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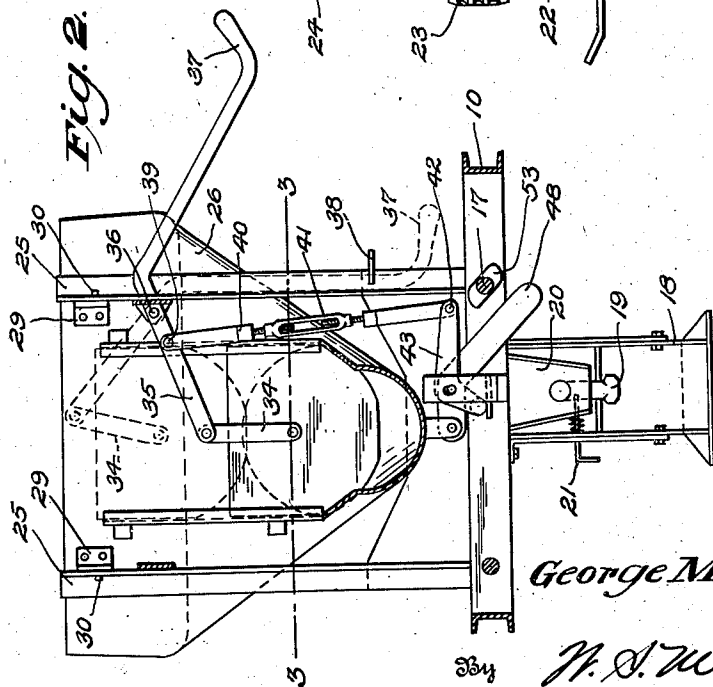
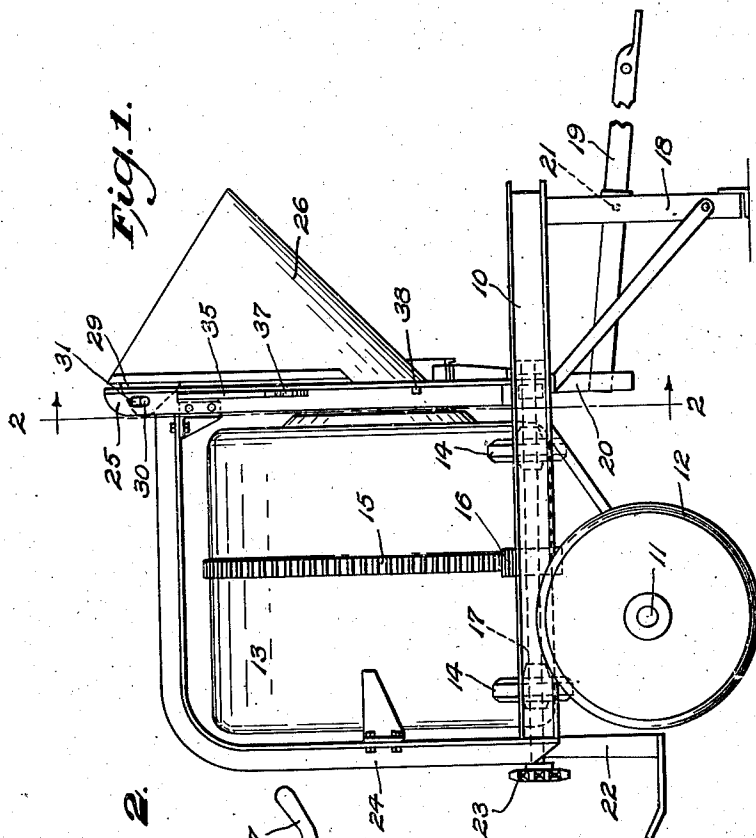
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2,398,549

VIBRATING APPARATUS FOR THE FEEDING CHUTES OF CONCRETE MIXERS

Filed Jan. 22, 1945

2 Sheets-Sheet 1.



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2 Sheets-Sheet 2

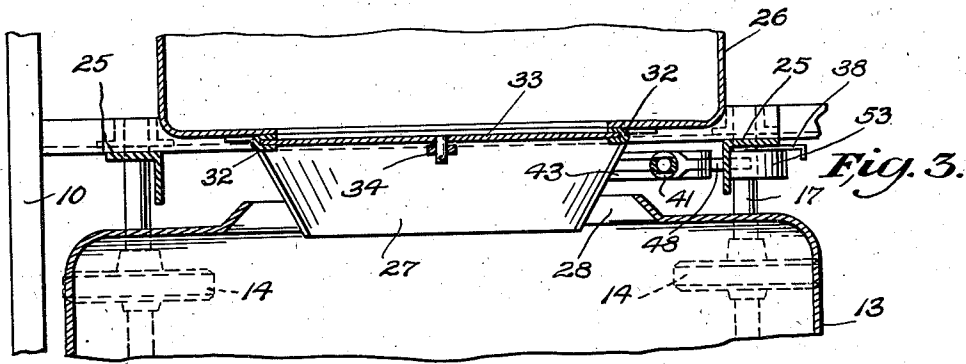


Fig. 4.

