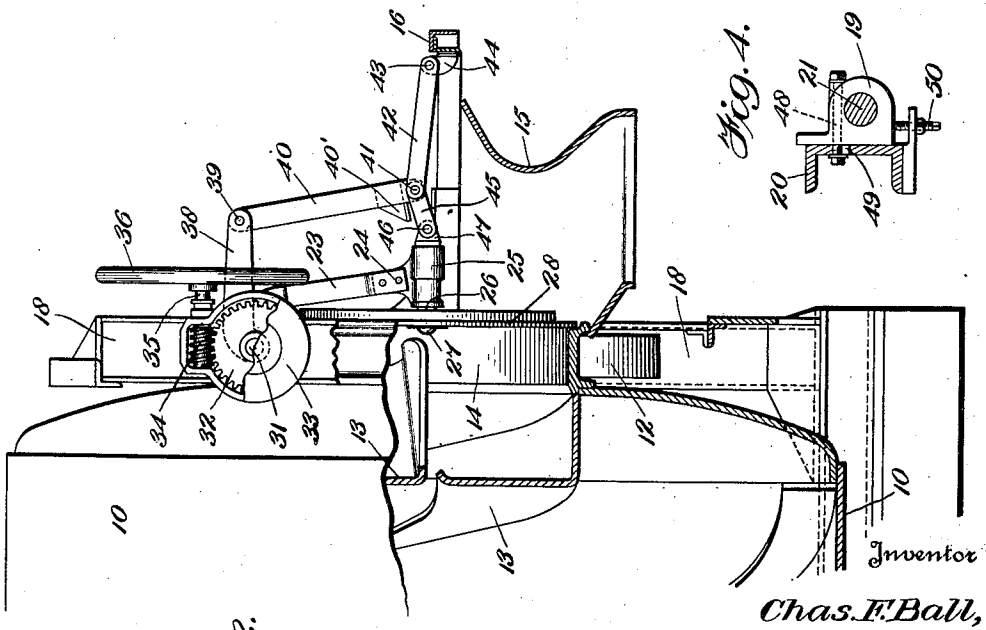


Fig. 4.

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CLOSURE MECHANISM FOR THE DISCHARGE OPENINGS OF CONCRETE MIXER DRUMS

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Application August 1, 1931, Serial No. 554,539

5 Claims. (Cl. 83—73)

This invention relates to closure mechanism for the discharge openings of concrete mixers and has for one of its objects to provide mechanism of this character which will be simple in construction, comparatively inexpensive to manufacture and more efficient in use than those which have been heretofore proposed.

A further object of the invention is to provide operating mechanism for closures of this type which will permit of the application of great force to the closure member whereby the latter may be easily moved to closing position while concrete is flowing from the discharge opening and thereby act as a cut off valve for such concrete.

In prior U. S. application filed by A. E. Miller and myself May 17, 1930, Serial No. 453,281 which has matured into Patent 1,918,205, granted July 11, 1933 there is described and claimed a closure mechanism for the discharge openings of truck mixers where the mixer is provided with a discharge chute by means of which the concrete is moved out of the drum through the opening. On the other hand, in my copending application filed June 24, 1931, Serial No. 546,591, entitled Discharge mechanism for concrete mixers, I have disclosed and claimed a mechanism for discharging concrete mixer drums which does not require the use of the discharge chute shown in the first mentioned application. The present closure mechanism is more particularly adapted to use in connection with the discharge mechanism set forth in the last mentioned application and it has been shown in connection with this type of discharge, although as will appear more fully below it may be employed with any other suitable type of discharge.

With the above and other objects in view which will appear as the description proceeds, the invention consists in the novel details of construction and combinations of parts more fully hereinafter described and particularly pointed out in the appended claims.

Referring to the accompanying drawings forming a pair of this specification in which like reference characters designate like parts in all the views:—

Figure 1 is a rear elevational view of a truck or transit mixer illustrating the application thereto of closure mechanism constructed in accordance with the present invention, the parts being shown in closed position;

Figure 2 is a fragmentary side elevational view, partly broken away of the parts shown in Figure 1;

Figure 3 is a view similar to Figure 2 but showing the closure member in its open position; and

Figure 4 is an enlarged cross sectional view illustrating one form of adjustment for the bearing blocks which support the closure disk and its associated parts.

In the said drawings 10 indicates the rotatable drum of a concrete mixer, here shown as of the truck type, which is provided at its rear end with the usual drip ring 11 which is rotatably mounted upon rollers 12 constituting the rear bearing for the drum. As disclosed in my said co-pending application, Serial No. 546,591 the drum may be provided with suitable pick-up troughs or buckets 13 which are adapted, when the drum is rotated in one direction, to pick-up portions of the concrete charge, move them to and through the opening 14 in the drip 11 and into the discharge hopper 15 which is carried by a suitable framework extension 16, rigidly connected by means of brackets 17 with the upright frame members 18.

Journalled in suitable bearings 19 mounted upon a transverse frame member 20 is a shaft 21 to which is keyed a pair of hubs 22 to which are connected downwardly extending arms 23 which at their lower ends are rigidly connected as at 24 to a bearing member 25 which is or may be substantially of the same construction as that shown in the said prior application of Ball and Miller, Serial No. 543,281. A stub shaft 26 is housed in said bearing 25 and is connected by means of a ball and socket joint 27 to the closure disk or member 28, as clearly shown in Figures 2 and 3.

