

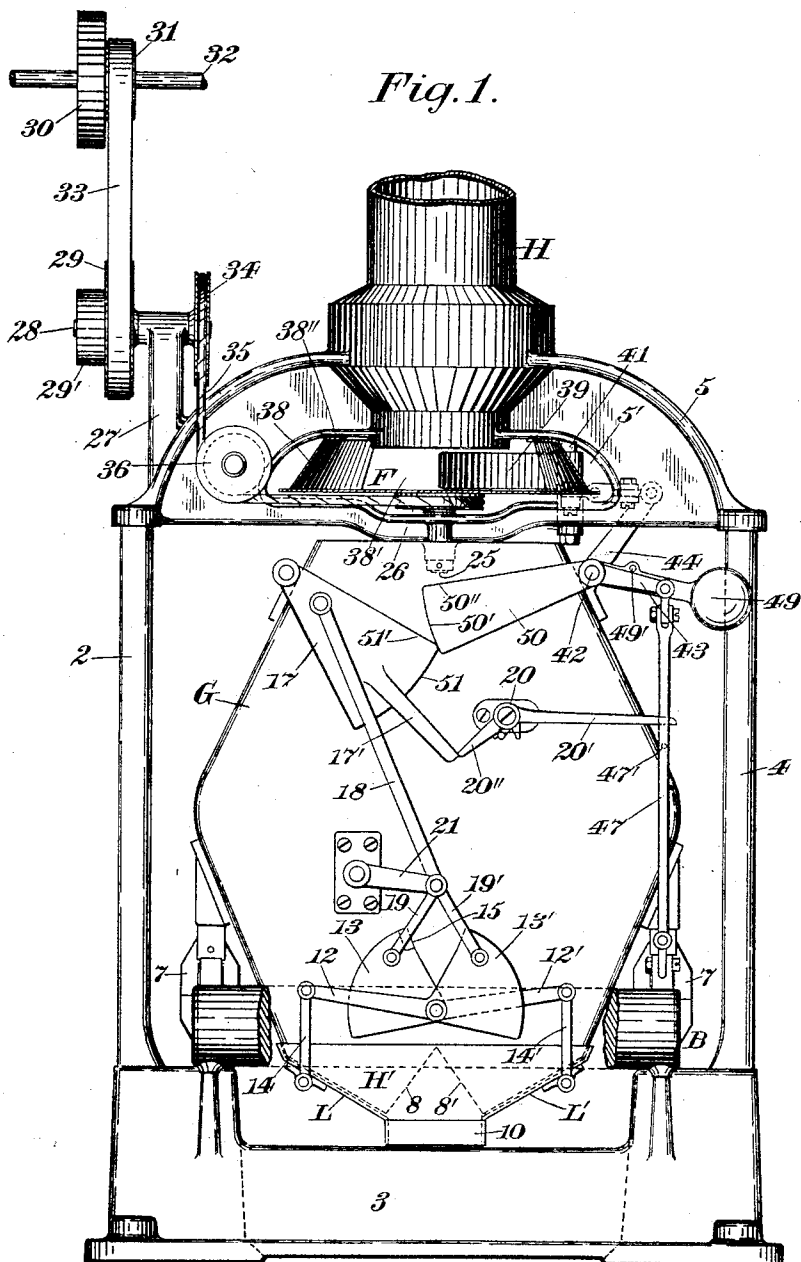
(No Model.)

3 Sheets—Sheet 1.

F. H. RICHARDS.
WEIGHING MACHINE.

No. 578,158.

Patented Mar. 2, 1897.



Witnesses:

J. L. Edwards Jr.
Fred. J. Dole.

Inventor:

F. H. Richards.

(No Model.)