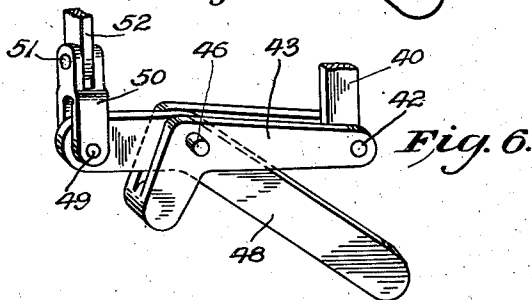
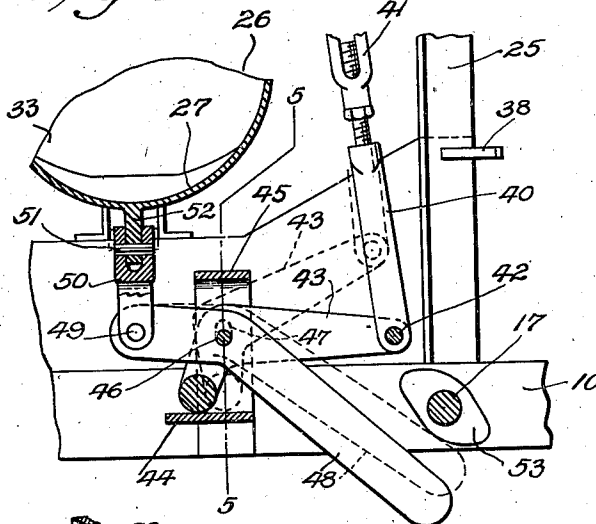
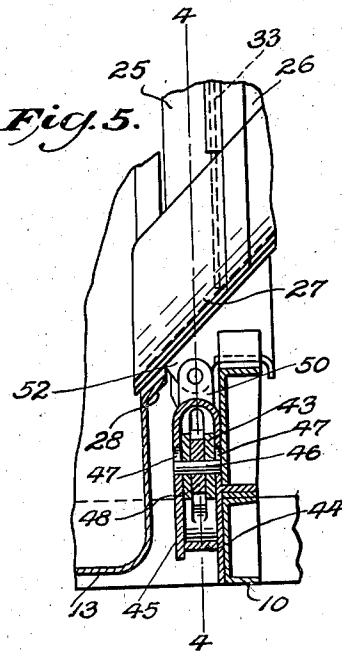


Fig. 5.



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UNITED STATES PATENT OFFICE

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VIBRATING APPARATUS FOR THE FEEDING
CHUTES OF CONCRETE MIXERSGeorge M. Murphy, Columbus, Ohio, assignor to
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3 Claims. (Cl. 259-164)

This invention relates to concrete mixers and, more particularly, to that type of mixer having a rotatable drum adapted to be charged with aggregates by means of a downwardly inclined, stationary, frame-mounted chute, such feed being under the control of a manually operated gate arranged at the discharge end of the chute.

In the operation of such mixers, it often happens that the aggregates, composed usually of cement, crushed minerals, sand and water, adhere to the surfaces of the chute or feeding trough so that the gravity flow of the aggregates into the mixing drum is impeded. In practice, to overcome this condition, the operators of the mixer frequently strike the chute or trough with percussion instruments to impart vibratory forces thereto for loosening the adhering aggregates, a practice which often results in denting and structurally injuring the chute.

Accordingly, it is an object of the present invention to provide means, substantially automatic in operation, for vibrating the stationarily mounted chute or trough of such a mixer in a manner to insure the proper flow of aggregate forming materials into the rotatable drum of the mixer, whereby to preclude such adherence of materials to the wall surfaces of the chute in amount sufficient to interfere with the desired passage of the materials through the chute.

It is another object of the invention to provide automatic chute-vibrating means for concrete mixers in which the vibrating mechanism becomes operative or active when the associated flow-controlling gate of the chute is raised to provide for aggregate flow from said chute into the mixing drum.

