(No Model.)

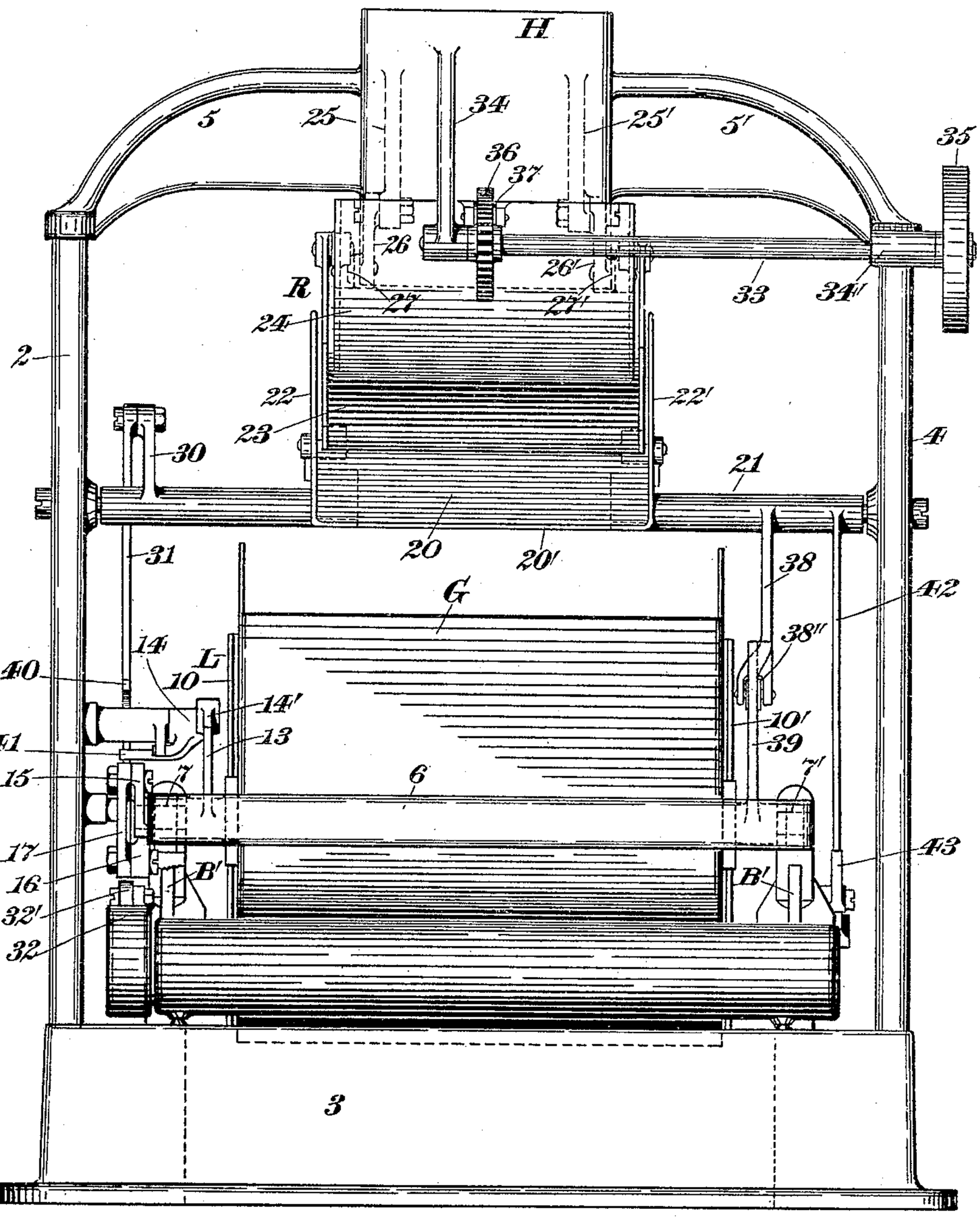
3 Sheets—Sheet 1.

F. H. RICHARDS.

WEIGHING MACHINE.

No. 573,421. Patented Dec. 15, 1896.

Fig. 1.



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(No Model.) 3 Sheets—Sheet 2.

