Feb. 26, 1946. A. McMILLAN 2,395,571

CONCRETE MIXER

Filed March 17, 1944

Fig. 2.

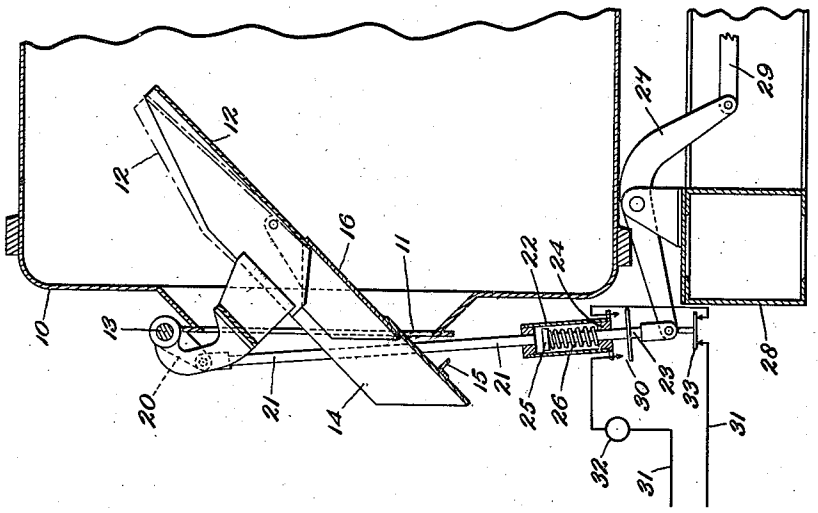
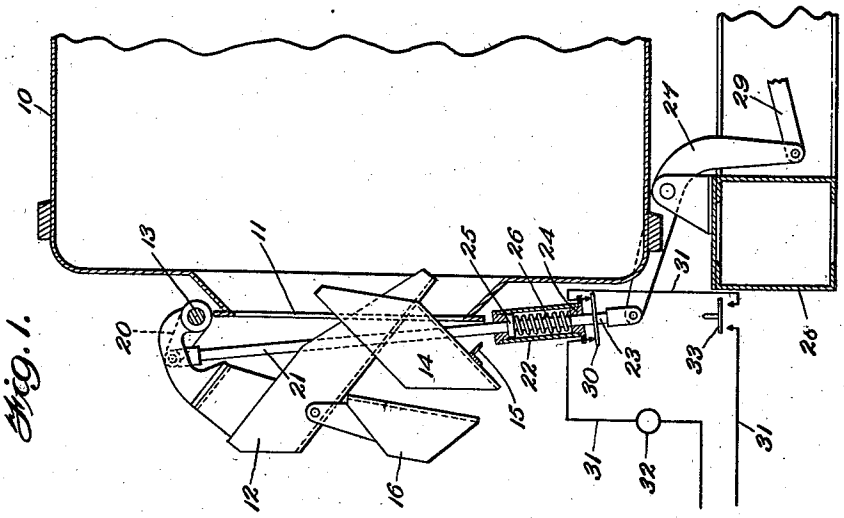



Fig. 1.




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2,395,571

## CONCRETE MIXER

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6 Claims. (Cl. 177—311)

The invention relates to concrete mixers, more particularly those equipped with material-transfer chutes, and has for its principal object the provision of simple and effective mechanism whereby the operator may be advised promptly upon the completion of the transfer of a batch of material by the chute. Since the invention has been developed primarily for use in connection with the well known discharge chutes whereby the batches of mixed concrete are transferred from the mixing chamber at the conclusion of the mixing operation, for purposes of the present disclosure it will be described in such connection, although those skilled in the art will readily recognize that it is not necessarily limited solely thereto.

In one typical form of concrete mixer in wide use a power driven rotatable mixing drum has a transfer chute associated with its discharge opening, which chute is movable manually or by power driven means between an operative and an inoperative position relative to said drum opening. In its operative position at least a portion of the chute lies within the drum and inclines downwardly toward the discharge opening, whereby concrete mixture deposited in such portion by bucket-like formations provided interiorly of the drum and gravitationally flowing down the chute may be directed through the discharge opening to the exterior of the drum.

