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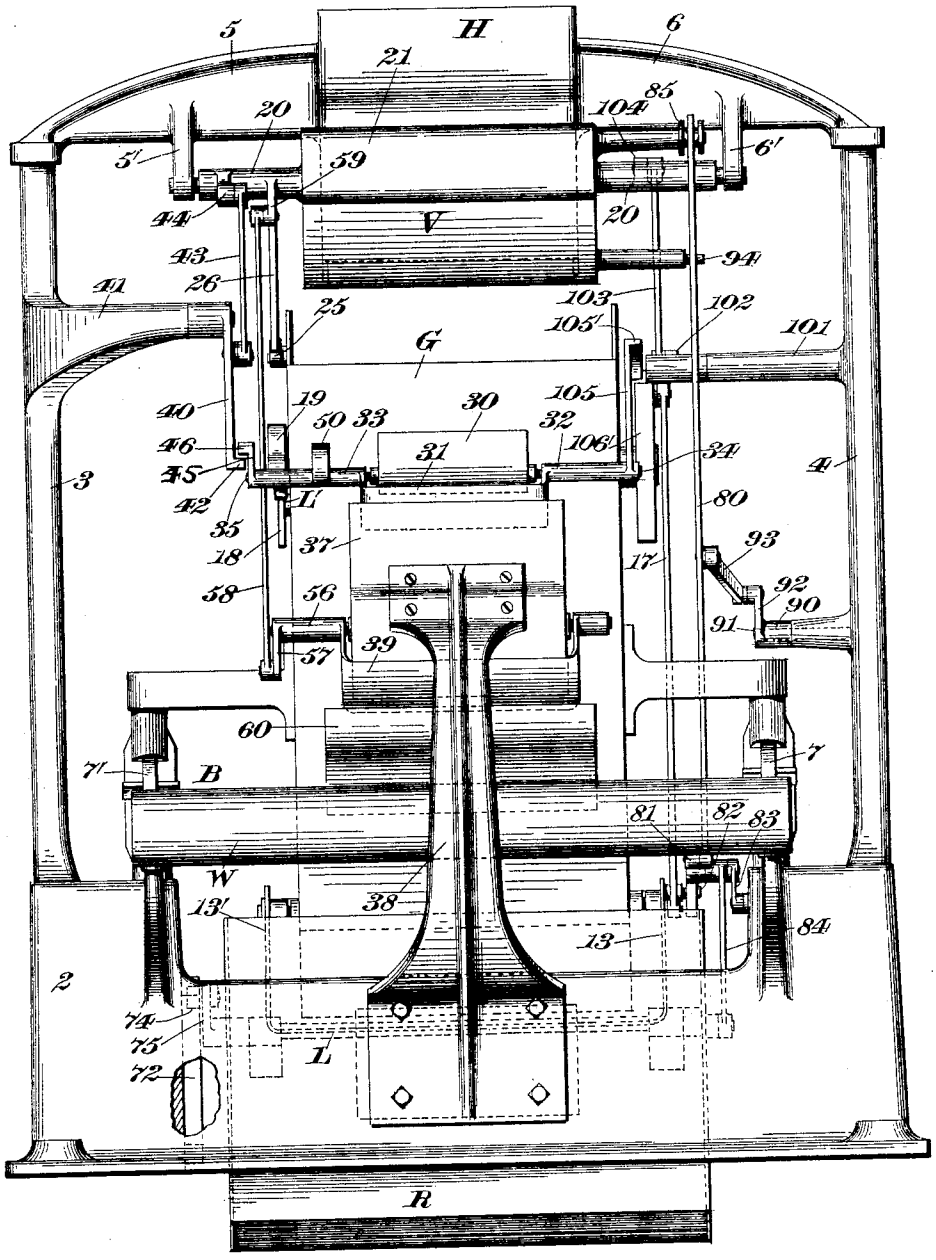
F. H. RICHARDS.

WEIGHING MACHINE.

No. 589,282. Patented Aug. 31, 1897.

Fig. 1.



Witnesses
Chas. S. Fehrenbach
Fred. J. Dole.

Inventor,
F. H. Richards.

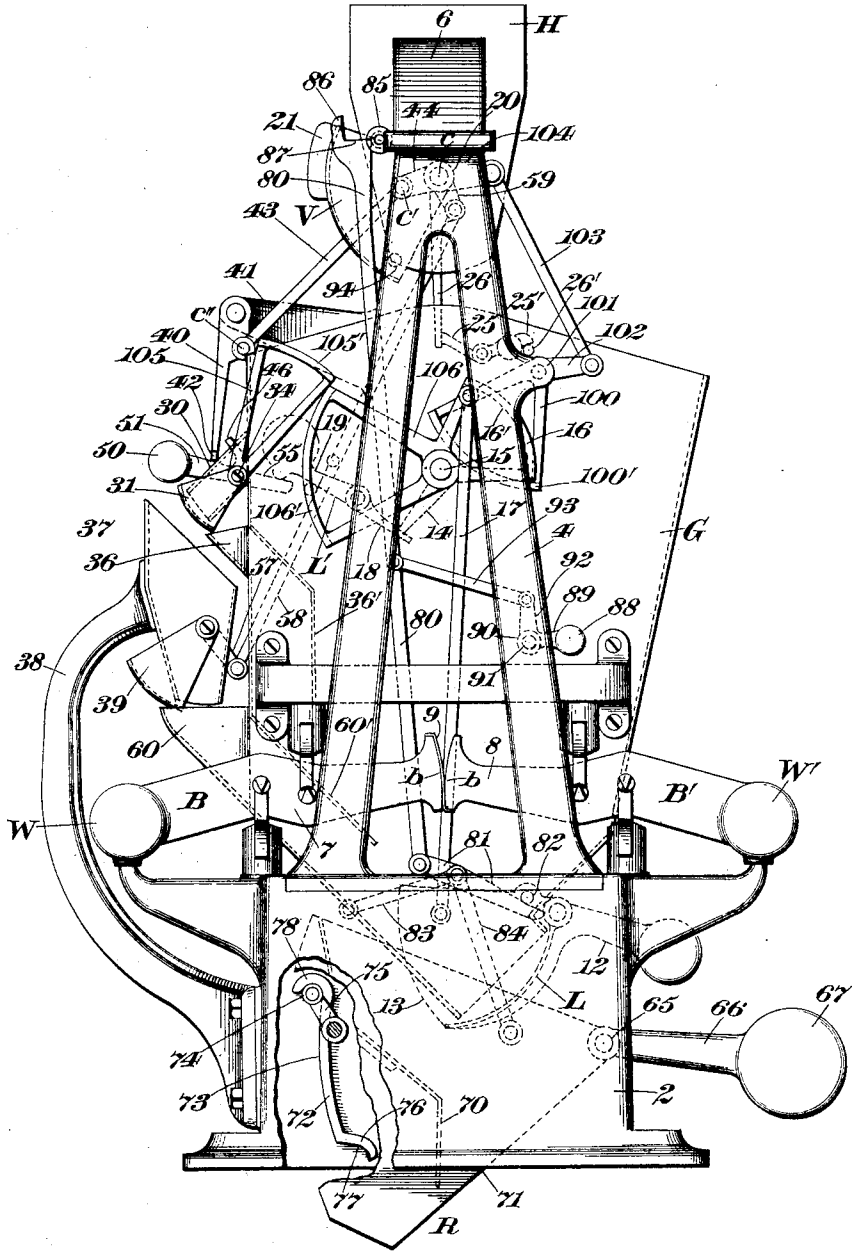
(No Model.) 6 Sheets—Sheet 2.