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Fig. 2.

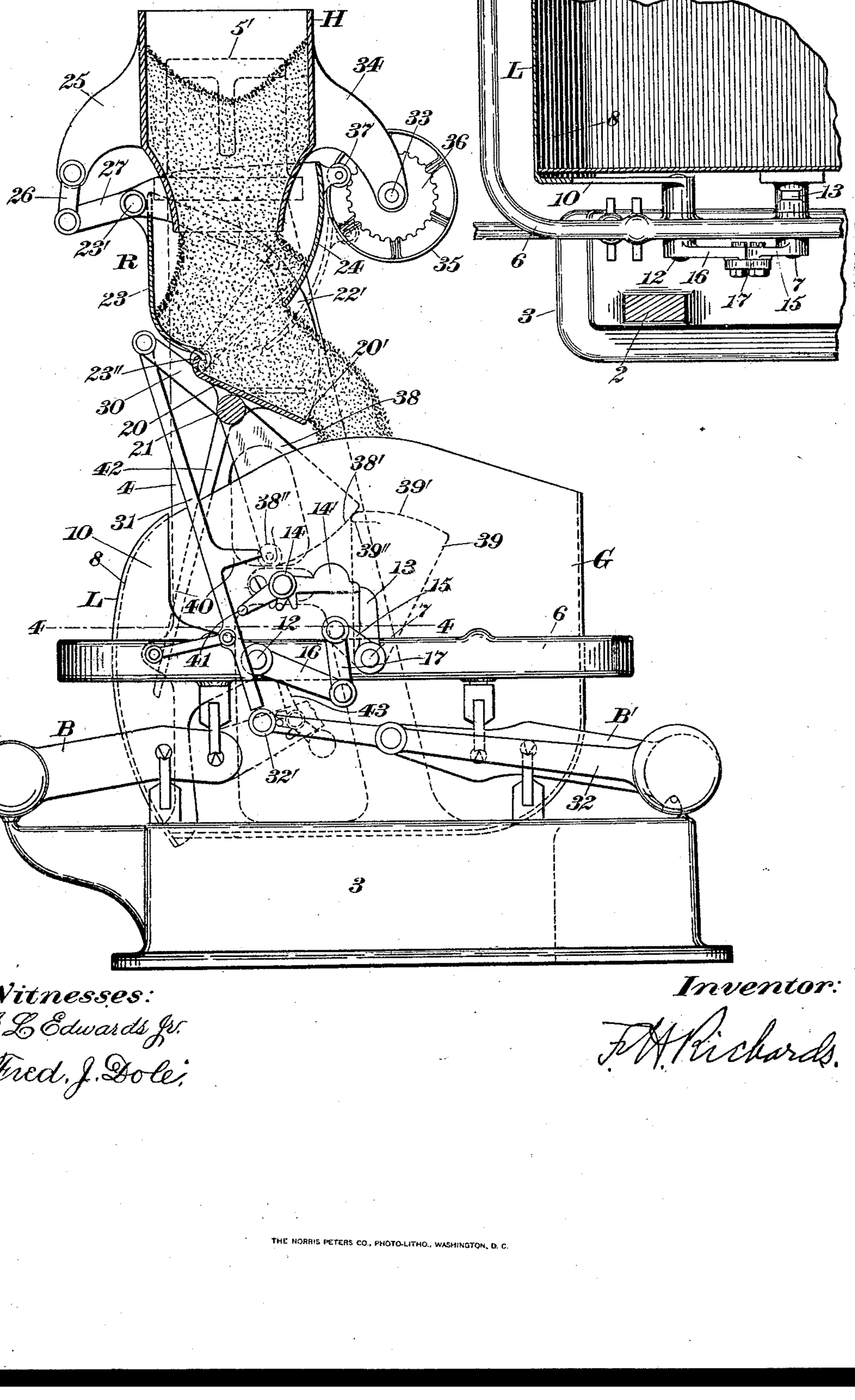

Fig. 4.

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(No Model.) 3 Sheets—Sheet 3.

