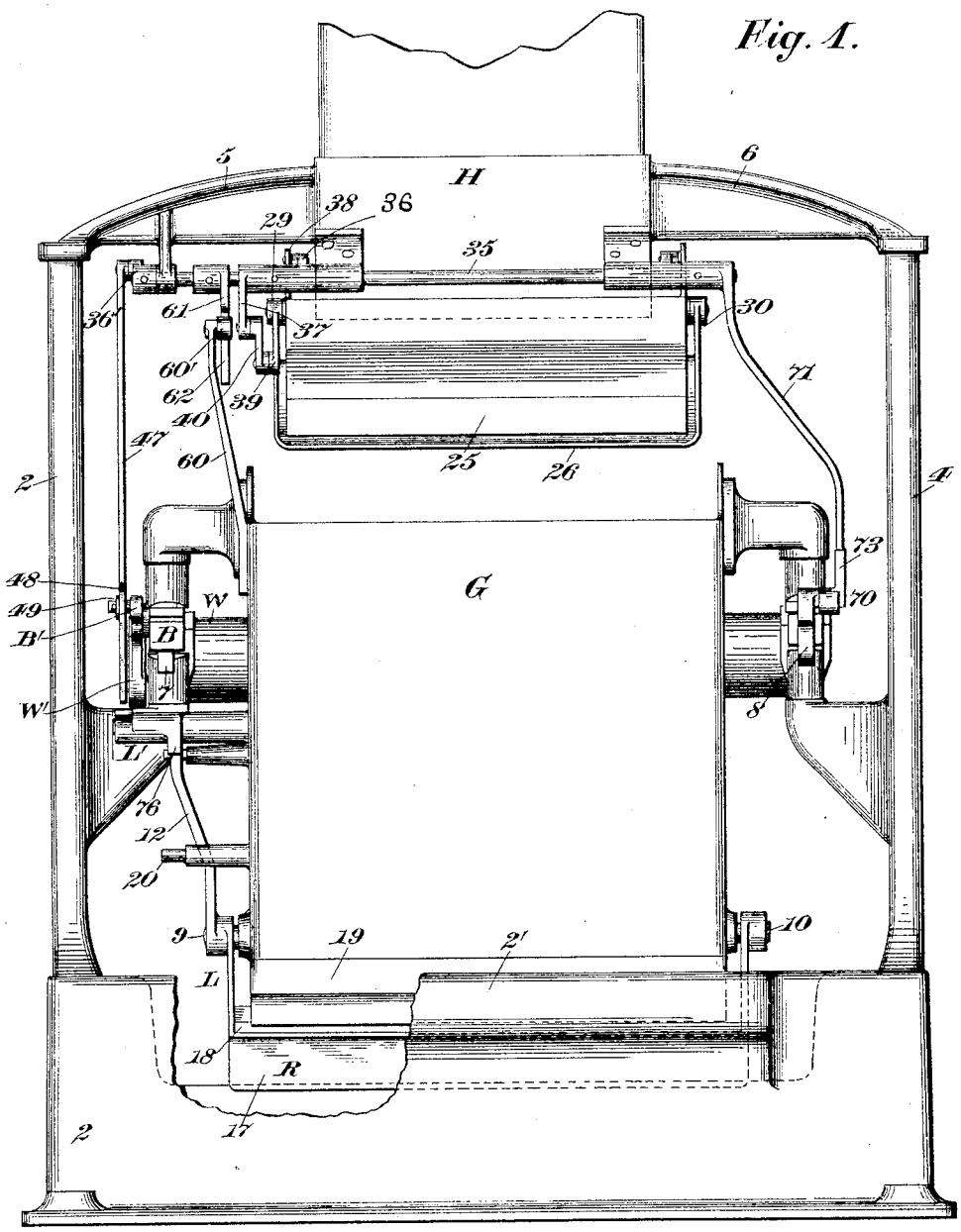
(No Model.) 4 Sheets—Sheet 1.

F. H. RICHARDS.

WEIGHING MACHINE.

No. 589,293. Patented Aug. 31, 1897.

Fig. 1.