F. H. RICHARDS.

WEIGHING MACHINE.

No. 589,282. Patented Aug. 31, 1897.

Fig. 2.



Witnesses

Chas. F. Schmelz

Fred. J. Dole

Inventor

F. H. Richards.

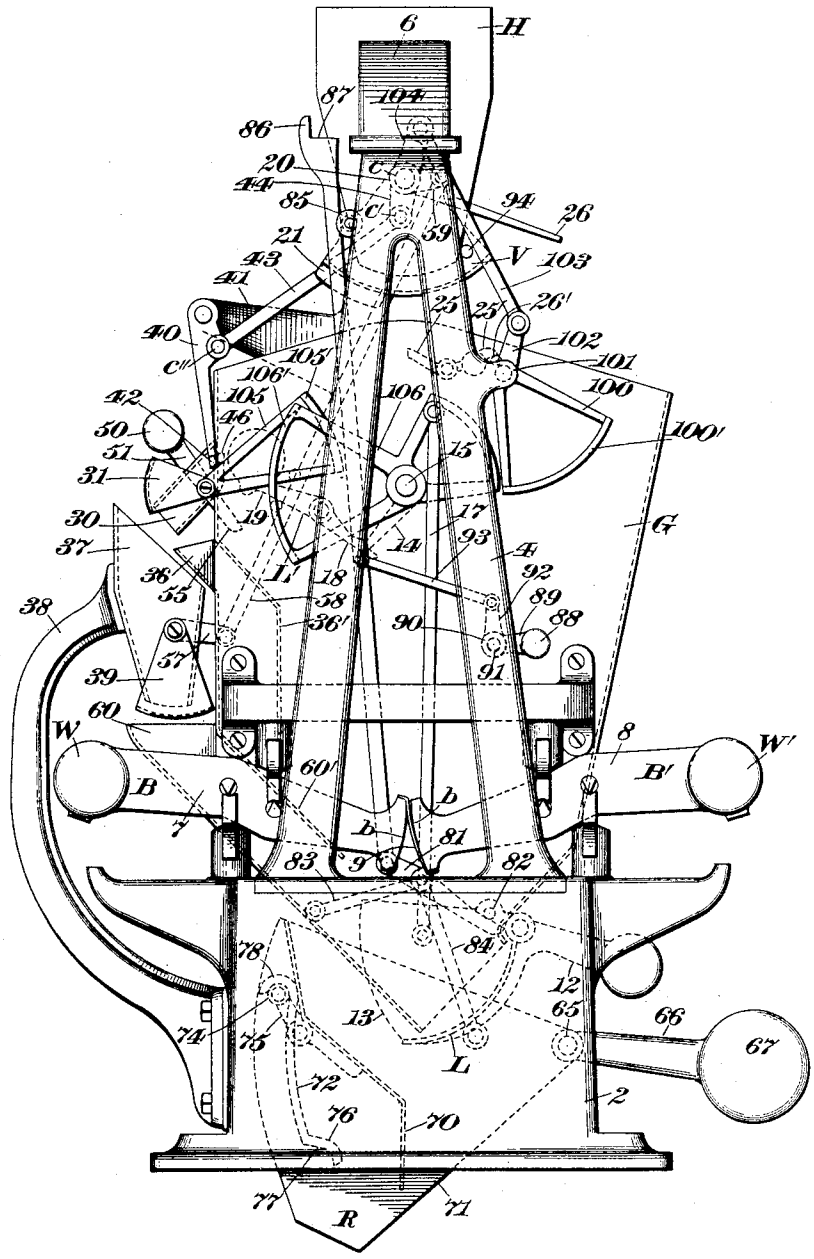
(No Model.) 6 Sheets—Sheet 3.

F. H. RICHARDS.

WEIGHING MACHINE.

No. 589,282. Patented Aug. 31, 1897.

Fig. 3.



Witnesses;
Chas. F. Schmeh
Fred. J. Dole.

Inventor;
F. H. Richards.