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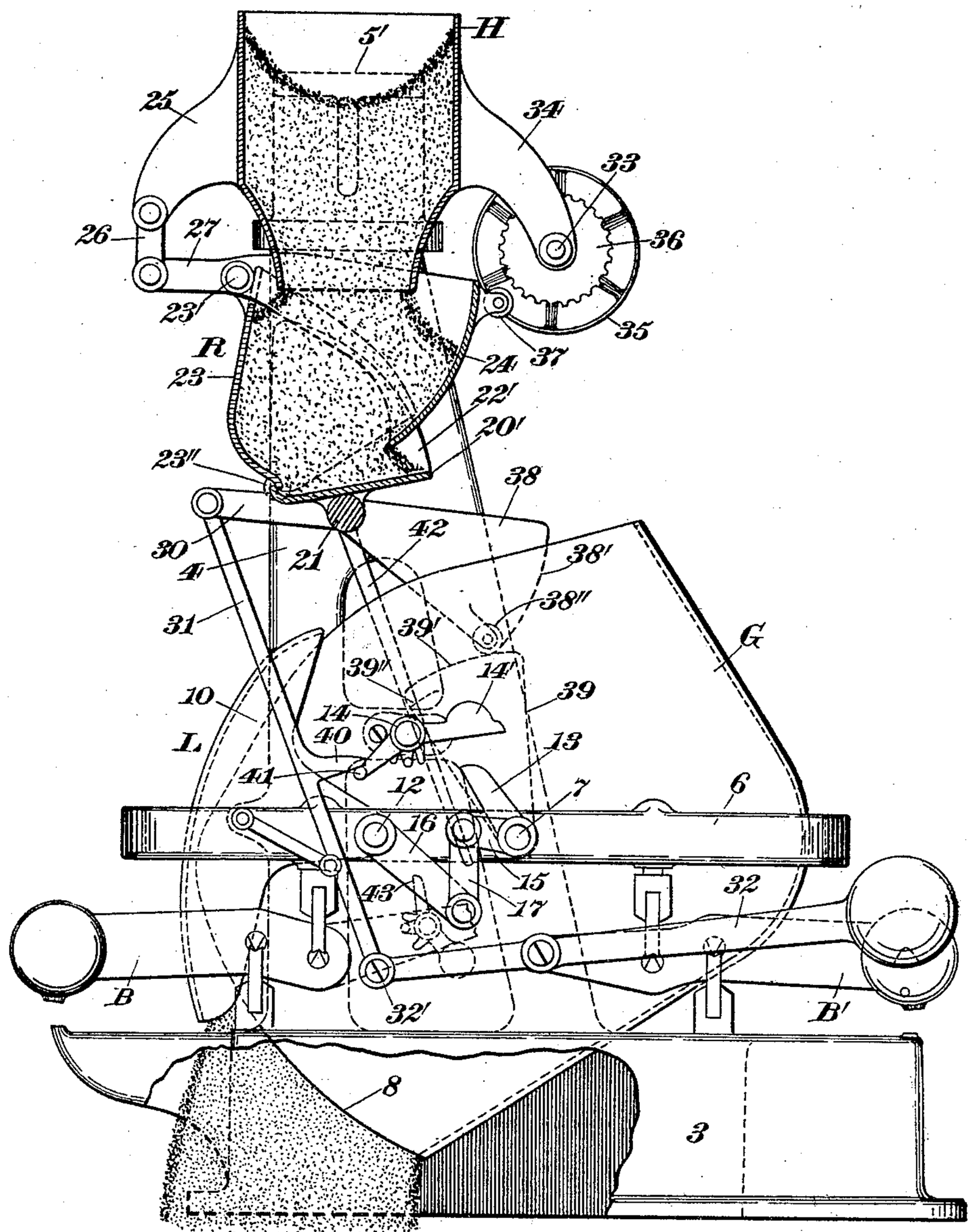
Fig. 3.



Witnesses:
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Fred. J. Dole.

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UNITED STATES PATENT OFFICE.

FRANCIS H. RICHARDS, OF HARTFORD, CONNECTICUT.

WEIGHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 573,421, dated December 15, 1896.