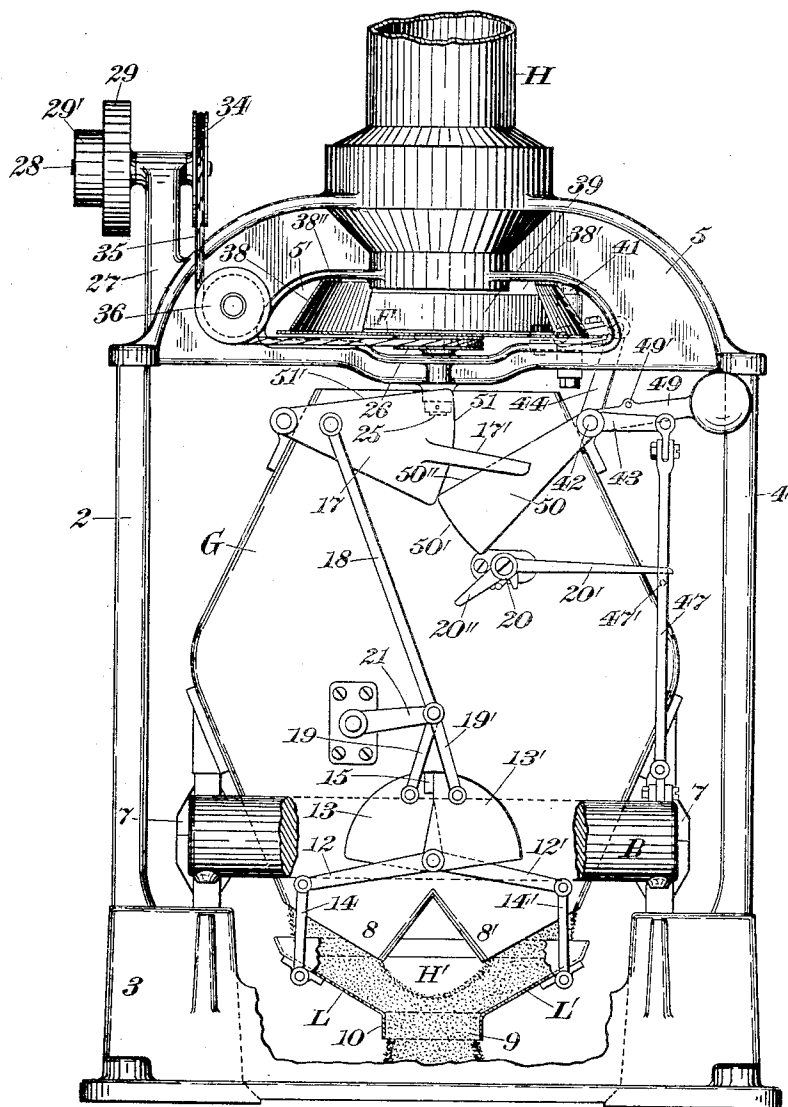
3 Sheets—Sheet 2.

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Fig. 2.