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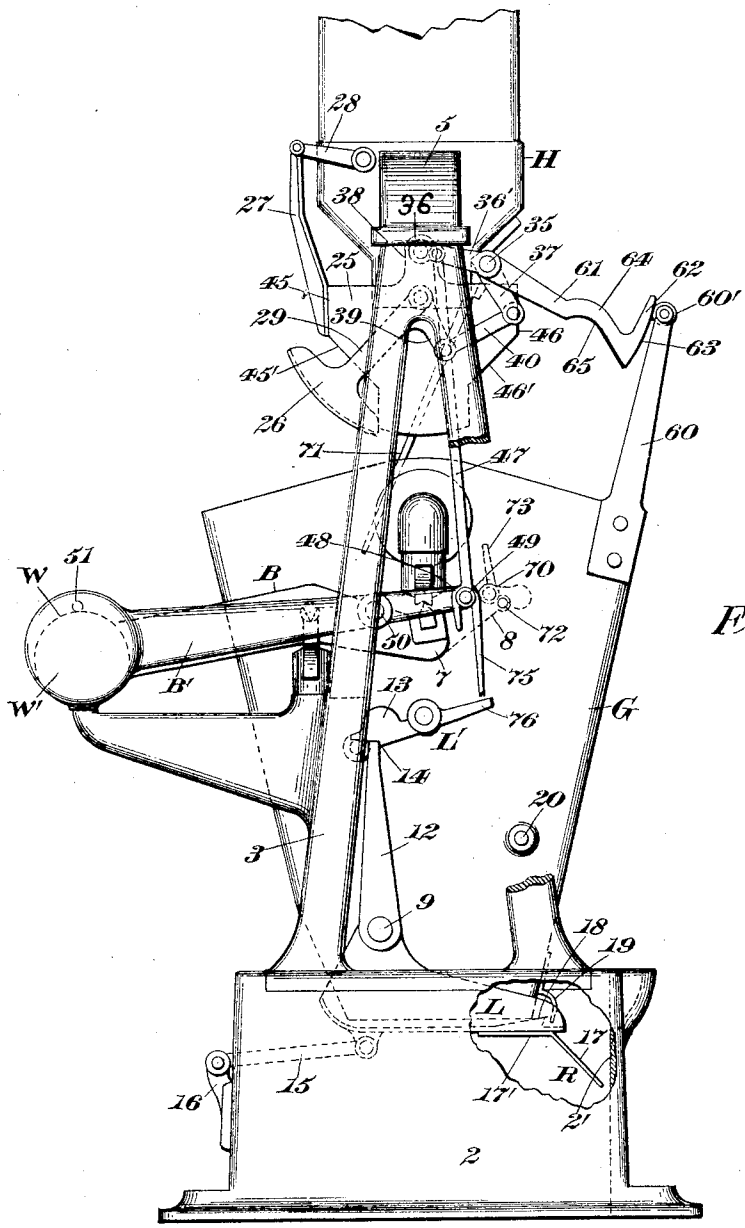

Fig. 2.