Application filed July 15, 1896. Serial No. 599,303. (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 improved load-supply mechanism comprehending in its preferred construction a chute and an adjacent oscillating valve which is supported to receive its closing force from a descending mass of material from said chute, such force being directed against one side of the axis of movement of said valve.

Another object of the invention is the provision of means for imparting a vibratory or reciprocatory movement to a part of the load-supply mechanism during the bucket-loading period, whereby the mass therein is loosened up and a free flow of the supply-stream to the bucket or weigher is insured.

A further object is to furnish improved bucket mechanism so organized and operable as to effect the discharge of a load of material therein in a relatively short space of time, by virtue of which the capacity of the machine is correspondingly increased.

In the drawings accompanying and forming part of this specification, Figure 1 is a front elevation of a weighing-machine comprising my present improvements in the preferred form thereof. Fig. 2 is an end elevation as seen from the left in Fig. 1, portions being broken away and in section to illustrate more clearly certain peculiar features of the invention. Fig. 3 is a similar view illustrating the positions occupied by the respective parts during the discharge of a bucket-load; and Fig. 4 is a detail in sectional plan view, the section being taken in line 4 4, Fig. 2.

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 shown consisting of the end frames or columns 2 and 4, mounted upon the base 3.

A supply hopper or chute, constituting one of the coördinate elements of the load-supply mechanism, is shown at H, and is furnished with the preferably-integral brackets 5 and 5′, suitably fastened to the end frames 2 and 4.

The bucket mechanism consists of a bucket having a suitable discharge-outlet and a closer for said outlet, the latter being supported independently of the bucket.

The bucket or weigher is designated by G, and is preferably supported for oscillatory movement within the frame 6, said bucket having projecting trunnions 7 and 7′, journaled in suitable bearings formed in the end members or bars of the frame 6.

For supporting the bucket the beam mechanism illustrated may be employed, and consists of the oppositely-disposed counterweighted scale-beams B and B′, suitably fulcrumed on the base 3 of the machine, and the arms of said beams will be furnished with suitable supports, which sustain bearings depending from and connected to the bucket-frame 6.

The bucket is shown having the approximately vertical discharge-outlet 8, preferably equaling in width the distance between the end walls of said bucket.

The closer for the bucket-discharge outlet is designated by L, and consists of a segmental plate or closer proper, which preferably fits tightly against the curved end walls of the bucket and projects a short distance below the horizontal bottom of the latter when in its shut position, as indicated in Fig. 2. The closer L will be preferably supported for movement independently of the bucket, so that one of said members may have a multiplied oscillatory movement relatively to the other for discharging its load in a minimum space of time, it being seen on reference to Fig. 3 that the greater part of the discharge-outlet of the bucket G is disclosed. The closer L is furnished with the end portions 10 and 10′, which have the pivots 12, working in suitable bearings formed in the bucket-frame 6.

The bucket and closer are shown in the normal positions thereof in Fig. 2. The center of gravity of the loaded bucket is located at one side or to the rear of the axis of oscillation of said bucket, the latter being normally held against load-discharging movement by suitable restraining or detent means.

It will be evident that when the bucket is

released at the proper point in the operation of the machine the mass of material therein will cause it to tilt or oscillate to the position shown in Fig. 3, the bottom of the bucket being then disposed at a relatively steep angle or inclination, so that the contents may be discharged with rapidity through the discharge-outlet thereof.

A vertically-disposed detent is shown at 13 rigid with the projecting trunnion 7, and having its free end positioned for engagement by a suitable detent—such as the latch 14. The bucket-latch 14 is preferably counterweighted, its detent or counterweighted arm 14′ swinging downward to engage the free end of the coöperating bucket-detent when the bucket is in its normal position. It will be evident that when the detent 14′ of the latch is raised or elevated and above the plane of rotation of the detent 13 the bucket G will be freed of all restraint, and, being filled, will be caused to oscillate or tilt for discharging its contents. The movement of the latch 14 will be preferably limited by suitable stops, as is usual.