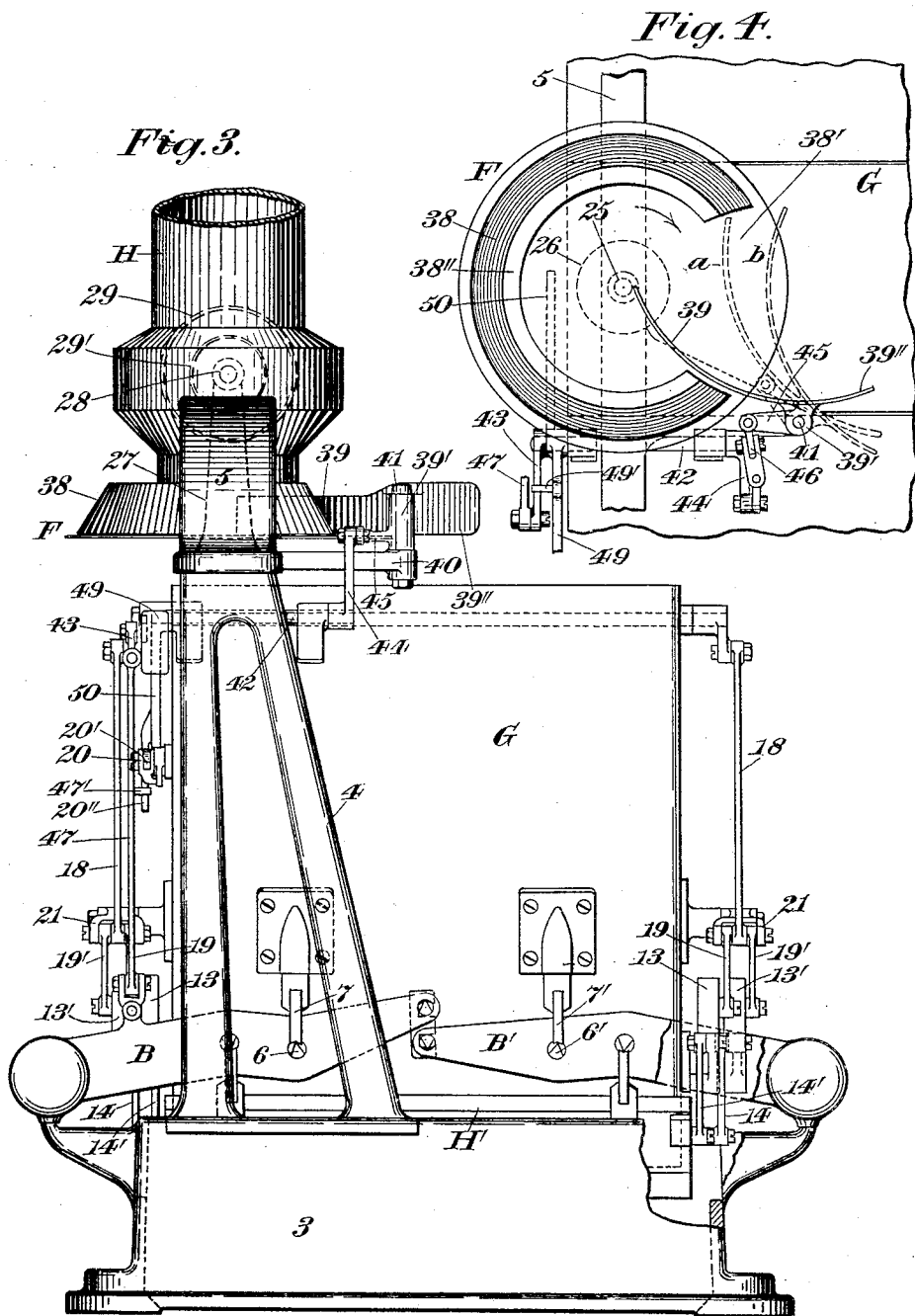
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UNITED STATES PATENT OFFICE.

FRANCIS H. RICHARDS, OF HARTFORD, CONNECTICUT.

WEIGHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 578,158, dated March 2, 1897.

Application filed July 6, 1896. Serial No. 598,084. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS H. RICHARDS, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Weighing-Machines, of which the following is a specification.

This invention relates to weighing-machines, an object of the invention being to provide an improved organization of mechanism comprehending an efficient load-supply device consisting in its preferred form of a movable feed-table and a deflecting or guide blade which coacts therewith, said parts serving to maintain a steady even stream to the bucket during the loading period.

Another object is to provide closer mechanism embodying a closer which is supported for vertical movement relatively to the bucket and which controls a discharge-outlet thereof, so that on the discharge of a load of material the gravitating mass may hold said closer open or down, to thereby allow ample time for the complete discharge of the bucket contents.

In the drawings accompanying and forming part of this specification, Figure 1 is a front elevation of a weighing-machine comprehending my improvements in the preferred embodiment thereof and illustrates the positions occupied by the respective parts at the commencement of operation. Fig. 2 is a similar view of the machine, showing the positions occupied by said parts during the load-discharge period. Fig. 3 is an end elevation as seen from the right in Fig. 1, the operative parts being in positions corresponding therewith; and Fig. 4 is a detail view in plan, illustrating the load-supply mechanism.

Similar characters designate like parts in all the figures of the drawings.

The framework for supporting the operative parts of the machine may be of any suitable character, and it is herein illustrated consisting of the end frames or columns 2 and 4, surmounted by the top plate 5, suitably attached thereto, said end frames being mounted upon the base 3.

