Oct. 18, 1960 G. G. MORIN 2,956,832

CONCRETE POURING BUCKET

Filed Sept. 22, 1954

Fig. 1.

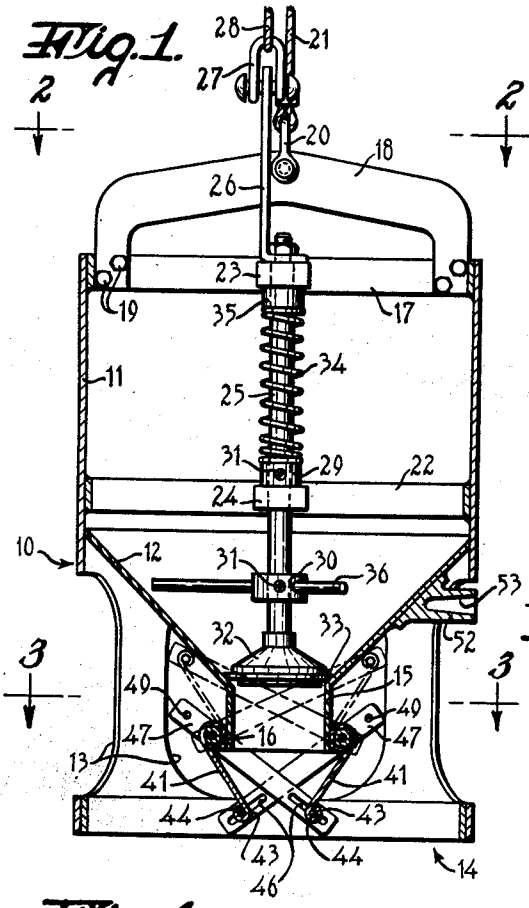


Fig. 2.

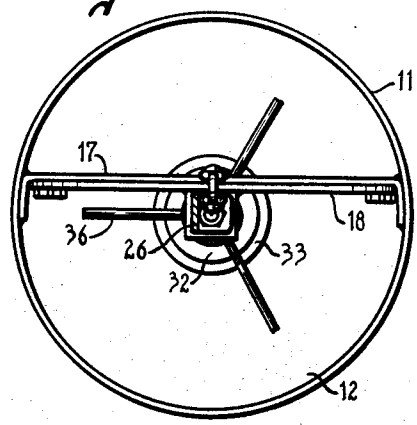


Fig. 3.

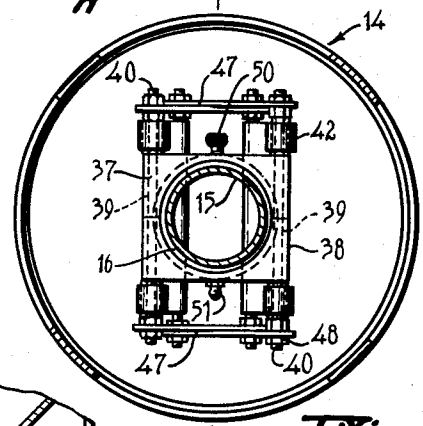


Fig. 4.

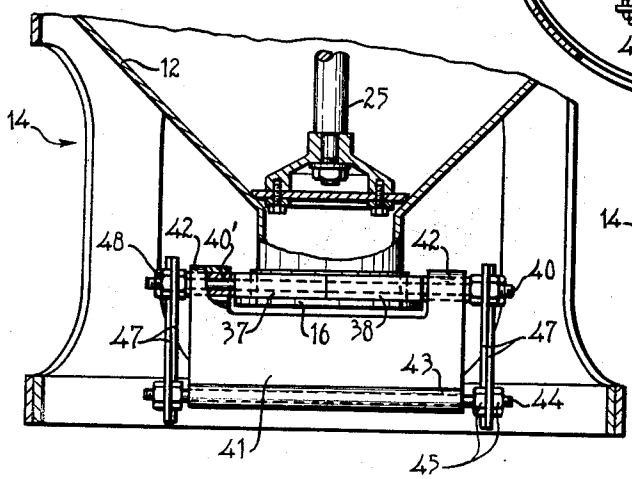
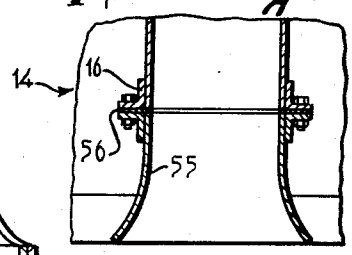


Fig. 5.



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CONCRETE POURING BUCKET

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8 Claims. (Cl. 294—69)

This invention relates to an improvement in crane carried buckets for pouring concrete into forms.