A further object of the invention is to provide a chute-vibrating means for concrete mixers of simple construction and one which is comparatively inexpensive to manufacture and more efficient in use than those which have been heretofore proposed.

With the above and other objects in view, which will appear as the description proceeds, the invention consists in the novel features 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 part of this specification and in which like reference characters designate like parts in all the views:

Fig. 1 is a side elevational view of a concrete mixer with the chute-vibrating mechanism comprising the invention applied thereto;

Fig. 2 is a vertical transverse sectional view taken through the mixer on the plane indicated by the line 2-2 of Fig. 1;

Fig. 3 is a detail horizontal sectional view showing the discharge end of the feeding chute and the mix-receiving end of the mixing drum, the plane of the figure being indicated by the line 3-3 of Fig. 2;

Fig. 4 is a detail vertical sectional view on the plane indicated by the line 4-4 of Fig. 5 and disclosing the cam-actuated lever system for imparting vibratory movement to the feeding chute;

Fig. 5 is a detail vertical longitudinal sectional view on the plane disclosed by the line 5-5 of Fig. 4;

Fig. 6 is a detail perspective view of the pivotally related lever members of the chute-vibrating mechanism.

Referring more particularly to the drawings, my improved chute-vibrating mechanism has been shown as applied to a conventional type of concrete mixer, embodying a frame 10, provided at one end with an axle 11 carrying ground-engaging wheels 12. Mounted on this frame is a rotatable mixing drum 13, the latter being supported by the usual cradle rolls 14. The drum is rotated by being provided with an external gear ring 15, which meshes with a pinion 16 provided on a drive shaft 17, the latter being rotatably supported by the frame 10 in longitudinal relationship therewith.

At the end of the frame, opposite to that occupied by the wheels 12, the same is provided with one or more rigidly depending ground-engaging legs 18, which impart stability to the mixer when the same is stationarily positioned for operation. Adjacent to these legs, the frame is provided with a draft tongue 19, the rear end of which is pivotally supported in connection with a stationary bracket 20 depending from the frame 10. The tongue is adapted to be connected with a draft vehicle in order that the mixer may be readily moved from one working location to another. The operating positions of the tongue are controllable by providing the leg structure 18 with a manually operated spring-pressed pin 21 and at its other end the frame is provided with a vertically adjusted jack foot 22. The shaft 17 may be provided with a sprocket 23 for the reception of a drive chain leading to a source of power, such as an internal combustion engine, not shown, and which may be suitably carried by the frame 10, or which may be separately mounted.

Arising from the frame 10 and surrounding the drum 13 is a substantially vertical supplemental

frame structure 24, the latter including a pair of spaced, parallel vertically disposed angle members 25. The latter are employed to effect the support of an inclined mix-feeding chute or trough 26. The aggregate used in forming a concrete mix is introduced into the relatively wide open upper end of the chute and gravitates toward the lower end thereof, the lower end of the chute being formed with an apron 27 which projects into the open mix-receiving end 28 of the drum 13, as shown in Fig. 2. The substantially vertical rear face of the chute lies adjacent to and in parallelism with the angle members 25 and is equipped with a pair of stationary brackets 29 provided with laterally extending pins 30, the latter being received within elongated slots 31 formed in the angle members 25, whereby the chute is pivotally united with the angle members but is capable of limited vertical movement with respect thereto.

The vertical back wall of the chute is equipped with guides 32 in which is slidably mounted a flow-controlling gate 33, the latter being adapted to be raised and lowered to regulate the outflow of an aggregate from the chute into the mixing drum. To raise and lower the gate, the latter is pivotally connected with the lower end of a link 34, the upper end of the link being pivotally connected with the inner end of a gate-operating lever 35. This lever is pivotally mounted as at 36 on one of the angular members 25 and projects outwardly and laterally therefrom, terminating in a curved hand-engaging extremity 37.

When the lever occupies the full line position, disclosed in Fig. 2, the gate is in its lowered or flow-obstructing position. However, when the lever is oscillated to assume the position disclosed by dotted lines in Fig. 2, the gate is moved upwardly, assuming a position providing for the flow of aggregates into the mixing drum. The lever may be retained in its gate-elevating position by being engaged with a shouldered projection 38 stationarily carried by one of the angle members 25.