The bucket or load-carrying receptacle of the machine is designated by G and is of the "single-chambered" type, though it is obvious that some other form might be employed.

For supporting the bucket the compound beam mechanism illustrated is employed, said mechanism consisting of the oppositely-disposed counterweighted scale-beams B and B', fulcrumed to the base or other part of the machine in the usual manner, although, as is obvious, any other suitable devices for accomplishing this purpose may be utilized. The beam mechanism at points intermediate its fulcrums will be furnished with suitable bucket-supports, (two of these being shown at 6 and 6', Fig. 3, as knife-edges,) which sustain the bearings 7 and 7', depending from hangers attached to the end walls of the bucket.

The bucket G is illustrated terminating in two spouts 8 and 8', the outlets of which are controlled by closers or shutters, said closers, in the form herein shown, being supported for vertical movement relatively to the bucket G, so that on their release at the proper point in the operation of the machine, as will hereinafter appear, the discharging mass from the bucket tends to force said closers open and hold them down to allow ample time for the discharge of the bucket contents.

The closers are designated by L and L' and consists in the present instance of the oppositely-inclined walls of the depressible hopper H' and are adapted, when in the normal position thereof, as indicated in Fig. 1, to abut or fit tightly against the lower edges of the spouts 8 and 8'. The hopper H' leads to an outlet 9, about which a tubular conduit 10 extends, the cross-sectional area of said conduit 10 being preferably less than the combined cross-sectional area of the two spouts 8 and 8', so that the outflow of material from the conduit 10 is less than the inflow into the hopper H' from the two bucket-spouts 8 and 8', whereby the hopper 9 may be maintained in its depressed position by the weight of the discharged material therein, as indicated in Fig. 2, for a relatively long period of time, the mass within the hopper H' tending to impede or retard its return movement.

For supporting the hopper H' the means illustrated are preferably employed and will now be described. A pair of crossing levers pivoted to the bucket G are shown at 12 and 12', furnished at their free ends with the segmental counterweighted plates 13 and 13', the

function of the latter being to return the two closers to their normal positions. The opposite ends of the levers are provided with depending links 14 and 14', pivoted thereto and similarly connected to the hopper H'. The closer-supporting mechanism just described will preferably be duplicated at the opposite sides of the bucket, so that an even movement of said hopper may be insured. The counterweighted plate 13 is provided with a lug 15, against which the complementary plate 13' is adapted to abut, whereby the descending movement of the hopper H' will be limited, as illustrated in Fig. 2.

For normally maintaining the hopper H', and consequently the closers L and L', against discharge movement the following instrumentalities, comprising as one of its constituent elements an inverted toggle, will be preferably employed: A rocker is shown at 17, supported for oscillation on the bucket G and having joined thereto a connecting-rod 18, said rocker and rod 18 constituting the two members of the toggle to which allusion has just been made. A pair of links are shown at 19 and 19', respectively, articulated to the rod 18 and also to the counterweighted plates 13 and 13'. When the hopper is in its normal position and the closers L and L' are shut, the three toggle-pivots will be approximately in line, as indicated in Fig. 1, so that said hopper may be held against movement by a minimum pressure on the rocker 17. For thus holding the rocker 17 against oscillation, and consequently preventing the discharge movement of the hopper H', a latch is illustrated at 20, pivotally supported on the end wall of the bucket G and positioned for engaging the rocker or the rigid arm 17' thereof when the parts are in the closed positions previously described. In the embodiment illustrated the detent-arm 20' of said latch swings upward to engage the rocker-arm 17'. It will be evident that when the long arm 20' of said latch is raised or tripped the detent-arm will be disengaged from the rocker-arm 17' and the rocker 17, and hence the hopper H' freed of all restraint, so that the weight of the contents in the bucket may force said hopper H' vertically downward and the closer-walls L and L' away from the edges of the spouts 8 and 8' to permit the discharge of a bucket-load. On the depression of the hopper H' by the weight of the mass of material therein the non-counterweighted arms of the levers 12 and 12' will move in coincidence therewith, the counterweighted plates 13 and 13' being oppositely rocked, until the plate 13' impinges against the lug or abutment 15 on the plate 13, which indicates that said hopper has reached the limit of its descending movement. As soon as the plates 13 and 13' overbalance the weight of material in the hopper H' the ascent of such hopper will be caused thereby, and as said hopper approaches its normal position any particles therein will gravitate down the inclined or closer walls thereof and pass into

the conduit 10. A guide in the form of a lever 21 is illustrated pivoted to the bucket G and to the lower end of the connecting-rod or toggle member 18, whereby the latter may be maintained in a true path during its reciprocations.