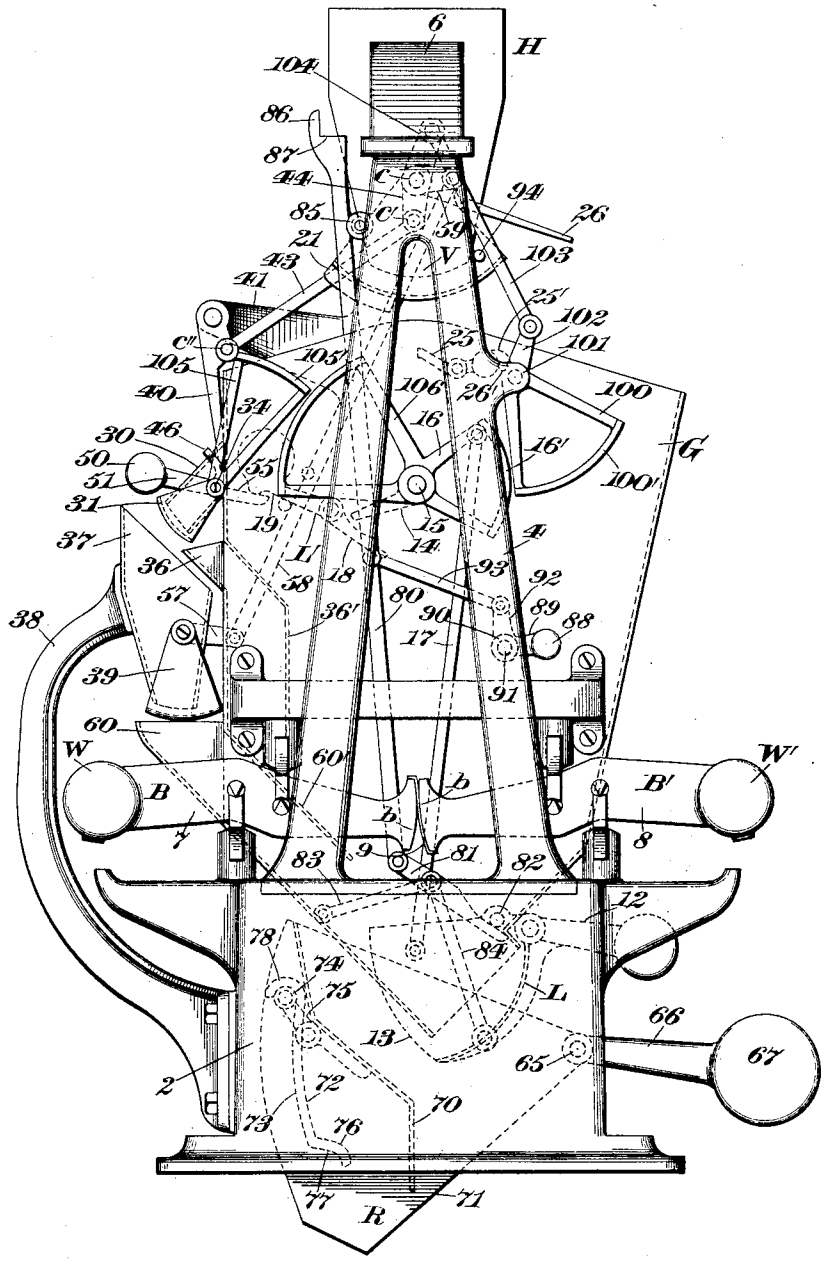
(No Model.) 6 Sheets—Sheet 4.

F. H. RICHARDS.

WEIGHING MACHINE.

No. 589,282. Patented Aug. 31, 1897.

Fig. 4.



Witnesses;
Chas. F. Schmelz
Fred. J. Dole.

Inventor;
F. H. Richards.

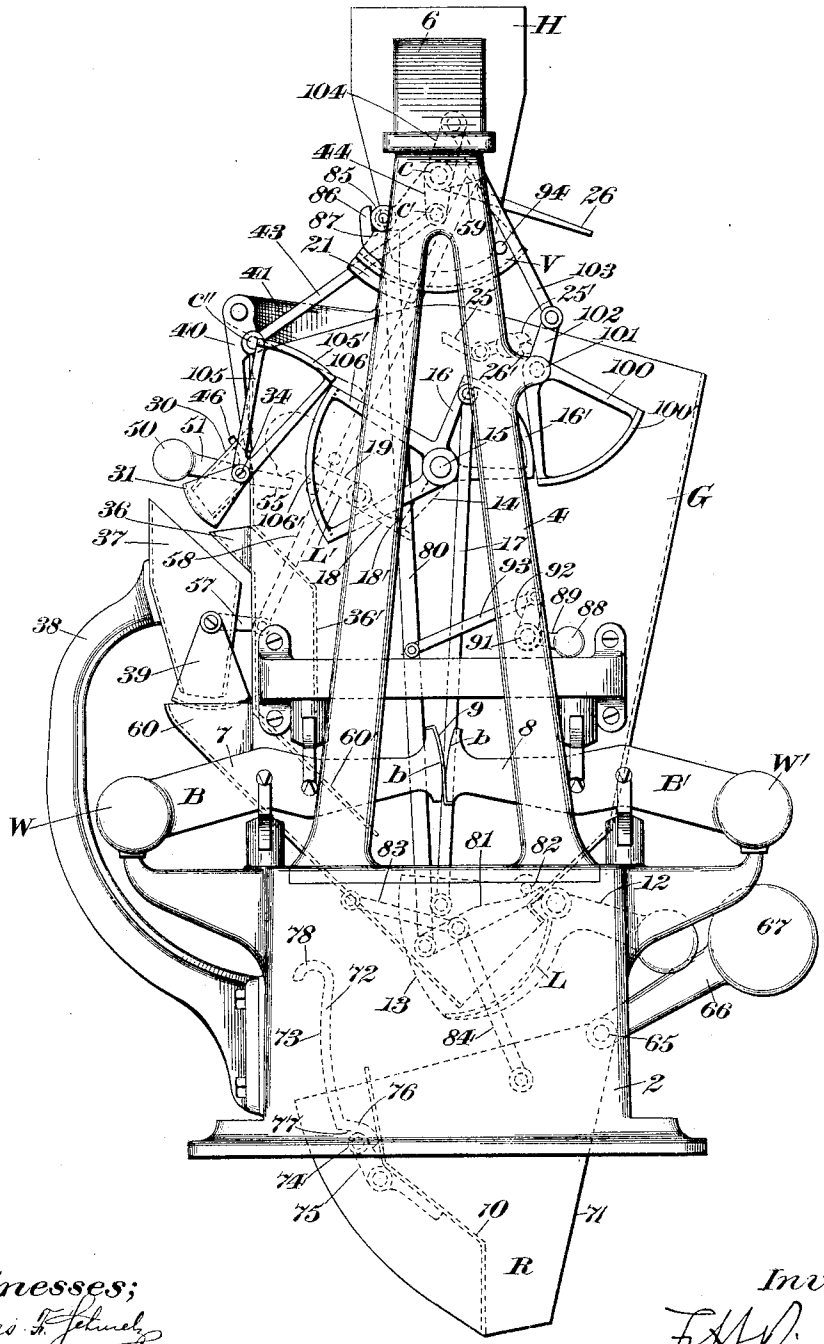
(No Model.) 6 Sheets—Sheet 5.