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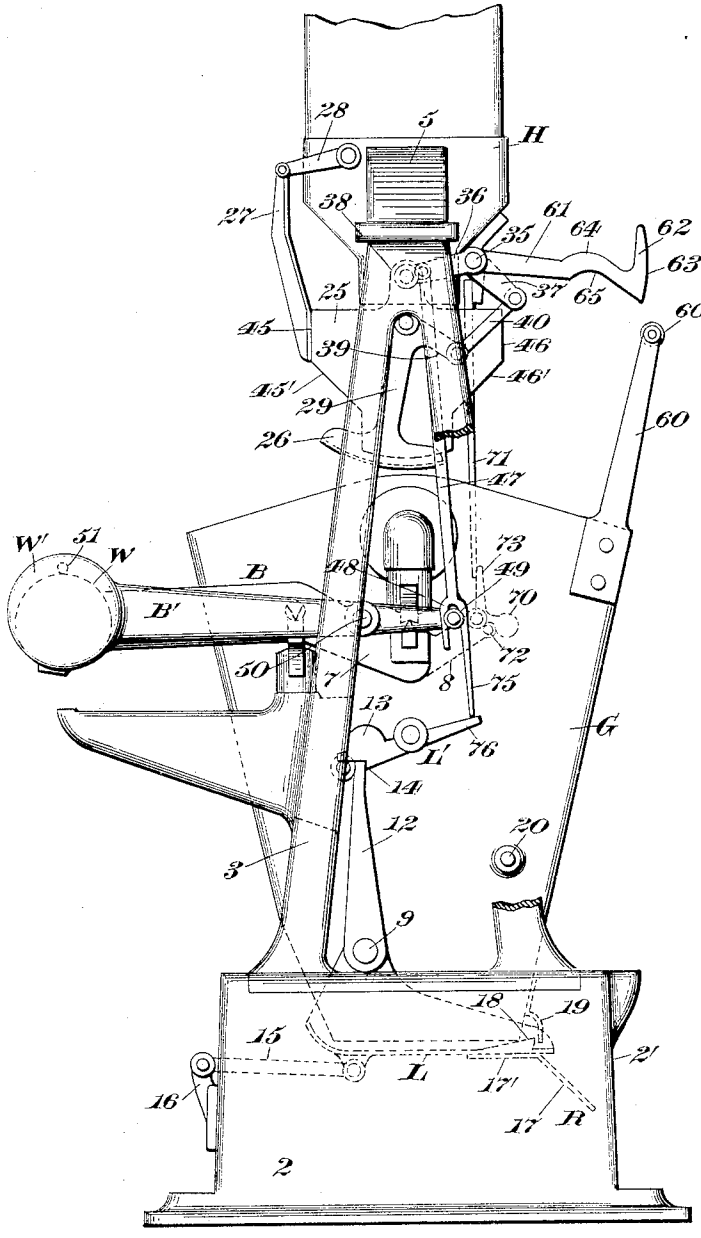

Fig. 3.

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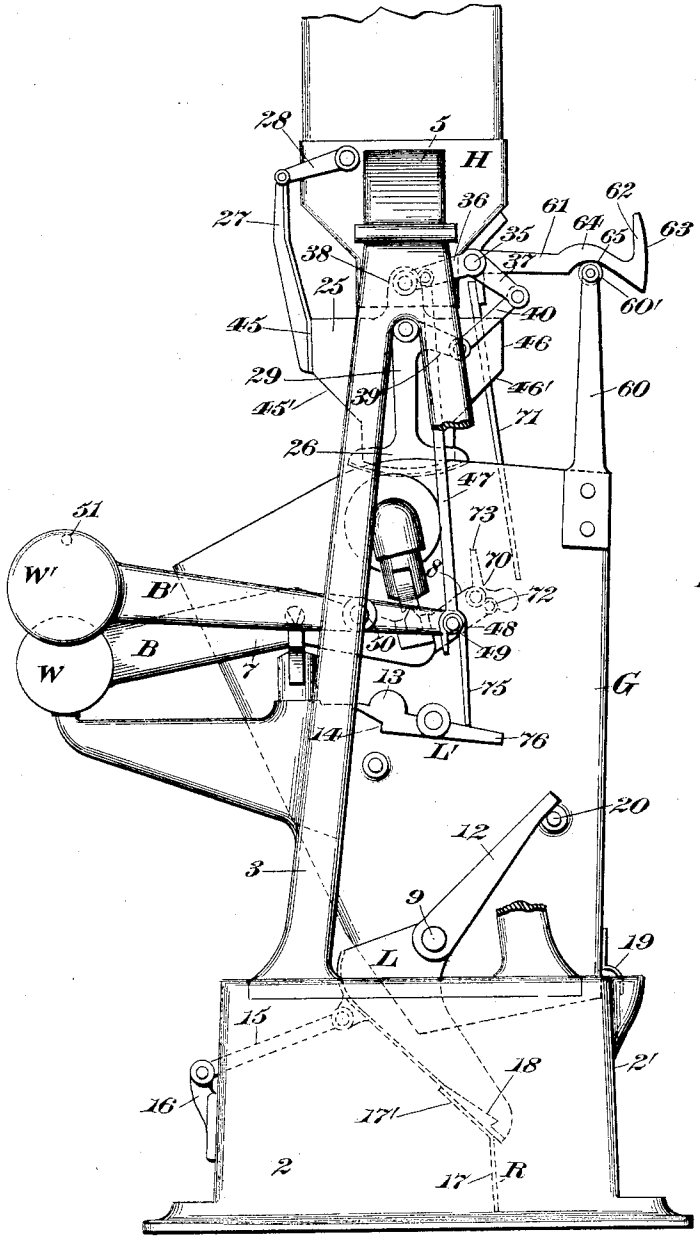

Fig. 4.