To provide for the vibration of the chute or trough 26 when the gate occupies its elevated position, there is pivoted to the lever 35, as at 39, the upper end of a variable length link 40, the intermediate portion of this link being formed to include a turn-buckle construction 41 by means of which its effective length may be regulated. The lower end of the link is pivotally connected as at 42 with the outer end of a bifurcated cam lever 43, the latter being of bell-crank formation, the shorter arm 43a of the lever 43 being rounded for engagement with a stationary shelf 44 of a cam-lever bracket 45, the latter being stationarily carried by the frame 10. The lever 43 carries a pivot pin 46, the ends of which are received within vertical slots 47 provided in the opposite vertical side walls of the bracket 45. Also turnable about the pin 46 is a shaker arm 48, the latter being disposed between the bifurcated portions of the cam lever 43.

The inner end of the arm 48 is pivotally joined as at 49 with the lower bifurcated end of a link 50. The upper bifurcated end of this link, which is disposed in a plane at right angles to that of its lower portion, is pivotally joined by a pin 51 with an ear 52 rigidly carried by and depending from the lower portion of the chute or trough 26. On one end of the drive shaft 17, there is mounted a rotatable cam 53 which is adapted to engage and oscillate the outer end of the shaker

arm 48 when the gate 33 occupies its elevated position.

In the operation of this mechanism, it will be evident that when the drum 13 is being rotated by the operation of the drive shaft 17, and with aggregate contained in the trough or chute 26, the oscillation of the lever 35 in a downward direction will result in the elevation of the gate 33 and consequent flow of the aggregate into the drum where the mixing thereof takes place in the usual manner.

Simultaneously with the downward movement of the lever 35, upward movement will be imparted to the link 40, which oscillates the cam lever 43, causing the shorter arm 43a thereof to engage the shelf 44 and thereby lift the cam lever 48 and its pivot pin 46, such lifting movement being provided by the slots 47 in the side walls of the bracket 45. This elevation of the pivot pin carries with it the shaker arm 48, bringing the outer end thereof into contact with the revolving cam 53 which is mounted on the rotating shaft 17. The resulting oscillation of the arm 48, by reason of its contact with the outer surfaces of the cam 53, imparts vibratory movement to the chute or trough 26, such movement being made possible by the bracket pins 30 of said chute which are received in the slots 31 of the supplemental frame members 25. Thus, in addition to gravity flow, the passage of aggregate through the chute or trough is positively attained by vibration, so that an assured flow of the mix-forming materials is secured.

It will be observed that the apparatus is essentially simple in construction and, moreover, is positive, efficient and reliable, the vibrating mechanism being rendered active or inactive through the mere manipulation of the gate-controlling lever 35.

While I have shown the cam 53 as being mounted on one end of the drive shaft 17, it will be understood that any other suitable drive mechanism may be used for operating the cam if higher or lower rotational speeds may be found to be desirable.

I claim:

1. A concrete mixer of the type having a rotatable drum and a relatively stationarily mounted chute for feeding mix-forming materials into said drum, the discharge end of the chute being provided with a movable flow-regulating gate opened or closed by a manually operated lever, means for vibrating said chute when said gate occupies its open position, said means comprising a cam lever, means linking the cam lever with said gate-operating lever, a stationary support with which said cam lever is pivotally connected for limited vertical movement in addition to pivotal rocking movement, a shaker arm pivotally movable about the axis of rocking movement of said cam lever, a rotatable power driven cam adapted for engagement with said shaker arm to oscillate the latter when said gate occupies its open position, and means pivotally uniting said shaker arm with said chute.

2. In a concrete mixer, a rotatable mixing drum, a relatively fixed aggregate-feeding chute, a movable gate governing the flow of aggregate from said chute into said drum, pivoted lever means for operating said gate, an oscillatory lever, a stationary support upon which said lever is mounted for rocking movement and limited linear movement, a link uniting one end of said lever the lever means for operating said gate, a vibratory arm pivotally carried by said support

for linear movement in unison with said cam lever, a rotatable power driven cam normally spaced from said arm and engageable therewith upon the actuation of said lever means to open said gate, and means pivotally uniting said arm with said chute.

3. In a concrete mixer, a frame structure, a drum rotatably supported by said frame structure, said drum having an open end, a downwardly inclined chute for feeding mix-forming materials into the open end of said chute, means for supporting said chute on said frame structure, said means admitting of limited reciprocatory

5 movement of the chute relative to the frame structure, an oscillatory arm pivotally mounted on said frame structure for limited linear movement with respect thereto, a power driven rotatable cam normally spaced from said arm, means pivotally uniting said arm with said chute, and manually operated means for moving said arm linearly relative to said frame, whereby to bring the arm into contacting engagement with
10 said cam and through the oscillation of said arm to impart limited reciprocatory movement to said chute.

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