One object of the invention is to provide a bucket which discharges downwardly, and which is power opened and closed.

A further object is to provide a bucket of the above character in which the parts are so arranged and adjusted that the positioning of the bucket for the discharge of its contents may be controlled by the crane operator without the assistance of workers at the point of discharge or at least with a minimum of such assistance.

This includes the provision of means by which the power for opening and closing the bucket is applied through the hoist lines and the quantity of material discharged from the bucket is completely under the control of the operator of the crane to the hoist lines of which the bucket is attached and also the provision of means which provides for a precise directional and lineally dispersive discharge of the concrete from the bucket.

With the buckets presently in use it is necessary to provide workers at the point of discharge of the bucket to orient the bucket to assure a proper directional discharge of the contents and to maintain its position and orientation during the discharge as well as to control the amount discharged in one location. The necessary presence of these workers requires the erection of staging or platforms adjacent the forms from which they can operate.

Other and further objects residing in the details of construction and operation will be made apparent from the disclosure of the accompanying drawings and the following specification and claims.

In the accompanying drawings,

Fig. 1 is a side elevational view, parts being broken away in section, of a bucket embodying the invention;

Fig. 2 is a sectional view substantially on line 2—2 of Fig. 1;

Fig. 3 is a sectional view substantially on line 3—3 of Fig. 1;

Fig. 4 is a sectional view on an enlarged scale substantially on line 4—4 of Fig. 3; and

Fig. 5 is a detail sectional view showing a modified arrangement.

Referring to the drawings, the bucket body is shown as comprising a cylindrical member 10, the upper portion of which forms the side walls 11 of the bucket, and a conical member 12 having its upper periphery welded or otherwise secured adjacent the lower edge of the side wall portion 11 of member 10. Below the portion 11 the cylindrical member 10 is cut away as at 13 to provide a frame structure generally indicated at 14. The conical member 12 terminates in a downwardly directed discharge opening having a cylindrical spout 15 around the discharge end of which a flanged ring 16 is welded or otherwise secured.

A transverse bar 17 is welded or otherwise secured at the upper end of member 10. A hoisting bail 18 is

secured as by bolts 19 to the bar 17, the bail being provided centrally with a pivoted eye 20 to which the hoist cable 21 from the crane (not shown) is secured. A second cross bar 22 is secured, parallel to bar 17, to the side walls 11 adjacent the upper end of conical member 12. Bars 17 and 22 are provided with respective bosses or lugs 23 and 24 suitably bored to slidably receive and guide a valve rod 25. The upper end of rod 25 is connected by an extension 26 to a pivoted eye 27 to the second hoist or brake line 28 of the crane. The rod 25 is provided on opposite sides of boss 24 with respective collars 29 and 30 adjustably secured to the rod as by set screws 31, the collars 29 and 30 limiting the vertical movement of the rod in the bosses 23 and 24. The lower end of rod 25 is provided with a valve head 32 provided with a flexible valve disc 33, of greater diameter than the head 32, the peripheral portion of disc 33 engaging the tapering wall of member 12 just above the spout 15 to close the bucket opening to the spout. A disc of rubber ½ inch thick forms a satisfactory valve disc. A coil spring 34 surrounds rod 25 and is compressed between collar 29 and a washer 35, which engages boss 23, to force the valve head and disc 33 into bucket closing position. Preferably the compressive force of spring 34 is substantially less than the weight of the empty bucket and its associated parts so that valve 32—33 can be raised by line 28 without lifting the bucket even when the latter is empty. In any event the compressive force of the spring is less than the loaded weight of the bucket. The collar 30 is preferably provided with a plurality of radially extending rods 36 which as later described serve to break up the concrete mix as the latter flows from the bucket.

Rotatably mounted on the horizontal flange of ring 16 is a supporting member in the form of a pair of plates 37 and 38 having their adjacent edges cut away in semicircular form to embrace the vertical flange of ring 16. The ends of plates 37—38 are provided with aligned bores 39 to receive respective pivot rods 40. Pivoted on rods 40 are opposed elongated baffle plates 41 which are of greater length than the diameter of spout 15 and, as best shown in Fig. 4, are provided at their upper edges with spaced extensions 42 which are bent around bushings 40' positioned on the rods 40, outwardly of plates 37 and 38, to form the pivotal connection of the plates 41 with the rods 40. The lower edges of plates 41 are bent as is indicated at 43 to pivotally embrace rods 44. The ends of rods 44 are adjustably secured as by nuts 45 in slots 46 formed in the lower ends of pairs of crossed links 47. Links 47 are releasably secured adjacent their upper ends to the ends of rods 40 by nuts 48, the ends of the rods 40 extending through one of a plurality of openings 49 formed in the upper ends of the links.