F. H. RICHARDS.

WEIGHING MACHINE.

No. 589,282. Patented Aug. 31, 1897.

Fig. 5.



Witnesses;
Chas. F. Fetherly
Fred. J. Dole.

Inventor
F. H. Richards.

(No Model.) 6 Sheets—Sheet 6.

F. H. RICHARDS.

WEIGHING MACHINE.

No. 589,282. Patented Aug. 31, 1897.

Fig. 6.

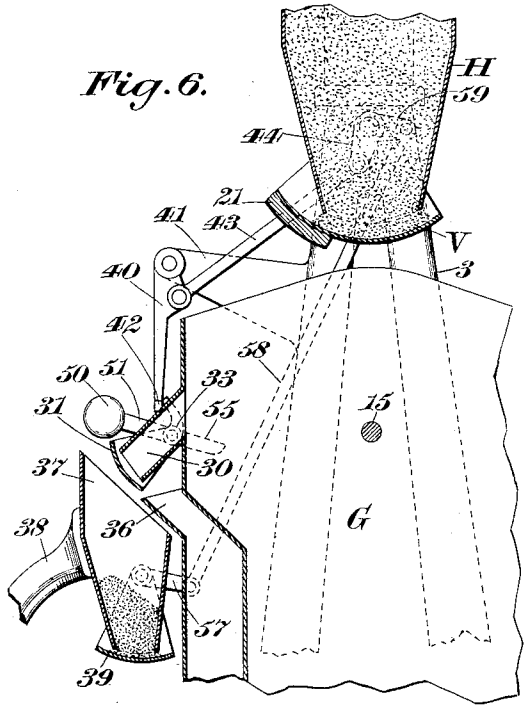


Fig. 8.

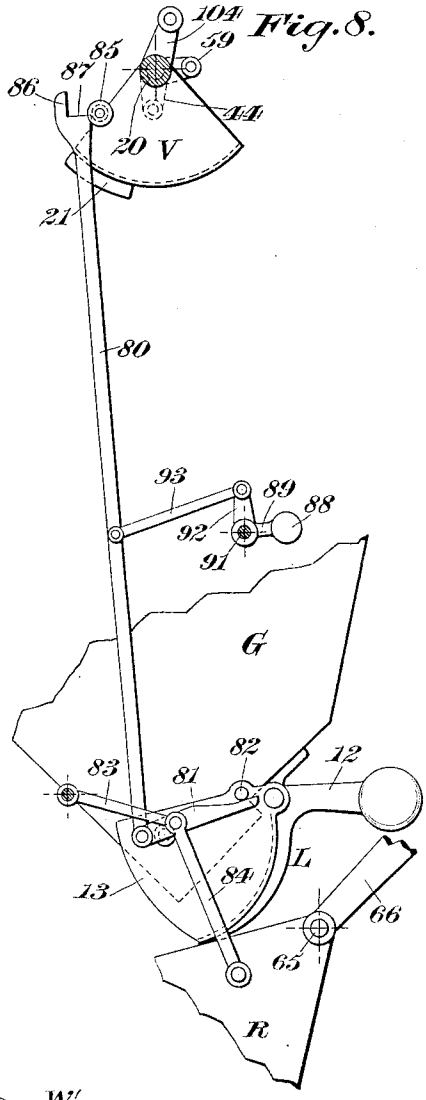


Fig. 7.

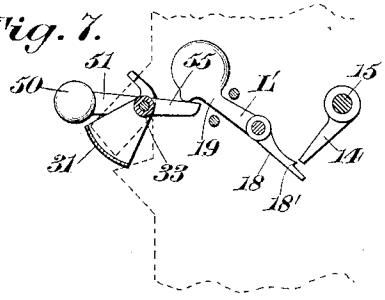
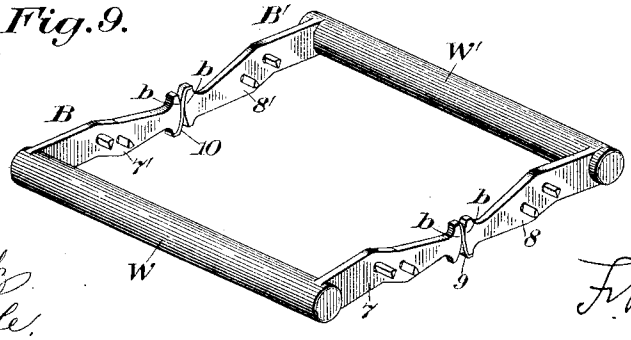


Fig. 9.



Witnesses;
Chas. F. Schmeh,
Fred. J. Dole.

Inventor;
F. H. Richards.

UNITED STATES PATENT OFFICE.

FRANCIS H. RICHARDS, OF HARTFORD, CONNECTICUT.

WEIGHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 589,282, dated August 31, 1897.

Application filed February 5, 1897. Serial No. 622,101. (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 of the type disclosed by Letters Patent No. 572,067, granted to me November 24, 1896, one of the objects of the invention being to provide improved and efficient overloading and load-reducing means, preferably automatically operative in the order named during the weighing of a load.