Journalled in suitable bearings 30 carried by the upright members 18 is a transverse shaft 31 which carries at one end a worm gear 32 enclosed in a suitable housing 33 and meshing with a worm 34 mounted on a shaft 35 which also carries a hand wheel 36 by means of which the parts may be rotated. The shaft 31 also carries a rigid hub 37 provided with the integral arm 38 to the outer end of which is pivotally connected as at 39, one end a link 40, the other end of which is pivotally connected as at 41 to one end of a pair of toggle bars 42, the other end of which is pivotally connected as at 43 to a bracket 44 carried by the framework 16 which supports the hopper 15. A second pair of toggle bars 45 have one of their ends pivotally connected to the link 40 and to the bar 42 by the pivot 41, while the other end of the said bars is pivotally connected as at 46 to the extension 47 of the bearing member 25.

In operation, assuming the parts to be in the positions shown in Figures 1 and 2, in order to discharge the mixer the hand wheel 36 is rotated in such direction as to cause the worm 34 to rotate

the worm wheel 32 in counter-clockwise direction, as viewed in Figure 2, whereby the shaft 31 together with the hub 37 and arm 38 will be moved in a similar direction, lifting the link 40 and collapsing the toggle bars 42 and 45, which has the effect of drawing the closure plate or member 28 outwardly also in a counter-clockwise direction about the axis of shaft 21. The movement is continued until the parts reach the positions illustrated in Figure 3 where the said closure member 28 will contact with the wall of the hopper 15, which contact preferably takes place just before the pivot 41 of the toggle reaches the dead center between the pivots 39 and 43. It thus results that the pivot 41 cannot pass beyond the dead center and become locked, which would prevent the return of the parts upon the reversal of the motion imparted to the handle wheel but that when such reversal takes place the pivot 41 will be moved downwardly from its position shown in Figure 3 in a counter-clockwise direction and will, through the toggle links 45, force the bearing member 25 and closure member 28 back to the closed position shown in Figure 2. The worm gearing, which is preferably of the self-locking type, of course affords a considerable increase in the power applied to the hand wheel 36 and this force is again multiplied through the action of the toggle links 42 and 45 so that great force is exerted in moving the closure member 28 to its closed position through the application of a relatively small force to the hand wheel 36. This is highly desirable since to close the member 28 against the flow of a stream of concrete from the discharge opening 14 considerable force is necessary and it is necessary in operating closures of this type that they may be employed to cut off the flow of concrete from time to time, as for example when the latter is being discharged into a wheel barrow or directly into a form.

A stop 40' is preferably provided on the link 40, for engagement with the toggle links 45 to limit movement and prevent locking of the toggle in the closing direction.

When the closure member is in its open position illustrated in Figure 3 it also serves as a deflector plate to guide the concrete from the discharge opening 14 downwardly through the discharge hopper 15 and prevents the splashing of the concrete mixture over the top edge of the hopper.

In order that the rotative axis of the closure member 28 may be brought into absolute coincidence with the rotative axis of the drum 10, the bearings 19 are preferably adjustably mounted upon the transverse frame member 20, by means of bolts 48 passing through elongated slots 49, in the frame member 20 (see Fig. 4) and each bearing 19 is provided with an independent adjusting screw 50. Thus by adjusting one or the other of the screws 50, one or the other bearings 19 may be raised or lowered to slightly incline the shaft 21 in one direction or another, with consequent lateral adjustment or swinging of the closure member 28 and its supporting bearing 25. On the other hand by adjusting both of the screws 50 the bearings 19 may be raised or lowered and vertical adjustment of the parts may be had so that the rotative axis of the closure member may be made to coincide with that of the drum, as will be readily understood.

While one form of the invention has been illustrated and described it is obvious that those skilled in the art may vary the details of construction as well as the precise arrangement of parts without departing from the spirit of the invention, and therefore it is not wished to be limited to the above disclosure except as may be required by the claims.

What is claimed is:

1. A closure mechanism for the axial discharge openings of rotatable concrete mixer drums, comprising a closure member; means mounting said member for rotation with said drum when in closing position, and for swinging movements to and from said closing position about an axis transverse to the drum axis; self-looking worm gearing mounted adjacent the drum opening; an arm actuated by said gearing; toggle-bars extending between said closure-mounting means and a fixed portion of the mixer framework; and a link connecting said arm and the knuckle joint of the toggle-bars.

2. In a concrete mixer having a rotatable drum provided with a discharge opening, and a hopper for receiving concrete from said opening, a closure member mounted for swinging movements to and from said opening about an axis transverse to the drum axis; and means including a toggle for swinging said member to and from said opening, said member when moved toward its open position being arranged to contact a portion of said hopper and thereby prevent said toggle from passing dead center and becoming locked.

3. In a concrete mixer having a frame and a rotatable drum provided with an axial discharge opening at one end thereof, a frame member spaced from said opening and extending transversely thereof; a closure member for said opening; a support rotatably mounting said closure member, said support being pivotally carried by said frame for swinging movements toward and from said opening; toggle members extending between said transverse frame member and said support, arranged to swing said support and closure member toward and from said opening, said toggle members in the closed position of said closure member exerting a substantially axial thrust against said closure member; and means for actuating said toggle members.

4. In a truck concrete mixer having a rotatable drum provided with an axial discharge opening, and a hopper for receiving concrete from said opening, a closure member for said opening; means for mounting said closure member for swinging movements to and from said opening about an axis transverse to the drum axis; a universal joint connection between said closure member and mounting means; toggle members, one of which is pivotally connected to said hopper substantially co-axial with said drum opening, and the other of which is connected to said closure mounting; and means for actuating said toggle members.

5. In a truck concrete mixer and the like, the combination of a rotatable drum having a discharge opening at one end thereof; a closure member for said opening; a supporting arm for said closure member, mounted for arcuate movement toward and from said opening; a universal joint connection between said closure member and arm; toggle members for moving said closure to and from said opening; said members being substantially co-axial with said opening when the closure is in closing position, and arranged to resist pressure exerted by the drum contents against said closure; and means for actuating said toggle members.

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