As will be apparent, the plates 41 form an elongated, linearly directing, downwardly opening concrete discharge nozzle, below spout 15, which nozzle can be oriented relative to the bucket and spout 15 by rotation of plate assembly 37—38 around the spout 15, the plate assembly being secured in desired angular relation to the axis of the bucket by a set screw 50 threaded through the plate 37 (see Fig. 3). Preferably the opposite plate 38, is provided with a grease nipple 51 by which the bearings of the plates on flange 16 may be lubricated. The transverse extent of the opening between the lower edges of the plates 41 may be adjusted by adjusting the rods 44 in the slots 46 or by the provision of additional openings 49 in the links 47 or both. When the linear discharge of the concrete mix afforded by the plates 41 is not desired the links 47 may be connected to the rods 40 through the endmost openings 49 and the links swung upwardly to the dotted line position of Fig.

1 after which the plates **41** may also be swung upwardly to the dotted line position of the latter figure, and reconnected to the slots **46** to hold the plates **41** in the inoperative position indicated in dotted lines.

Preferably the conical surface of the member **12** is provided with one or more castings **52**, each formed with a tapered opening **53** to receive the end of a suitable power driven vibrator by which the walls of the bucket may be vibrated to maintain a free flow of even the stiffest concrete and to maintain the walls of the bucket free of adhering concrete.

Assuming, for example, that it is desired to pour concrete in the forms for a six inch wall, that is the sides of the form are 6 inches apart, the baffle plates **41** will be adjusted to space their lower edges 2 inches apart, the plates thus forming an elongated opening 2 inches wide and about 18 to 24 inches long, depending on the length of the baffle plates which depends on the size of the bucket, and the volume of cement discharged through spout **15**. In general the baffle plates will be given a length relative to the rate of discharge such that the discharge is confined within the plates to assure that there is no transverse spreading or fanning out the discharge at the ends of the elongated opening.

The bucket is then swung over the form and plates **37—38** rotated about spout **15** until the opening between the baffle plates is aligned with the form, the plates **37—38** being then clamped in position by set screws **50**. Thereafter the bucket swings into properly aligned discharging position automatically without assistance from workers at the point of discharge. The direct downward discharge of the concrete avoids any tendency of the bucket to swing as occurs in a sidewise discharging bucket where there is a component of sidewise thrust resulting from the discharge. Not only is time and labor thus saved in the pouring operation but there is a substantial saving in lumber and construction time in erecting the forms. When pouring high narrow walls such as retaining or flood control walls or high building foundations, it has been necessary to build wide platforms on each side of the wall forms to accommodate the three to six men usually required to manipulate the bucket. Part of this lumber is broken when the forms are taken down and cannot be used again. With the bucket of the invention only a narrow platform is necessary in high wall construction to accommodate the operator of the vibrator and a signal man when the crane operator cannot see the forms. In the case of both high and low wall forms, the construction of widely flared side members at the top of the form are eliminated.

The bucket is handled and discharged in the following manner:

Cranes of the type with which the bucket of this invention is adapted to be used are equipped with two lines wound on respective power driven drums with brakes for each. The line **21** which is connected to the bucket bail is used to hoist, lower and hold the bucket in place, this may be called the hoist line. The other line **28** is connected to the gate opening rod, this may be called the opening line. When the bucket is hoisted with the hoist line, the opening line is taken up slack. When the bucket is lowered over the form the opening line is payed out slack. The bucket is then held by the hoist brake and the bucket is opened by pulling on the opening line, or, in effect, shifting part or all of the weight of the loaded bucket to line **28** from line **21**. The valve may be only partially opened or opened wide and held in either position by the opening line brake. The bucket is closed by simply releasing the opening line brake. The upward movement of the valve head **32** together with rods **36**, break up the concrete mass in the bucket and induce a free flow of concrete, avoiding the use of a vibrator when the mix is relatively wet.

This bucket can also be used for underwater concrete pouring by removing plates **37—38** and the parts covered thereby and bolting a funnel **55** to flange **16**, the funnel extending downward flush with the lower edge of the bucket shell or frame **14**, and the connection being made air-tight by a gasket **56**, as shown in Fig. 5. The object of making this funnel air-tight is that with an air-tight tube or funnel at the bottom of the bucket, when the bucket is lowered in the water, air will be trapped in this tube or funnel and will prevent water from rising inside the tube so that when the bucket is opened the concrete will flow into an air chamber and spread without initial mixing with water.