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UNITED STATES PATENT OFFICE.

FRANCIS H. RICHARDS, OF HARTFORD, CONNECTICUT.

WEIGHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 589,293, dated August 31, 1897.

Application filed April 3, 1897. Serial No. 630,507. (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, the object being to provide an improved machine of this character for automatically weighing and delivering various classes of granular and similar materials.

In the drawings accompanying and forming part of this specification, Figure 1 is a front elevation of my improved weighing-machine; and Figs. 2, 3, and 4 are end elevations of the same, as seen from the left in Fig. 1, and they show said machine in the several positions occupied thereby during the making and discharging of a load.

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

The framework of the machine may be of any suitable character, it consisting in the present case of the chambered supporting base or bed 2, the end frames or columns 3 and 4, which rise therefrom, and the brackets 5 and 6, extending oppositely from the hopper H, said parts being connected together in some usual way, and the hopper H constituting a convenient means for delivering the supply of material to be weighed to the load-receiver.

The weighing mechanism is composed of a suitable load-receiver and a supporting scale-beam therefor, which parts may be of any convenient type.

The load-receiver is herein illustrated consisting of a hopper-shaped receptacle G, having the usual discharge-outlet, the passage of material from which is controlled by a closer, as is customary.

The scale-beam for the load-receiver is designated by B and it is represented consisting of a pair of longitudinal arms 7 and 8, which are pivotally mounted on suitable brackets on the end frames 3 and 4 and which are joined at the rear by the cylindrical counterweight W, said beam-arms being furnished with the usual pivots at the poising ends thereof, upon which are sustained the usual V-shaped or notched bearing-plates connected with the load-receiver.

The closer for the load-receiver is designated by L, and it consists of a substantially flat plate pivoted to the load-receiver, and which, when shut, is contiguous to the lower edge of said load-receiver, as indicated in Figs. 2 and 3. The closer L is supported by the projecting journals or pivots 9 and 10, which extend from opposite sides of the load-receiver and which pass through suitable hubs or other bearings on the closer.

The means for governing the discharge of the load includes a latch, which may be of any suitable construction and which is designed to engage the closer, or a member connected therewith, as the upright arm 12, which is fixed to the closer L and constitutes a part thereof.

The latch for holding the closer shut is designated by L′ and is pivoted to the load-receiver, the working arm 13 of said latch being shouldered, as at 14, to engage the coöperating arm 12 of the closer, said arm 13 being counterweighted to throw it into engagement with the arm 12.

My present invention comprehends the provision of suitable means for tilting the load-receiver simultaneously with the opening of the closer, whereby the material will be dislodged from the sides of the load-receiver and whereby a suitable stop will be rendered effective for locking a stream-controller or stream-controllers against action during the discharge of a load, and for thus tilting the load-receiver the closer L will be preferably connected with a suitable resistance member, such as the framework, whereby when the latch is tripped the closer will be opened and the load-receiver will be simultaneously tilted.

The closer L is represented having pivoted to its under side the connecting-link 15, the latter being similarly attached to the base 2 or the arm 16 thereon.

Fig. 2 illustrates the load-receiver at the limit of its upstroke. On the supply of material to and when the load-receiver has received a certain percentage of the predetermined load it will descend, the supply being progressively reduced as the load-receiver approaches the poising-line, at which time

the passage of material to said load-receiver is instantly stopped and the latch L′ is tripped by suitable instrumentalities, as will hereinafter appear. On the tripping of the latch L′ it will be disengaged from the arm 12 of the closer, whereby the latter will be forced open by the pressure of the material in the load-receiver acting thereagainst, and as the closer opens it is operable for forcibly tilting the load-receiver to the position indicated in Fig. 4, and for the purpose of facilitating this action the center of motion of the load-receiver will be at a point very near the upper end thereof. When the material has passed from the closer or a suitable regulator thereon, as R, the closer can be returned to its normal or shut position by the righting of the load-receiver.

The regulator R consists of an angular longitudinal plate, the portion 17′ of which is suitably fastened to the under side of the load-receiver. On the discharge of the load it will be directed against the front wall 2′ of the chambered base 2 and will act against the portion 17 of the regulator with sufficient pressure to prevent the intermediate shutting of the closer or until all of the material has passed from the discharge edge thereof.