Another object of this invention is to furnish improved mechanism for actuating the stream-controller, such mechanism comprehending in the present case a regulator in the form of an oscillatory hopper which is situated beneath the load-receiver and is adapted to receive and temporarily contain the contents thereof, said regulator constituting an actuator for the stream-controller, the means for transferring the power of said regulator to the stream-controller being preferably automatically governed; and instrumentalities are also provided to momentarily lock the regulator in its depressed position, so that it can be completely emptied before the stream-controller is operated.

Another object of the invention is to furnish an improved beam system consisting of a pair of scale-beams having a rocking joint therebetween and a link attached to said beams, such organization insuring the simultaneous movement of said beams as the load-receiver reciprocates.

In the drawings accompanying and forming part of this specification, Figure 1 is a rear elevation of a weighing-machine embodying my present improvements. Figs. 2, 3, 4, and 5 are end elevations of the machine as seen from the right in Fig. 1, and they illustrate the positions occupied by the respective parts during the making and discharging of a load. Fig. 6 is a detail view, in central vertical section, of the overloading and load-reducing means and an auxiliary load-receptacle. Fig. 7 is a detail view of the latch and its tripper. Fig. 8 is a detail view of the actuating mechanism for the stream-controller and parts adjacent thereof, and Fig. 9 is a perspective view of the beam mechanism.

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

The framework for supporting the various parts of the machine may be of any suitable or preferred form, it comprising in the present case the chambered bed or base 2, the end frames or columns 3 and 4, which rise therefrom, and the brackets 5 and 6, which extend oppositely from the supply hopper or chute H, said parts being connected in some well-known manner.

The supply hopper or chute H, in connection with a suitable stream-controller, constitutes a convenient means for overloading the load-receiver, as will hereinafter appear.

The weighing mechanism consists of a load-receiver, as G, which is single-chambered, and a plurality of supporting scale-beams therefor, two of such scale-beams being represented and being designated by B and B′, respectively. Each of the scale-beams consists of a pair of longitudinal arms joined at the rear by a combined weight and connecting shaft.

The arms of the scale-beam B are designated by 7 and 7′, respectively, (see Fig. 9,) the similar arms of the beam B′ being denoted by 8 and 8′, respectively, and the two weights being represented by W and W′, respectively.

The two beams B and B′ are fulcrumed or pivotally supported upon the base or bed 2, as is usual, and the respective arms thereof are furnished with supports for the load-receiver located between the beam-supports.

For the purpose of insuring a movement of the two beams in unison as the load-receiver reciprocates I provide a rocking joint between the same and prefer to connect them by a suitable link or links, two of such links, of leather or analogous flexible material, being shown.

The two arms 7 and 8 are connected by a link or strap 9, and the arms 7′ and 8′ are connected by the strap or link 10, the points of attachment of the two links being crosswise or reverse—that is to say, the link 10 is fixed to the upper side of the arm 8′ and to the lower side of the arm 7′, while the opposite link 9 is attached to the upper side of the arm 7 and the lower side of the arm 8. The inner or adjacent ends of the several beam-

arms are rounded or of segmental form, as at *b*, to provide the necessary rocking joint, and between these rounded portions the two links are disposed.

The load-receiver G has the usual discharge-outlet in its bottom for the passage of material therefrom, and for covering said outlet the closer L, in the form of a concave plate pivoted to the load-receiver at one side of said outlet, is furnished. The closer L is provided with the forwardly-extending counterweighted arm 12 for shutting the same on the discharge of a bucket-load, and it also has the guard walls or flanges 13 and 13′ (see Fig. 1) for preventing lateral flow of the material when the load is discharged.

The means for controlling the discharge from the load-receiver includes a latch which is adapted to engage a member connected with the closer L, such as the crank-arm 14, extending from the rock-shaft 15, that passes entirely through the bucket, said shaft being furnished at the end thereof opposite to that having the crank-arm 14 with the skeleton or open segment 16, to one branch of which is pivoted the connecting-rod 17, said rod being also jointed to the closer L.

The latch that normally engages the crank-arm 14 to hold the closer shut is designated by L′, it being counterweighted and the working arm 18 thereof swinging upward to engage said crank-arm. The latch-arm 18 has a suitable shoulder or stop, as 18′, against which the operating-arm 14 is adapted normally to abut.

It is evident that by lifting the weighted arm 19 of the latch L′ the opposite arm thereof is lowered to disengage it from the crank-arm 14 to effect the release of the closer L, which operation taking place the latter can be forced open by the weight of the charge within the load-receiver. The action of the latch L′ is suitably limited by properly-positioned stops on the bucket, as is usual. (See Fig. 7.)

To obtain a correct load in the load-receiver G, a supply of material in excess of that determined upon for the requisite or true charge will be conducted to said load-receiver, which causes the latter to descend to a point somewhat below the so-called "poising-line." At a predetermined point in the movement of the bucket or when it has almost reached the end of its downstroke the load-reducing means will be called into requisition for removing the surplus or excess from the load-receiver, the material that is withdrawn being preferably delivered to an auxiliary receptacle carried on the framework.

The stream-controller for the hopper H in the present case consists of an oscillatory cut-off valve V, which has a reciprocatory movement beneath the outlet of said hopper to stop or permit the passage of the supply to the load-receiver, said valve being carried by the two-part shaft 20, which has journal-openings in its opposite ends for receiving pivot-screws on the brackets 5′ and 6′, respectively. The valve V is equipped with the weight 21 for closing the same, which weight is attached to the bottom of the valve in some convenient manner and which tends normally to close the same.