In many instances the movements of the chute to and from its operative position are under the control of some form of automatic mechanism whereby the operations of the various instrumentalities of the machine, including the said chute movements, are caused to take place relative to one another in an accurately timed cycle. Such automatic control devices however, usually permit of the operator taking instant manual control of the chute if necessary.

Under normal automatically controlled operation the control device is usually set to hold the chute in its discharging position for a time sufficient to insure complete discharge of a batch from the drum under the most unfavorable conditions apt to be encountered, as for example, when working on down-grades, handling oversize batches, etc. However, with such setting of the automatic control mechanism, time may be lost when such unfavorable conditions do not obtain, since under more favorable conditions several seconds may elapse after the batch is completely discharged from the drum before the automatic mechanism moves the chute to inoperative position. Rapid changing of the settings of the automatic control devices to take care of changing conditions of operation is not ordinarily feasible.

To avoid the loss of time just mentioned, the present invention provides simple and effective means for audibly or visually advising the operator in the event discharge of the batch is completed prior to the expiration of the period determined by the automatic control setting, whereby he may take manual control of the chute to effect its movement to non-discharge position. Obviously too, the invention may be employed to advantage where some or all of the various functions of the machine are normally under manual control, at the volition of the operator.

One form of the invention has been illustrated, more or less diagrammatically, in the accompanying drawing forming a part of this specification, in which like reference characters designate like parts throughout the views, and in which

Fig. 1 is a sectional-elevational view of the pertinent elements of a concrete mixer of the type above mentioned, with the invention applied thereto, the parts being illustrated in the positions assumed when the discharge chute is in its inoperative position; and

Fig. 2 is a similar view showing the positions of the parts when the chute is in its operative position.

The mixer elements here shown comprise the rotatable mixing drum 10 having a discharge opening 11 in one end wall thereof, adjacent which opening a discharge chute 12 is mounted by a transverse rock-shaft 13 for swinging movements between the positions illustrated in Figs. 1 and 2 respectively. The interior of the drum 10 may be provided with conventional mixing blades and pick-up bucket formations, not shown but well known in the art. A fixed sub-chute 14 is mounted by a member 15 of the machine framework, the major portion of which sub-chute lies exteriorly of the opening 11, as will be clear from the drawing. The chute 12 carries a hinged extension 16 which in the operative positions of the parts serves to bridge a gap between the lowermost end of the chute 12 and the sub-chute 14, as shown in Fig. 2.

The chute is movable between the two positions shown by an arm 20 carried by the shaft 13, to which arm is connected a rod 21 which carries a housing 22. A second rod 23 slidably enters the said housing through its lower head 24, which second rod is provided with a flange or head 25. A coiled compression spring 26 is interposed between the heads 24 and 25 and tends to maintain the rods 21 and 23, and housing 22 in the Fig. 1 positions. The rod 23 is connected to one arm of a bell-crank lever 27 mounted on a member 28 of the machine frame and having its other arm connected by a link 29 to a power-driven actuating mechanism of appropriate conventional type, such for example, as that disclosed in prior U. S. Patent No. 1,415,411 granted May 9, 1922 on an application filed by Samuel Shafer, Jr. This device may be under the manual control of the oper-

ator, or it may in turn be controlled by an automatic control mechanism, such for example, as that disclosed in prior U. S. Patent No. 1,608,831 granted November 30, 1926 on an application filed by Charles F. Ball.

As is well known to those skilled in this art, the power actuating mechanism of the said Shafer patent moves the chute 12 from the inoperative position of Fig. 1 to the operative position of Fig. 2 by pulling upon the link 29, which motion is transmitted through the several elements 27, 23, 25, 26, 24, 22, 21 and 20 to the rock-shaft 13, which swings the chute into the drum. After an interval determined either by the operator, in the case of manual control, or by the control mechanism of the Ball patent, in the case of automatic control, the power actuating device pushes upon the link 29 to restore the parts to the Fig. 1 positions.