My present improvements involve the provision of a movable feed-table and a deflecting or guide blade therefor, which parts coact to supply a stream of material to the bucket.

The top plate is apertured at 5', between the walls of which aperture the feed-table, which is designated by F, is supported for movement, said table in the present instance, though not essential, consisting of a circular plate supported for rotary movement beneath the supply-outlet of the chute or hopper H, the latter being of ordinary construction and preferably formed integral with the top plate 5. The table or platform F' is furnished with a projecting spindle or stud 25, journaled in a suitable bearing formed in said top plate. The spindle 25 is provided with a pulley 26, which communicates with a suitable motor by which motion may be transmitted to the feed-table F.

A riser is shown at 27, having journaled in its upper end the shaft 28, provided with the differential pulleys 29 and 29', respectively, belted to the similar pulleys 30 and 31, mounted on the shaft 32, Fig. 1, the connecting-belt being designated by 33. The shaft 38 also carries the pulley 34, connected by the rope or cable 35 with the pulley 26, said rope being partially passed around the guide-pulley or idler 36, rotatively supported by the top plate.

It will be evident that by shipping the belt 33 from the pulleys 31 and 29 to the pulleys 30 and 29', and vice versa, the speed of the feed-table F may be varied. The chute H upon being supplied with a mass of material will direct the same to the feed-table F, which is preferably horizontally disposed below the mouth of said chute.

An inclined guard-wall is shown at 38, extending partially about the feed-table F, the lower edge of said wall being approximately contiguous to said feed-table. The space 38' between the adjacent edges of the wall constitutes a feed-opening, said wall being also flanged, as at 38'', through which and a rib or flange on the top plate 5 suitable fastening means may be passed.

A deflecting or guide blade is shown at 39, supported for oscillatory movement on an axis coincident with that of the feed-table F, said deflecting-blade 39 being projectable across the plane of the feed-table F. Said blade 39 is also illustrated curved for a purpose that will be hereinafter apparent, and as also having the lug or ear 39', through which and an opening formed in the bracket 40 the pivot 41 is adapted to pass.

The chute H will, during the operation of the machine, constantly supply the rotary feed-table with a mass of material. The di-

rection of rotation of said feed-table is indicated by the arrow in Fig. 4, and the normal position of the deflecting-blade, in which it has its highest efficiency, is illustrated by the full lines in said figure, it lying across the base-line of the mass of material supported by said table.

It will be evident that on the rotation of the feed-table the mass thereon will be carried against the deflecting-blade, so that on the continuation of such movement said blade will serve in the nature of a "scraper" and will deflect or guide a part of the material laterally outward through the feed-opening 38' in the guard-wall 38 in the form of a stream which, on leaving the table F, gravitates into the bucket G. It will be evident that by projecting the blade outward or nearer to the base-line of the perimeter of the mass on the table F the result will be a reduction in volume of the supply-stream, and when said blade has wholly crossed or intersected said line the result will be a stoppage of the stream and said blade will act as an effectual bar to the entrance of any of the material into the bucket, though the feed-table F continues its rotary movement. By reason of the curvature of the blade 39 spattering of the material will be wholly obviated and the power necessary to operate the same minimized. By the employment of the curved deflecting-blade the mass on the feed-table will be gradually and not suddenly impacted against said deflecting-blade, as in the latter case the material would tend to spatter outward from said blade. The blade 39 also has an extended curved portion 39'' beyond its axis of movement, which serves as a guard for preventing scattering of the material after it leaves the feed-table F, and for also guiding the supply-stream into the bucket.