On the retracting or opening movement of the stream-controller or valve V to permit the overload-supply to pass from the hopper H into the load-receiver G, I provide means for preventing the immediate advancing or shutting of the stream-controller, such means consisting of a stop on the weighing mechanism whereby a stream of relatively large volume can pass from said hopper for a comparatively long duration of time. The stop for this purpose is designated by 25, it being of the "by-pass" type and pivotally supported near the upper end of the load-receiver, the weighted arm 25′ thereof resting on a pin 26′ on said load-receiver. The free arm of the by-pass stop 25 is disposed in the path of movement of the radial rod 26, that projects from the two-part valve-shaft 20. The operation of these parts will be apparent from an inspection of the several end elevations of the drawings.

When the valve V is opening, the rod 26, as said valve approaches the end of its stroke, will impinge against and lower the rear or free arm of the by-pass 25, whereby said valve can be fully opened without hindrance. The valve will then shut for a very short distance or until the rod 26 abuts against the free arm of the by-pass 25, which thereby prevents its further immediate closure. When the load-receiver has passed below the poising-line with the overload-supply therein, the by-pass stop 25 will have been carried below the arc of oscillation of the rod 26, thereby releasing the valve, so that it can be promptly shut by the weight 21 thereon.

The load-reducing means in the present case includes a valve that is reciprocatory below an opening in the bucket, such as the outlet of the load-reducing spout 30 near the upper end of the load-receiver, said valve being designated by 31 and having the laterally-extending sleeves 32 and 33, (see Fig. 1,) in which are located the pivot-screws 34 and 35, fixed in the opposite walls of the spout 30. A second spout on the load-receiver is shown at 36, located under and in alinement with the spout 30 and the valve 31 and into which the contents of the spout 30 can pour or pass at the conclusion of the weighing operation, as they form a part of the true load.

A valved auxiliary load-receptacle is represented at 37, it being attached to the standard or upright 38, which is fastened to the rear side of the base or bed 2, said auxiliary load-receptacle being in the form of a storage box or hopper and being intended to receive the overload from the load-receiver, which runs through the spout 30 on the opening of the valve 31 during the weighing of a load, at

which time the valve of said hopper is closed to prevent the material from running therethrough.

The valve for the auxiliary load-receptacle is denoted by 39, and it will be normally shut, so that said auxiliary load-receptacle constitutes a suitable storage device for containing the overload or surplus material withdrawn from the load-receiver G. The means for actuating the valve 39 to open and close the same will be hereinafter described.

The actuator for the load-reducing or auxiliary valve 31 will be preferably connected to the main or overload-controlling valve V for shifting movement, whereby said actuator can be thrown into and out of action. Such actuator is designated by 40, and it consists of a straight arm pivoted to and depending from the bracket 41 on the end frame 3, said arm having a toe or projection 42 at its free end for a purpose that will hereinafter appear. The arm 40, which is intended for opening the auxiliary valve 31, has pivoted thereto the comparatively long link 43, which is likewise attached to the crank-arm 44 on the two-part valve-shaft 20. The longitudinal sleeve 33, that extends from and forms part of the auxiliary valve 31, is provided with the rock-arm 45, having a projection 46 at its outer end which is adapted to coöperate with the similar projection 42 on the actuator or arm 40, to which I have previously referred.

The crank-arm 44 and the link 43 constitute a toggle, the several centers thereof being designated by c, c', and c'', and they are illustrated out of line in Fig. 2, wherein the valve is shown almost in its wide-open position. In said Fig. 2 the valve V is represented held nearly in its wide-open position by the by-pass stop 25 on the load-receiver G, which engages the rod 26, the auxiliary valve 31 covering the outlet of the spout 30 to prevent the passage of material from said spout into the auxiliary load-receptacle 37, although the material can trickle into the spout 36 on the load-receiver. The valve V being in the position just mentioned a large stream of material will flow from the hopper H into the load-receiver G to nearly fill the same, which will carry the latter down and below the poising-line, thereby freeing the valve by the dropping of the by-pass 25 below the rod 26, as shown in Fig. 3. At this time the projection 46 on the rock-arm 45 will have reached a point in the line of travel of the toe or projection 42 of the actuator or rod 40. The valve V being released and closed by its weight 21 the three centers c, c', and c'' will be thrown rapidly into line, which results in swinging the arm 40 for a short distance to the left, and when the point c' has crossed the dead-center line the arm 40 will be swung forcibly inward, so that the projection 42 by impinging against the projection 46 on the rock-arm 45 will open the auxiliary valve 31 to permit a portion of the material within the load-receiver G to pass therefrom through the spout 30 and into the auxiliary load-receptacle 37, the valve of which is closed, as shown in Fig. 3. The lightened load-receiver G will then ascend, and when the excess of material has been removed therefrom the projection 40 will have risen to a point above the coacting projection 42, which results in freeing the auxiliary valve 31, so that it can be quickly shut to stop the withdrawal of material from the load-receiver G, as shown in Fig. 4. For thus shutting the auxiliary valve I provide the weight 50, it being at the outer end of the arm 51 on the valve-sleeve 33 and which exerts a constant valve-closing force. On the opening of the main or overload-controlling valve V the reverse action with respect to the arm or actuator 40 will take place. On the completion of the load when the auxiliary valve 31 is shut the material within the spout 31 can readily pass therefrom and enter the spout 36, such material forming a part of the true load and being discharged therewith.

It will be remembered that a latch L′ has been described for holding the closer L shut during the loading period by engaging the crank-arm 14, that is connected to said closer. The tripper for said latch is designated by 55, and it consists of a rock-arm extending from the valve-sleeve 33, and the momentum acquired by the valve 31 in shutting is transmitted to the tripper 55, so that said tripper by imparting a sudden blow to the weighted arm 19 of the latch will lift the same and will depress the opposite arm 18, as shown in Fig. 7, to effect the release of the closer L. On the tripping of the latch the weighted arm thereof will drop for a short distance and will correspondingly retract the valve to the position shown in Fig. 2, where it can completely cover the outlet of the spout 30. It is to be understood that the weight of the latch L′ is somewhat heavier than the valve-actuating weight 50, the latch being tripped simply through the momentum acquired by the tripper 55 on the accelerated closure of the valve, the jar applied to the latch being a very sudden one. On the shutting of the closer L by the counterweight 12 thereof the valve V will be opened, as will hereinafter appear, the load-receiver being at this stage empty.