The closer L has near its discharge edge the angular longitudinal ridge or rib 18, which when said closer is shut is substantially in contact with the lower front edge of the load-receiver, as shown in Fig. 2, whereby a close joint is formed at this part to prevent leakage of the material.

A longitudinal guard is shown at 19, consisting of a curved plate fastened to the front part of the load-receiver, near the lower edge thereof and extending below the same, so that in case any material should work through the joint between the load-receiver and the angular ridge 18, as might be the case with fluffy or light materials, the escape thereof will be prevented by the curved guard 19.

For preventing the opening of the closer L for too great a distance a stop, in the form of a pin projecting from the load-receiver, is shown at 20, it being disposed in the path of movement of the arm 12, and against which said arm is adapted to abut when the closer is opened the requisite distance.

My present invention includes as a part thereof two stream-controllers, consisting, respectively, of the reciprocatory hopper 25, which moves through a vertical path, and the valve 26, which is pivotally connected with the hopper H for movement therewith and which is actuated thereby, the hopper being controlled by the weighing mechanism.

The reciprocatory hopper 25, which is in line with the stationary hopper H, has the upright 27 thereon, which is connected by a guide-link 28 with said hopper H.

The valve 26, which is reciprocatory beneath the mouth or outlet of the movable hopper 25, has the arms 29 and 30 at each end thereof, which are suspended from suitable pivots on the hopper 25.

A transverse rock-shaft is shown at 35 supported by suitable brackets or other bearings on the hopper H, said shaft being connected, respectively, with the reciprocatory hopper 25 and the valve 26, whereby as the hopper descends and ascends the valve can be closed or opened, as will be apparent. The shaft 35 has near one end thereof the oppositely-projecting crank-arm 36 and 37, the first-mentioned being pivoted to the lug 38 on the upper end of the hopper 25, and the crank-arm 37 being connected with the corresponding crank-arm 39 on the valve 26 by the connecting-link 40.

It will be evident that as the hopper 25 drops from its uppermost position (shown in Fig. 2) the two crank-arms 36 and 37 will be oppositely rocked, whereby the link 40 and the crank-arm 39 will pull the valve 26 shut, in correspondence with the movement of said hopper, so that said valve can progressively reduce and subsequently cut off the stream from said hopper. The opposite walls 45 and 46 of the hopper are made inclined or sloping, as at 45′ and 46′, respectively, so that the weight of the material thereagainst will aid in depressing the hopper.

It will be understood that the action of the reciprocatory hopper 25 is controlled by the weighing mechanism, a suitable connection between said parts being provided, and the longitudinal rod 47 is illustrated for this purpose, said rod being pivoted at its upper end to the crank-arm 36′ and having a bifurcation 48 at its lower end for embracing a suitable projection, as the antifriction-roll 49, at the outer end of the auxiliary beam B′.

The auxiliary beam B′ consists of a counterweighted lever pivoted at 50, near the poising end of the beam-arm 7, the weight W′ of said auxiliary beam being furnished with the projecting pin 51, which normally rests upon the main weight W, whereby as the load-receiver G descends the inner end of the auxiliary beam B′ will move therewith and will thereby limit the downward movement of the hopper 25, and consequently the closure of the valve 26. The return movement of the auxiliary beam B′ with the main beam B will be blocked, as will hereinafter appear, but when it is released it will drop, and in so doing will transmit an upward thrust to the rod 47 for raising the hopper 25 and for also opening the valve 26.

In connection with the load-receiver G means will be employed for blocking the action of the stream-controller or hopper 25, and hence the stream-controller or valve 26, such means being represented herein as the stop or upright arm 60, fixed to the load-receiver and which is coöperative with the stop or arm 61, that is secured to the transverse rock-shaft 35, the arm 60 having the auxiliary stop 60′, in the form of an antifriction-roll, at its up-

per end. The arm 61 has at its outer end the transverse portion 62, having the curved face 63, which is concentric with the axis of movement of the rock-shaft 35, and said arm 61 also has the curved portion 64, provided with the curved face 65.