The deflecting-blade 39 will be preferably actuated or controlled in part from and by the weighing mechanism, and is herein illustrated connected to the scale-beam B for this purpose.

A crank or rock shaft is shown at 42, it being suitably supported by the bucket G and having the crank-arms 43 and 44 connected, respectively, with the scale-beam B and with the deflecting-blade 39, the first-mentioned of said crank-arms being movable about the supporting-shaft 42 for a purpose that will hereinafter appear. The lug or ear 39' of the deflecting-blade 39 is shown furnished with a rigid arm 45, being preferably connected to the crank-arm 44 by a universal joint. A vertical thrust-rod is illustrated at 47, joined, respectively, to the crank-arm 43 and to the counterpoised side of the scale-beam B, or that part to the left of its fulcrum in Fig. 3, the juncture between these parts being preferably universal.

The scale-beam B constitutes a medium for actuating the deflecting-blade 39 in one direction—i. e., thrusting it outward—the counterweighted lever 49, which is rigid with

the shaft 42, being employed to impart an opposite stroke to said blade. A pin or stud is shown at 49', projecting laterally from the counterweighted lever 49 and which normally bears on the crank-arm 43, as indicated in Fig. 1, so that on the upward movement of the vertical rod 47 the crank-shaft 42 will be rocked, and hence the diverting-blade 39 will be swung outward to reduce the volume of the stream supplied to the bucket G and to also subsequently stop the same.

The deflecting-blade 39 being in the position in which it is illustrated by the full line in Fig. 4 and the feed-table F slowly rotating in the direction of the arrow, a stream of material will be supplied to the bucket G, and when a certain part of the load has been received by said bucket it will descend, the poising side of the beam B moving in coincidence therewith, the counterpoised side of the scale-beam B being caused to rise and thrust the rod 47 upward, and the crank-arm 43 being against the pin 49' on the lever 49 it will be apparent that said lever will be raised, which action will revolve the rock-arm 45 through the operative connections therewith and swing the blade 39 outward in correspondence with the movement of the bucket and the beam mechanism. When the blade 39 has reached the positions indicated by the dotted line *a*, Fig. 4, the result will be the diversion of a relatively fine stream of material, which constitutes the drip, its purpose being to complete the partial bucket-load. On the completion of said load the blade 39 will be further oscillated and to its ineffective position, as indicated by the dotted line *b* in said Fig. 4, at which time its return movement is blocked, the closers L and L' having during the interim been opened. Such blocking action will continue until the closers have resumed their normal positions, though the counterpoised side of the beam B will descend. As said scale-beam B descends the crank-arm 43 will be caused to move away from the projecting pin 49', the lever 49 being held in its uppermost position through the medium of stop mechanism, the preferred form of which will be hereinafter described. When the deflecting-blade 39 is released, the counterweighted lever 49 will also be released and may drop to its normal position; and during such movement the shaft 42 will be rocked and the deflecting-blade 39 swung inward to its effective position to again divert the supply-stream into the bucket.

The invention involves the provision of a pair of reciprocally-effective stops operative, respectively, with the closer mechanism and with the deflecting-blade 39, so that the two closers will be positively held against opening movement should the latch 20 be prematurely tripped, and for also maintaining the deflecting-blade 39 in its ineffective position during the load-discharge period. The rocker 17 will preferably serve as one of said stops, the coacting-stop being designated by 50, the

latter being rigid with the crank-shaft 42 and herein shown as integral with the lever 49, so that any limitation in movement of the stop 50 will similarly affect the shaft 42, the lever 49, and hence the connected blade 39. The two stops 17 and 50 will preferably be segmental in shape, their curved faces 51 and 50' being concentric with their axes of movement, said stops also having the straight stop-faces 51' and 50'' at right angles to said curved faces.