The closer L will have a movement away from the horizontal portion of the bucket for further increasing the area of the discharge-outlet of the bucket, and for effecting this operation actuating connections with the bucket will be preferably employed. A rock-arm is shown at 15 rigidly attached to the bucket-trunnion 7. A second and relatively longer rock-arm is illustrated at 16 fixedly connected to the closer-pivot 12 and connected to the rock-arm 15 by the interposed link 17, which latter is pivoted, respectively, to said rock-arms. On the release and oscillation of the bucket the detent 13 will swing to what is shown as the "left," and, through the agency of the projecting trunnion 7, the rock-arm 15, the connecting-link 17, and the rock-arm 16, will be thrust downward and the closer L upward, it being evident that through the intervention of the described connections the horizontal portion of the bucket and the closer L will be caused to move in opposite directions, or away from each other.

The load-supply mechanism comprehends a chute and an adjacent oscillating valve supported to receive its closing force from a descending mass of material from said chute, such force being directed against one side of the axis of movement of said valve, thereby effecting, as is obvious, a saving in the running expense of the machine.

The chute or hopper is shown at II and the valve or cut-off at 20, the latter consisting in the present instance of an approximately flat plate supported for oscillatory movement by the two-part shaft 21 at a point about midway its front and rear ends, said shaft having suitable bearings in its extremities for the reception of journals carried by the framing of the machine.

The valve 20 is shown furnished with the vertical guard-walls 22 and 22′, which constitute an efficient means for preventing side flow of the material sustained on said valve.

A stream-regulator or conduit is shown at R, located between the valve 20 and the chute II, and consists of two complemental sections 23 and 24, pivoted together at 23′, the first-mentioned section being hinged or pivoted at 23″ to the valve. Each of the regulator-sections 23 and 24 will be provided with end walls, the end walls of the section 23 overlapping those of the other, so that said regulator forms an inclosure for the downflowing stream of material from the chute and constitutes practically a continuation of such plate.

A pair of rearwardly-extending brackets or arms are shown at 25 and 25′, formed rigid with the chute or hopper II, which have pivoted thereto the suspension-links 26 and 26′, which at the commencement of operation of the machine are disposed a little to the left of the vertical.

A pair of rock-arms are shown at 27 and 27′, connected to the pivots 23′ and jointed to the suspension-links 26 and 26′, respectively.

The operation of the regulator R and its connected parts will be apparent from an inspection of Figs. 2 and 3 of the drawings. A mass of material being in the chute or hopper II will gravitate downward, and the force thereof will be directed partly against the rear of the valve 20 and the regulator-section 23, considerable pressure being applied to the pivotal or hinge point 23″, such action slowly throwing the discharge edge 20′ of the valve 20 upward, the volume of the stream of material which flows between such discharge edges of the valve 20 and the regulator-section 24 being reduced in correspondence with such movement, the stream being subsequently cut off.

The regulator-sections 23 and 24, it will be understood, move downward in unison, the last-mentioned coacting with the valve to reduce the volume of the supply-stream by directing the downflowing mass away from the discharge edge of said valve.

Means will be employed for limiting the closure of the valve 20, and hence the downward movement of the regulator-sections 23 and 24, and for this purpose the following-described instrumentalities may be employed: A rock-arm is shown at 30 projecting rearward from the two-part valve-supporting shaft 21 and has pivoted thereto the depending rod 31. A counterweighted lever is illustrated at 32, pivotally supported adjacent to the inner or poising side of the scale-beam B′ and having an antifriction-roll 32′, against which the rod 31 is adapted to bear during the major period of the operation of the machine. The weight of the lever 32 will be normally added to the counterpoised side of the scale-beam B′, where it is held by suitable means, so that the non-counterweighted arm of such lever practically constitutes an integral extension of said scale-beam. On the descent of the scale-beam, said lever being

in contact with the rod 31, it will be evident that the closure of the valve 20 will be limited or checked in accordance with the movement of the beam mechanism. On the discharge of a load of material the lever 32 will be held in its extreme position, and the counterpoised side of the beam B′ will move away from the counterweight of said lever, and when the bucket G has resumed its normal or load-receiving position the lever 32 may also resume its normal position, and in so doing will impart an upward thrust to the rod 31, which is communicated to the valve 20, for forcing the same open and for also returning the regulator R to its normal position.