In moving the chute into the drum the power actuating mechanism tends to position it substantially as indicated in broken lines in Fig. 2. However, with a batch of concrete in the drum being lifted by the discharge buckets thereof and dropped into the chute, the weight and/or impact of the mixture will cause the chute to occupy substantially the full line position shown in said figure. This produces a compression of the spring 26 and a separation of the rods 21 and 23, as also indicated in said Figure 2. When the batch has been discharged and there is no longer any concrete in the chute, the spring 26 will expand and lift the chute to the broken line position; and in accordance with this invention this movement of the parts as the discharge is completed is utilized to control an appropriate signal whereby the operator may be immediately notified of such fact.

One mode of accomplishing the result is shown diagrammatically in the drawing, wherein an electric switch 30 is arranged to be actuated by the relative movement between the rod 23 and the housing 22. This switch controls a circuit 31 which includes a suitable signal 32, such as a lamp, bell, horn, etc. So long as the spring 26 is expanded and the elements 22 and 23 are in substantially the Fig. 1 relation, the switch 30 remains closed. When the parts 22 and 23 are in the Fig. 2 positions as a result of the weight and/or impact of the concrete in the chute as above described, the switch 30 will be open and the signal 32 not energized, but when the spring 26 restores the elements 22 and 23 to the relative positions of Fig. 1 at the conclusion of discharge, the switch will be closed and the signal will indicate the completion of discharge to the operator.

In order that the signal 32 will not be actuated when the chute is out of the drum, a second switch 33, normally open, is included in the circuit 31, being appropriately positioned to be closed by some part of the chute-moving linkage, as for example an arm of the bell-crank lever 27, as the chute reaches discharge position.

While one form of the invention has been illustrated and described it will be 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. In a concrete mixer having a mixing receptacle and a material-transfer chute which is movable between an operative and an inoperative position relative to the receptacle: a signal; means responsive to the presence and absence of material in the chute to actuate the signal at the completion of a material transfer; and means for preventing actuation of the signal when the chute is in its inoperative position.

2. In a concrete mixer having a mixing receptacle, a material-transfer chute, and means for moving said chute between an operative and an inoperative position relative to the receptacle: an electric circuit including a signal; means for controlling said circuit in response to the presence and absence of material in the chute, whereby to actuate the signal at the completion of a material transfer; and means for rendering said circuit inoperative when the chute is in its inoperative position.

3. In concrete mixing apparatus and the like, having a material-transfer chute mounted for movements to and from an operative position, and means for so moving said chute: the combination of means comprising a yieldable connection between said chute and moving means, whereby, when the chute is in said operative position, relative movements may take place between it and the moving means in response to the presence and absence of material in the chute; a signal; and means responsive to such relative movements between the chute and moving means for controlling said signal whereby to indicate the absence of material in the chute.

4. Apparatus according to claim 3, having means for preventing actuation of the signal when the chute is in its non-operative position.

5. In concrete mixing apparatus and the like, having a material-transfer chute mounted for movements to and from an operative position, and means for so moving said chute: a connection between the chute and moving means arranged to secure a predetermined relationship between the two whenever the chute is empty, and to yield upon deposit of material in the chute whereby relative movement may take place between the chute and moving means; a signal; and means controlled by said movements between the chute and moving means for actuating the signal to indicate absence of material in the chute upon completion of the discharge thereof.

6. In concrete mixing apparatus and the like, having a material-transfer chute mounted for movements to and from an operative position, and means for so moving said chute: resilient means arranged to transmit force from said moving means to the chute without yielding whereby to move the chute to said operative position, said resilient means being yieldable upon deposit of material in the chute whereby the latter may move slightly relative to the moving means; a signal; and means operable by the relative movements between the chute and moving means for controlling the signal whereby to indicate completion of the discharge of material so deposited in the chute.

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