In Fig. 2 the antifriction-roll 60′ is represented in contact with the curved face 63, whereby the arm 61 will block or prevent the load-receiver G from tilting prematurely. As the hopper 25 and load-receiver G descend the antifriction-roll 61 will be caused to ride along the curved face 63 until it reaches a point below the same, as represented in Fig. 3, so that when the latch L′ is tripped and the closer L is opened the load-receiver is tilted. Immediately on the tilting of the load-receiver the antifriction-roll 60′ will be carried into contact with the curved face 65 to block or prevent retractive movement of the stop-arm 61, and consequently of the hopper 25 and the valve 26. When the load-receiver G rights itself in the manner hereinbefore specified, the roll 60′ will pass clear of the curved face 65, whereby the spout 25 and valve 26 can be returned to their initial positions.

It will be evident that when the arm 60 is swung under the coöperating arm 61 on the discharge of a load and when a certain portion of the material has left the load-receiver it will rise by reason of the dropping of the counterweight W but the return movement of the auxiliary beam B′ will be prevented by reason of its connection with the shaft 35, which is locked by the stop 60. When the stop 61 is released, as described, the auxiliary beam B′ will be also released and can promptly return to its normal position and in so doing will thrust the rod 47 upward for simultaneously elevating the hopper 25 and opening the valve 26.

For the purpose of arresting the advancing movement of the two stream-controllers 25 and 26, respectively, to permit the passage of a drip-stream to the load-receiver a suitable stop will be employed, such stop being mounted on the arm 8 of the scale-beam B, and consisting of the by-pass 70, of ordinary construction, which is disposed in the path of movement of the depending rod 71 on the transverse rock-shaft 35. The by-pass 70 consists of a counterweighted lever pivoted to the beam-arm 8, the weighted arm thereof resting on the pin 72 of said beam.

At the commencement of the poising period, as shown in Fig. 3, the rod 71 will abut against the upright arm 73 of the by-pass to thereby hold the two stream-controllers to permit the drip-stream to enter the load-receiver. On the descent of the load-receiver below the poising-line, indicating the completion of a load, the by-pass 70 will pass out of contact with the rod 71, thereby releasing said stream-controllers, so that the hopper 25 can promptly drop for closing the valve 26, and it will be evident that as the valve closes material will accumulate in the hopper sufficiently so that at the last part of its operation the valve will be closed quickly. The rod 47 also constitutes a tripper for the closer-latch L′, the leg 75 of the bifurcation 48 being extended downward beyond the complementary leg thereof, whereby on the completion of the load said leg will be caused to impinge against the arm 76 of the latch to raise the opposite arm 13 thereof, whereby the latter will be disengaged from the arm 12 of the closer. When this last-mentioned action takes place, the closer L will be freed of all restraint and can be forced open by the weight of the material in the load-receiver.

The operation of the hereinbefore-described machine, briefly stated, is as follows: Fig. 2 represents the positions occupied by the respective parts at the commencement of operation, the valve 26 being wide open and the reciprocatory hopper 25 being at the limit of its upstroke and the closer L being shut and held in such position by the latch L′, which engages the arm 12 of said closer, so that the supply-stream will flow from the hopper H and will pass through the hopper 25 and from thence into the load-receiver G. When a certain proportion of the load has been received, the load-receiver, with the poising sides of the beam B and auxiliary beam B′, will descend, whereby the projection 49 on the auxiliary beam, by moving away from the rod 47, will permit the hopper 25 to drop, this movement being assisted by the weight of material in said hopper. As the hopper thus drops the crank-arm 36 will be drawn downward and the shaft 35 rocked, the crank-arm 37 being moved in a direction opposite to that of the crank-arm 36 or elevated, whereby it, by reason of its connection through the link 40 with the crank-arm 39, will close the valve 26. At the commencement of the poising period, as shown in Fig. 3, the rod 71 will abut against the upright arm 73 of the by-pass stop 70 on the scale-beam B, whereby the further movement of the hopper 25 and the valve 26 is interrupted to permit a reduced stream to pass from said hopper into the load-receiver G. When this reduced stream completes the load, the by-pass stop 70 will descend below the arm 71, thereby releasing the latter, and consequently the two stream-controllers 25 and 26, whereby the first mentioned can drop at a rapid rate of speed to close the valve 26 for cutting off the supply. On the final action of said stream-controllers the rod 47 will be thrust downward, with the leg 75 of its bifurcation 48 into contact with the latch-arm 76 for raising the counterweighted arm 13 of said latch. On this action taking place the closer will be freed of all restraint and can be forced open. As the closer opens it will tilt the load-receiver G, and when all the material has passed from the regulator R the closer L can be shut by the righting of the load-receiver, after which the other parts of the machine will re-

sume their initial positions and the operation will be repeated.