Means will be employed for imparting a vibratory or shaking movement to the regulator R, and hence to the connected valve, such action taking place preferably during the load-supply period, so that the mass in said regulator and on the valve will be loosened up, and a free flow of the supply-stream to the bucket or weigher G will be assured.

A shaft is shown at 33, journaled in the brackets 34 and 34′, formed on the chute H and end frame 4, respectively, said shaft carrying the pulley 35, which may be connected with a suitable motor. (Not shown.) The shaft is also provided with a cam or toothed wheel 36, which is splined or otherwise secured to said shaft, the regulator R being furnished with a projection or antifriction-roll 37, which is forcible into the plane of rotation of the teeth of the member 36.

It will be evident that by virtue of the disposition of the suspension-links 26 and 26′ the regulator R will be self-operative toward the cam-wheel, so that the roll 37 may be thrust across the plane of rotation of the teeth of the wheel 36, and as said teeth are successively caused to engage with the antifriction-roll 37 an opposite movement will be imparted to the regulator R and its vibration thereby effected, said vibration continuing until the roll 37 and suspension-links 26 and 26′ have assumed the positions shown in Fig. 3.

My present invention contemplates the provision of reciprocally-effective stops operative, respectively, with the load-discharge member (which in the present instance is the bucket G) and the valve or cut-off 20. The valve-operative stop is shown at 38, depending from and formed integral with the two-part shaft 21, the coacting or bucket-operative stop being designated by 39, and both stops being preferably segmental blades. Said stops will be furnished with the supplemental stops 38′ and 38″ and 39′ and 39″, the supplemental stops 38′ and 39′ being shown as curved faces and concentric with the axes of movement of the members 38 and 39. The action of the coacting stops will be apparent on reference to Figs. 2 and 3, the supplemental stop 39″ being approximately contiguous to the supplemental stop 38′, so that should the latch 14 be prematurely tripped the discharge oscillation of the bucket G will be positively prevented by the stop member 38, which blocks the movement of the member 39, the thrust of the latter being directed against the two-part shaft 21, and this relation continuing so long as the stops 38′ and 39″ are in contact. When, however, the supplemental stop 38″ has intersected the arc of the supplemental stop 39′, the stop member 39 and the bucket G are free to oscillate, and on such movement the curved face 39′ will travel along the supplemental stop 38″, whereby the member 39 positively arrests the return movement of the member 38, and consequently positively maintains the valve 20 in its shut or stream cut-off position. When the bucket G has resumed its normal position, these supplemental stops will pass out of contact, so that the valve 20 may be opened.

Means are provided for intercepting the valve at a predetermined point in its closing movement, whereby it may be held to permit the flow of the drip-stream into the bucket to complete the partial load therein. A depending rod is shown at 42 rigidly connected with the valve-supporting shaft 21, and a coöperating stop for engaging the same is shown as the counterweighted by-pass 43, pivotally mounted on the beam B, the vertical portion of said by-pass engaging said rod at the commencement of the poising period. When the beam B passes below the poising-line, indicating the completion of a bucket-load, the rod 42, and hence the valve 20, will be released, whereby the latter may be closed to cut off the supply-stream.

A latch-tripper is shown at 40 as a projection on the thrust-rod 31, and having a movement into engagement with the latch-pin 41 when the valve 20 has nearly reached the end of its cut-off movement, whereby the detent portion 14′ of the latch will be raised and disengaged from the coöperating bucket-detent 13. When this action takes place, the bucket G will be free to oscillate.

The operation of the hereinbefore-described weighing-machine is as follows: Fig. 2 represents the positions occupied by the respective parts at the commencement of operation, the bucket G and closer being locked in the normal positions thereof by the latch 14, which is in engagement with the bucket-detent 13, the valve 20 being opened, so that a stream of material may descend from the supply-chute H, through the regulator R, over the valve 20, and into the bucket. When a certain proportion of the load has been received by the bucket, it and the beam mechanism, and hence the shiftable lever 32, will descend, and said lever falling from under the thrust-rod 31 thereby permits the closure of the valve 20 by the force of the descending mass of material from the chute H. On the completion of the bucket-load and when the valve 20 has nearly reached the close of its cut-off movement the projection 40 on the thrust-rod 31 will be forced into engagement with the latch-pin 41, so that the detent por-

tion 14′ of the latch will be raised clear of the bucket-detent 13 and the bucket G thereby freed of all restraint. Such action taking place, the weight of material in the bucket will cause the same to oscillate or tilt to effect the discharge of the completed bucket-load.