The action of the stop mechanism is as follows: Fig. 1 represents the normal positions of the stops 17 and 50 at the commencement of operation, the curved face 50' being contiguous to the straight face 51', so that should the latch 20 have been prematurely tripped the oscillation of the stop 17, and hence the opening of the closers L and L', will be positively prevented by the coacting stop 50, the thrust of the former being directed against the shaft 42, and this blocking action will continue so long as the said stop-faces are in contact. When, however, the straight stop-face 50'' has crossed the plane of curvature of the curved face 51, the stop 17 is free to move about its axis. When this last-mentioned operation takes place, the deflecting-blade will have reached its ineffective position, or the limit of its outstroke, and the curved face 51 will travel along the straight stop-face 50'', so that the return movement of the stop 50 will be positively checked and will continue to be so long as the stop-faces 51 and 50'' are contiguous. When the closers L and L' have reached their normal positions, however, the stop-faces 51 and 50'' will pass out of contact, so that the deflecting-blade 39 may be returned to its normal position through the intervention of the counterweighted lever 49 in the manner previously described.

It will be understood that as soon as the closers L and L' are opened and the material gravitates from the bucket the counterpoised side of the beam B will descend, the rod 47, and hence the crank-arm 43, being moved therewith, the latter falling away from the projecting pin 49' on the lever 49, the movement of the latter being arrested by the interlocking stops 17 and 50, as will be obvious.

For tripping the latch a projecting pin is shown at 47' on the thrust-rod 47, which has a movement into engagement with the relatively long arm 20' of the lever 20 at a point succeeding the stoppage of the supply-stream, so that on such movement said arm will be raised and the detent-arm 20'' disengaged from the rocker-arm 17', whereby the rocker 17, and hence the two closers L and L', will be released, the latter being instantly forced open by the weight of the bucket contents.

The operation of the hereinbefore-described weighing-machine is as follows: Fig. 1 represents the positions occupied by the respective parts at the commencement of operation, the closers L and L' being in the normal position thereof and so held by the latch 20,

the detent-arm 20'' of which is in engagement with the rocker-arm 17', the deflecting-blade 39 being in its position of highest efficiency, as indicated by the full lines in Fig. 4. On the rotation of the feed-table F a stream of material will be diverted to the bucket G by the blade 39. When a certain portion of the load has been received by the bucket, the latter, and hence the poising side of the beam mechanism, will descend, and the counterpoised side of the beam B ascending and thrusting the rod 47 upward the shaft 42 will be rocked, the motion of the latter being transmitted to the rigid arm 46 through the operative connections therebetween, so that the blade 39 will be swung outward. At the commencement of the poising period the blade 39 will occupy the position illustrated by the dotted lines *a* in Fig. 4, so that a relatively fine or drip stream will be supplied to the bucket G. On the completion of the bucket-load by the drip-stream the beam mechanism will descend below the poising-line, thrusting the rod farther upward and swinging the blade 39 to its ineffective position, as indicated by the dotted lines *b* in said Fig. 4. During this last-mentioned movement of the scale-beam B the pin 47' will be forced into engagement with the latch-arm 20', raising the same and thereby disengaging the detent-arm 20'' of said latch from the rocker-arm 17', whereby said rocker, and hence the closers L and L', will be released, so that the latter may be forced open by the weight of the bucket contents.

Having described my invention, I claim—

1. The combination with weighing mechanism including a bucket, of a movable feed-table; a deflecting-blade for said feed-table, said blade being movable to regulate the amount of material supplied to the bucket by the feed-table; and means controlled by the weighing mechanism for actuating said blade during the weighing of a load.

2. The combination with weighing mechanism including a bucket, of a rotary feed-table; a deflecting-blade for said feed-table; and means controlled by the weighing mechanism for actuating said blade during the weighing of a load.

3. The combination with weighing mechanism including a bucket, of a feed-table; a reciprocatory deflecting-blade for said feed-table; and means controlled by the weighing mechanism for imparting a stroke to said blade in one direction during the weighing of a load.

4. The combination with weighing mechanism including a bucket, of a rotary feed-table; a reciprocatory deflecting-blade projectable across the plane of said table; and means controlled by the weighing mechanism for imparting a stroke to said blade in one direction during the weighing of a load.

5. The combination with weighing mechanism including a bucket, of a movable feed-table; a reciprocatory deflecting-blade sup-

ported independently of the feed-table and movable about an axis parallel with that of the feed-table; and means controlled by the weighing mechanism for imparting a stroke to said blade in one direction during the weighing of a load.