What is claimed is:

1. A concrete pouring bucket which comprises a bucket body having a downwardly directed discharge opening, valve means controlling the flow of concrete through said opening, a pair of spaced baffle plates, positioned below and extending transversely of said opening, between which the concrete passes from said opening to effect a lineal discharge of the concrete, said plates being connected to the bucket body for bodily rotation about the axis of said opening, means to connect the bucket to two lifting lines of a crane and means responsive to a predetermined difference in tension on said lines to actuate said valve.

2. A concrete pouring bucket which comprises a bucket body having a downwardly directed discharge opening, valve means controlling the flow of concrete through said opening, a support rotatably connected to said bucket body for angular adjustment around the axis of said opening, opposed elongated baffle plates pivotally connected at their upper edges to said supporting member at opposite sides of said opening and between which the concrete discharged from said opening passes, said plates being of greater length than the diameter of said opening to effect a lineal discharge of the concrete, means to adjust the distance between the free edges of the baffle plates, means to connect the bucket to two lifting lines of a crane and means responsive to a predetermined difference in tension on said lines to actuate said valve.

3. A concrete pouring bucket which comprises a bucket body having a downwardly directed discharge opening, valve means, movable to and from open and closed positions, controlling the flow of concrete through said opening, a support rotatably connected to said bucket body for angular adjustment around the axis of said opening, opposed elongated baffle plates pivotally connected at their upper edges to said supporting member at opposite sides of said opening and between which the concrete discharged from said opening passes, said plates being of greater length than the diameter of said opening to effect a lineal discharge of the concrete, means to adjust the distance between the free edges of the baffle plates, means to connect the bucket to two lifting lines of a crane, means responsive to a predetermined difference in tension on said lines to move said valve from closed to open position and a spring biased to hold said valve in closed position when both said lines are slack.

4. A concrete pouring bucket which comprises a bucket body having a downwardly directed discharge opening, valve means, movable to and from open and closed positions, controlling the flow of concrete through said opening, a rod reciprocably mounted on said bucket body and connected at one end to said valve means to move the latter from one of its said positions to the other upon reciprocation of the rod relative to the bucket, a support rotatably connected to said bucket body for angular adjustment around the axis of said opening, opposed elongated baffle plates pivotally connected at their upper edges to said supporting member at opposite sides of said opening and between which the concrete discharged from said opening passes, said plates being of greater length than the diameter of said opening to effect a lineal discharge of the concrete, means to adjust the distance between the free edges of the baffle plates, a spring acting on said rod and biasing said rod to valve closing position, the biasing force of said spring being less than the empty weight of

the bucket, means connecting said bucket body to one of two lifting lines of a crane and means connecting said rod to the other of said two lines.

5. In a concrete pouring bucket which includes a bucket body having a downwardly directed discharge opening, and valve means controlling the flow of concrete through said opening, a pair of spaced baffle plates, positioned below and extending transversely of said opening, between which the concrete passes from said opening to effect a lineal discharge of the concrete, said plates being connected to the bucket body for bodily rotation about the axis of said opening.

6. In a concrete pouring bucket which includes a bucket body having a downwardly directed discharge opening, and valve means controlling the flow of concrete through said opening, a support rotatably connected to said bucket body for angular adjustment around the axis of said opening, opposed elongated baffle plates pivotally connected at their upper edges to said supporting member at opposite sides of said opening and between which the concrete discharged from said opening passes, said plates being of greater length that the diameter of said opening to effect a lineal discharge of the concrete, and means to adjust the distance between the free edges of the baffle plates.

7. A concrete pouring bucket which comprises a bucket body having a downwardly directed discharge opening, valve means controlling the flow of concrete through said opening, a tubular spout extending downwardly from said opening and terminating in a flange, a supporting member releasably and rotatably mounted on said flange,

a pair of opposed spaced baffle plates pivotally connected at their upper edges to said supporting member at opposite sides of the opening of said spout and between which the concrete discharged from said spout passes, said plates being of greater length than the diameter of said spout to effect a lineal discharge of the concrete, means to adjust the distance between the free edges of the baffle plates including means to position said plates in an inoperative position.

8. A concrete pouring bucket as in claim 7, the bucket body having a portion extending downwardly below said baffle members and forming a cylindrical frame, said flange being adapted to receive a downwardly extending inverted funnel in water-tight relation thereto upon removal of said supporting member, said funnel extending to the plane of the bottom of said frame.

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