Having described my invention, I claim—

1. The combination with a bucket having a discharge-outlet; of a closer in position for controlling said outlet, said bucket and closer being movable about independent axes; a detent for holding said bucket against oscillation during the supply of material thereto; and means connecting said detent with the closer, whereby when the bucket tilts to discharge its load said closer is given a movement opposite to the motion of the bucket.

2. The combination with weighing mechanism, of a tilting bucket; a closer for said bucket, supported by the framework of the machine; means connecting said closer with the bucket, whereby the closer is given a motion opposite to that of the bucket; a latch for holding the closer shut during the filling of the bucket; and means controlled by the weighing mechanism, for tripping the latch.

3. The combination with a frame, of a bucket having projecting trunnions journaled therein, one of which is provided with a rock-arm; and a closer supported in position for regulating the discharge-outlet of the bucket, having a rock-arm connected by a link to said first-mentioned rock-arm.

4. The combination with a frame, of a bucket having projecting trunnions journaled therein, one of which is provided with a rock-arm; a closer supported in position for regulating the discharge-outlet of the bucket, having a rock-arm connected by a link to said first-mentioned rock-arm; a detent rigidly connected to said trunnion; a latch for engaging said detent; and a latch-tripping device.

5. The combination with a bucket supported for oscillatory movement, said bucket having an outlet; of a closer for said outlet, having an opening movement in opposition to the movement of the bucket; means operative for maintaining the bucket and closer in their normal positions; a valve supported to receive its closing force from the descending mass of material passing from the supply-spout; and a stop device for preventing movements of the valve or bucket except at the proper times.

6. The combination with a frame, of a bucket journaled therein and having a discharge-outlet, the end walls of the bucket adjacent to said outlet being curved; a segmental closer-plate hinged to the frame and adapted, when in its normal position, to bear tightly against said curved walls and also to project below said horizontal bottom; and means for maintaining said bucket and closer in the normal positions thereof.

7. The combination with a chute and with a valve, of an interposed regulator, and a toothed wheel for imparting a vibratory movement to said regulator.

8. The combination with a chute and with a valve, of an interposed regulator connected to one of said parts, and a toothed wheel for imparting a vibratory movement to said regulator.

9. The combination with a chute and with a valve, of an interposed regulator connected to said valve, and a toothed wheel for imparting a vibratory movement to said regulator.

10. The combination with a chute, of a regulator adjacent thereto and self-operative in one direction, and a toothed wheel for imparting an opposite stroke to said regulator, whereby it will be vibrated.

11. The combination with a chute, of a valve, and an interposed regulator consisting of two hinged sections, one of which is connected to said valve.

12. The combination with a chute and with a valve, of a regulator; a pair of suspension-links connected to said regulator, whereby the regulator is self-operative in one direction; and means for imparting an opposite stroke to said regulator.

13. The combination with a chute and with a valve, of a regulator; a pair of suspension-links connected to said regulator, whereby the regulator is self-operative in one direction; and a cam for imparting an opposite stroke to said regulator.

14. The combination with a chute, of a valve; an interposed regulator consisting of two hinged sections, one of which is provided with a projection and the other of which is connected to said valve; a pair of suspension-links connected to said regulator by rock-arms; and a cam for engaging said projection.

15. The combination with a chute, of an adjacent oscillating valve supported to receive its closing force from the descending mass of material from said chute, which force is directed against one side of the axis of movement of said valve.

16. The combination with weighing mechanism embodying a shiftable bucket, of a chute; an adjacent oscillating valve supported to receive its closing force from a descending mass of material from said chute, which force is directed against one side of the axis of movement of said valve; and reciprocally-effective stop devices operative, respectively, with said valve and bucket.

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