6. The combination with weighing mechanism including a bucket, of a movable feed-table; a reciprocatory deflecting-blade for said feed-table; and instrumentalities controlled by the weighing mechanism, for actuating said blade during the weighing of a load and for stopping the same on the completion of such load.

7. The combination with weighing mechanism including a bucket, of a movable feed-table; a reciprocatory deflecting-blade therefor; means controlled by the weighing mechanism for imparting a stroke to said blade in one direction during the weighing of a load; and a supply-chute located over said feed-table.

8. The combination with weighing mechanism including a bucket, of a movable feed-table having a wall extending partially about the same; a deflecting-blade movable between the ends of said wall; and means controlled by the weighing mechanism for imparting a stroke to said blade during the weighing of a load.

9. The combination with weighing mechanism including a bucket, of a movable feed-table; a reciprocatory deflecting-blade for said table, supported independently of the same; and means for imparting a stroke to said blade in one direction during the weighing of a load, said means being operative with the weighing mechanism.

10. The combination with a bucket having a closer, of a movable feed-table; a deflecting-blade projectable across the plane of said table; and reciprocally-effective stops operative, respectively, with said blade and closer.

11. The combination with a scale-beam and a bucket supported thereby, of a movable feed-table and its actuating mechanism, and a deflecting-blade for said table operated by the scale-beam.

12. The combination with a scale-beam and a bucket supported thereby, of a movable feed-table; a deflecting-blade for said feed-table projectable across the plane of said table by the scale-beam; and a counterweighted lever connected to said blade.

13. The combination with a feed-table, of a deflecting-blade therefor; actuating mechanism for said members; a bucket and its supporting scale-beam; and a shaft mounted on said bucket and operatively connected with said deflecting-blade and scale-beam.

14. The combination with a feed-table, of a deflecting-blade therefor; actuating mechanism for said members; a bucket and its supporting scale-beam; a shaft mounted on said bucket and having crank-arms operatively connected with said blade and with the scale-beam, one of said arms being loose on said

shaft; and a counterweighted lever rigidly attached to said shaft.

15. The combination with a feed-table and with a deflecting-blade therefor, of actuating mechanism for said members; a bucket and its supporting scale-beam; a shaft having arms operatively connected to said blade and scale-beam, one of said arms being loose on said shaft; and a counterweighted lever rigidly connected to said shaft and provided with a projection adapted to bear against said loosely-mounted arm.

16. The combination with a feed-table and with a deflecting-blade therefor, of actuating mechanism for said members; a scale-beam; a bucket supported by said scale-beam and provided with a closer; a shaft on said bucket having a crank-arm connected to said blade; an arm loosely movable on said shaft and operatively connected with the scale-beam; a counterweighted lever on said shaft; a stop also on said shaft and a coacting stop operative with the closer.

17. The combination with a bucket having a closer, of holding means embodying a latch, operative for maintaining said closer in its normal position; a feed-table; a deflecting-blade for said table; and a shaft operatively connected with said scale-beam by a thrust-rod provided with a latch-tripping device.

18. The combination with a bucket, of a hopper supported for movement relatively thereto, one of the walls of said hopper constituting a closer for the discharge-outlet of said bucket; and means normally operative for maintaining said hopper against movement.

19. The combination with a bucket, of a hopper supported for movement relatively thereto and having an outlet, one of the walls of said hopper constituting a closer for the discharge-outlet of said bucket; and means normally operative for maintaining said hopper against movement.

20. The combination with a bucket having a pair of discharge-outlets, of a discharge-hopper supported for movement relatively to the bucket and having oppositely-inclined walls constituting closers for said outlets, said hopper also having a discharge-opening; and a conduit extending about said discharge-opening.

21. The combination with a bucket having a pair of discharge-outlets, of a discharge-hopper supported for movement relatively to the bucket and having oppositely-inclined walls constituting closers for said outlets, said hopper also having a discharge-opening; a conduit extending about said discharge-opening; and a pair of counterweighted levers supported on the bucket and provided with links connected to said hopper.

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