For the purpose of discharging the load-receptacle 37 I prefer to connect its valve 39 with the main valve V, whereby these two members can be opened simultaneously, the necessary power being applied to the valve V.

The valve 39, which is pivotally hung from the receptacle or hopper 37, has at one side thereof the integral bearing-sleeve 56, from the outer end of which extends the crank-arm 57, to which the rod 58 is pivoted, said rod being similarly jointed to the crank-arm 59 on the two-part valve-shaft 20. As the valve V is opened the shaft 20 and crank-arm 59 will be rocked, and the rod 58 will be thrust

downward simultaneously, so that the valve 39 can be swung open to permit the contents of the receptacle or hopper 37 to pass therefrom and enter the supplemental spout 60 on the load-receiver G, the inlet-opening of which is located immediately below the outlet of the receptacle 37.

To prevent material backing up in the spouts 36 and 60, I provide the guard-walls 36′ and 60′ inside the load-receiver, which extend from its opposite inside faces and about the inlets of the two spouts.

There is situated below the load-receiver a regulator R, which is in the form of an oscillatory hopper, the pivot thereof being designated by 65, and said hopper is furnished with the forwardly-extending arm 66, which carries the operating-weight 67 for returning said regulator to its uppermost position when the mass has gravitated therefrom, said regulator being intended to receive the loads intermittingly discharged from the load-receiver G and to be depressed or forced downward thereby.

There is located within the regulator-hopper R the swinging governor 70, in the form of a gate or valve, which is pivotally supported between the end walls of the said regulator, and the discharge edge of said governor when it is in its normal position is adjacent to the under inclined wall 71 of the hopper. The hopper R, as previously stated herein, is situated to receive the loads of material that are intermittingly discharged from the load-receiver, and said regulator is adapted to contain sufficient of the material discharged thereinto to overbalance the weight 67, which thereby causes its depression or lowering, the material being discharged therefrom when it reaches its lowest position, as indicated in Fig. 5.

Means will be provided for locking the governor or gate 70 in its normal position when the regulator R is at the limit of its upstroke and during its descent, such locking means being effective until the regulator has almost reached the end of its down movement, whereby said regulator can receive sufficient material to insure the overbalancing of the operating-weight 67. The locking means for the gate 70 consists of the flange or rib 72, which can be cast on the inside face of the base 2, said flange having the curved face or runway 73, which is concentric to the axis of the hopper R and over which the projection or roll 74 on the crank-arm 75 of the gate is adapted to travel, whereby the movement of the gate from its normal position is prevented so long as the roll 74 is in contact with the curved face 75. When, however, said roll 74 leaves said face, the gate 70 can be readily forced open by the pressure of the mass acting thereagainst, as indicated in Fig. 5. Instrumentalities will be furnished for momentarily locking the regulator R against return movement, so that it can be completely emptied of its contents before the valve V is opened, as said regulator constitutes the medium for transmitting the necessary power to the valve to effect this operation. For this purpose I prefer to employ the rib 72 as a locking device, it having the deflected or oblique portion 76 at its lower end, and the roll 74 when it leaves the curved face 73 will be contiguous to the under face 77 of said portion 76, said roll being swung thereunder by the action of the gate 70 in opening. It will be evident that the deflected or oblique portion 76 of the rib 72 constitutes an effective blocking device for preventing the immediate ascent of the regulator, and it will continue to do so until the gate 70 has returned to its normal position, said gate being permitted to do this when the mass within the regulator has passed completely below the lower edge of said gate, the latter having a slight preponderance of weight below its axis of movement, whereby its return is somewhat prolonged.

The flange or rib 72 has at its upper end the overhanging stop portion 78, against which the roll 74 is adapted to abut on the ascent of the empty regulator R, to thereby restrict such action.

It will be remembered that the regulator R has been described as constituting an actuator for the stream-controller, and in the present case such stream-controller, which consists of a valve, will be opened on the ascent of the regulator after its contents have been passed therefrom.

As a means for transferring the power of the regulator to the valve I provide the thrust-rod 80, which is normally disconnected from the valve, whereby said valve can be freely and rapidly closed to cut off the supply from the hopper II, but which is thrown into operative relation therewith at the proper time automatically. Said rod 80 is pivoted at its lower end to the lever 81, which bears against the fulcrum 82, in the form of the pin on the closer L, said lever 81 being jointed to the links 83 and 84 at their point of pivotal connection. The link 84 is pivoted to one side of the hopper, while the other link is similarly attached to the inside face of the base 2. The valve V has on its right-hand end wall (see Fig. 1) the projection or grooved antifriction-roll 85, with which the upper or free end of the rod 80 is adapted to coöperate, said rod having the stop-shoulder 86 adjacent to said roll.

At the commencement of operation, as represented in Fig. 2, the regulator being up and the valve V nearly in its wide-open position, with the radial rod 26 against the stop 25, the inside face of the thrust-rod 80 near its upper end will be in contact with the periphery of the projection or roll 85. It will be evident that when the valve is released by the dropping of the stop 25 below the rod 26 it can be promptly closed without interference of any kind. (See Fig. 3.)

When the load is discharged from the load-

receiver G, it will enter the hopper R and promptly depress the same, and as the regulator descends it will pull the rod 80 downward through the medium of the interposed links 83 and 84 and the lever 81, said lever acting against the fulcrum 82, and until the upper working edge 87 of the thrust-rod has been lowered to a position opposite the lowest point of the periphery or tread of the projection or roll 85, whereby said working edge 87 can be thrown into operative relation with said roll by being thrust thereunder. For effecting this last-mentioned operation I provide means carried by the framework, such as the weight 88 on the outer end of the arm 89. The hub 90 of said arm is fixed to the rock-shaft 91, carried by the end frame 4, and said hub 90 has the crank-arm 92, to which is pivoted the link 93, said link being also pivoted to the thrust-rod 80.