Having described my invention, I claim—

1. The combination, with weighing mechanism including a load-receiver provided with a closer connected with the framework, of supply mechanism for the load-receiver; a latch in position normally to hold the closer shut; and a tripper for said latch, connected with the supply mechanism.

2. The combination, with a load-receiver and its scale-beam having a projection, of a closer connected with the load-receiver and with the framework; a latch in position to hold the closer normally against movement; supply mechanism; a rod connected with the supply mechanism and having a bifurcation at its lower end embracing said projection, one of the legs of the bifurcation being extended downward to form a tripper for the latch.

3. The combination, with weighing mechanism including a load-receiver provided with a closer connected with the framework, whereby when the closer is opened the load-receiver will be caused to tilt; of a latch in position normally to hold the closer shut; a tripper for the latch; supply mechanism; a stop coöperative with the supply mechanism; and a coöperating stop secured to the load-receiver, to be thrown under the first-mentioned stop when the load-receiver is tilted.

4. The combination, with weighing mechanism including a load-receiver having a closer connected with the framework, whereby when the closer is opened the load-receiver will be caused to tilt, said closer having a rigid arm; of a latch mounted on the load-receiver and adapted to engage said arm; and a stop on the load-receiver, disposed in the path of movement of said arm and adapted to prevent the closer from opening too far.

5. The combination, with a load-receiver having a discharge-outlet; of a closer for the discharge-outlet, connected with the load-receiver and having a longitudinal ridge near its discharge edge and on the upper side thereof, which, when the closer is shut, is in contact with the lower edge of the load-receiver; and a guard fixed to the front wall of the load-receiver near the lower edge thereof.

6. The combination, with weighing mechanism embodying a load-receiver, of means including a latch for governing the discharge of a load; a reciprocatory hopper controlled by the weighing mechanism; a stream-controller carried by, and reciprocatory with, said hopper; and connections between said hopper and the stream-controller for actuating the latter.

7. The combination, with a scale-beam and with a load-receiver, of a reciprocatory hopper having a valve connected thereto; a rock-shaft carried by a stationary part and connected, respectively, with the hopper and valve; and a connection between the scale-beam and the valve.

8. The combination, with a load-receiver and a scale-beam, of a reciprocatory hopper having a valve; a rock-shaft carried by a stationary part and having a pair of oppositely-disposed crank-arms connected, respectively, with the hopper and the valve, and having a third crank-arm; and a connector between said third crank-arm and the scale-beam.

9. The combination, with weighing mechanism embodying a load-receiver, of a reciprocatory hopper; a valve; a transverse rock-shaft having oppositely-disposed arms, one of which is connected with said hopper; a link connected with the other arm and also with the valve; and connections between said rock-shaft and the weighing mechanism.

10. The combination, with weighing mechanism embodying a load-receiver having a closer, of means operable on the opening of the closer for tilting said load-receiver; a stream-controller; a stop-arm connected with the stream-controller and having a transverse portion; and a coöperating stop-arm having an auxiliary stop adapted to ride along a face of said transverse portion.

11. The combination, with weighing mechanism embodying a load-receiver provided with a closer, of means operable on the opening of the closer for tilting said load-receiver; a stream-controller having a stop-arm provided with a transverse portion at one end and having a curved face adjacent thereto; and a coöperating stop-arm on the load-receiver, having an auxiliary stop adapted to run in contact with a face of said transverse portion and to also run in contact with said curved face when the load-receiver is tilted.

12. The combination, with weighing mechanism embodying a load-receiver provided with a closer, of means operable on the opening of the closer for tilting said load-receiver; a reciprocatory hopper; a valve carried by and reciprocatory with said hopper; a transverse rock-shaft connected, respectively, with the reciprocatory hopper and valve; a stop-arm on said rock-shaft; and a coöperating stop-arm connected with the load-receiver.

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