It will be apparent that when the rod 80 has been drawn down in the manner just specified its upper edge 87 can be readily swung under the projection or roll 85 of the valve V, and until the stop-shoulder 87 meets said roll, by the action of the weight 88, as shown in Fig. 5.

On the ascent of the empty regulator R, which is caused by the falling of the operating-weight 67, the thrust-rod 80 will be elevated, and said rod being in contact with the roller or projection 85 the opening of the valve V will of course follow. For automatically throwing these parts out of operative relation or out of contact I conveniently employ means operative with the valve V, such as the pin 94 thereon. When said valve has nearly reached its wide-open position, the pin 94 will have met the rod 80, which is disposed in its path of movement, so that on the continued opening action of the valve the rod 80 is swung to the left and until its upper edge 87 is forced from under the roll 85. When this takes place, the valve V closes for a short distance, or until the rod 26 that is operative therewith comes against the stop 25, which thereby arrests the further closure of said valve and until the load-receiver has passed below the poising-line. As the valve moves from this wide-open position to that illustrated in Fig. 2 the rod 80 will be carried therewith by the weight 88 acting through the intermediate connections, the inside face of the rod being maintained in contact with said projection by said weight.

In connection with the closer and the stream controller or valve I provide reciprocally-effective stops operable to preclude the simultaneous opening of these two members. The open segment 16, which is connected with the closer L, acts as one of said stops, the cooperating stop being designated by 100 and illustrated pivotally carried by the projection 101 on the end frame 4, said segment having near its angle the crank-arm 102, which is connected by the intermediate link 103 with the crank-arm 104 on the two-part valve-shaft 20. The segmental stop 16 has the stop-flange 16′, the coacting member being equipped with a similar flange 100′, said flanges extending in opposite directions from the respective stops.

In Fig. 2, wherein the closer L is represented shut and the valve V open, the flange 16′ is indicated situated above and adjacent to the flange 100′. During this time should the latch L′ be tripped too quickly or fail to work, the closer L can open for a very limited distance, or until the flange 16′ reaches the cooperating stop-flange 100′, the latter thereby arresting the further action of the stop 16. When the valve V is closed, the stop 100 will have been swung by said valve bodily across the plane of the outside curved face of the stop-segment 16, thereby releasing the latter, (see Fig. 3,) so that the latch L′ being tripped the closer L can be forced open, thereby drawing the stop 16 downward, with its flange 16′ substantially in contact with the flange 100′, as represented in Fig. 4, whereby retractive movement of the stop 100, and consequently of the valve V, will be prevented, and this relation will continue so long as the closer L is open. When said closer has been shut, the stop 16 will release its companion stop 100.

In connection with the auxiliary or load-reducing valve and the closer a similar pair of stops will be furnished. The stop that is operative with the auxiliary valve is designated by 105, it being similar in construction to the previously-described stops and preferably cast integral with the sleeve 32 of the auxiliary valve. The coacting stop is designated by 106, and it can be made in one piece with the stop 16. The stop-flange of the member 105 is designated by 105′, the coacting flange of the other member being denoted by 106′. The operation of these two stops is indicated clearly in Figs. 3 and 4. On the opening of the auxiliary valve, as shown in Fig. 2, the flange 105′ will be carried over the cooperating flange 106′, so that the oscillation of the stop 106 will be prevented by the flange 105′, as will be understood. On the shutting of the auxiliary valve the stop 105, that is connected therewith, will release the coacting stop 106. On the opening of the closer, as shown in Fig. 4, the stop 106 will be thrust upward with its flange 106′ across the path of movement of the flange 105′, whereby the opening of the valve 31 will be barred by the blocking of the stop-flange 105′ as soon as the latter touches the flange 106′.

It will be evident from the preceding that the opening of the auxiliary valve 31 will be firmly blocked while the closer is open, so that the material within the spout 30 cannot run into the hopper 37 during the discharging of the load-receiver.

The operation of the hereinbefore-described weighing-machine is as follows: Fig. 2 represents the positions occupied by the various parts at the commencement of operation, the closer L being shut and held in such position by the latch L′, which is in engagement with

the arm 14, that is connected with said closer, and the valve V is shown open and held in such position by the stop 25, which is in engagement with the rod 26 of the valve, so that a stream of large volume will flow from the hopper H and enter the load-receiver to nearly fill and to carry the same to a point below the poising-line. When the load-receiver has reached the end of its down movement, the stop 25 will have been carried below the rod 26, so that the valve V can be quickly shut by the weight 21. (See Fig. 3.) When the valve V has nearly reached its closed position, the actuator or arm 40, which is connected to said valve, will be swung inward with the toe or projection 42 thereof against the similar projection 46 on the rock-arm 45, that extends from the sleeve 33 of the auxiliary valve 31, so that said valve can be opened to permit the surplus to pass from the load-receiver and into the auxiliary receptacle 37. This will cause the lightened bucket to rise, and when the overload has been withdrawn from the load-receiver the projection 46 will have reached a point above the projection 42, so that the auxiliary valve 31 can be promptly shut by the dropping of the weighted arm 51, which prevents further withdrawal of material from the load-receiver. As the auxiliary valve 31 shuts the tripper 55, which is connected thereto, will strike and raise the weighted arm 19 on the latch L' and will depress the opposite arm thereof and disengage it from the crank-arm 14, so that the closer L is released and forced open and the charge from the load-receiver emptied into the regulator-hopper R to depress the same. As said regulator descends the rod 80, through the intermediate connections, will be drawn downward thereby and its upper end will be swung beneath the projection or roll 85 on the valve V by the weight 88. When the material has passed below the discharge edge of the closer, it can shut, and when the regulator is empty the weight 67 thereof will cause the same to rise, so that an upward thrust will be applied to the rod 80 to force the valve V open, and when said valve has nearly reached its wide-open position the projection 94 thereon will throw the rod 80 out of contact with the roll 85 and the valve will be shut for a short distance, or until the rod 26 abuts against the stop 25. As the valve V opens the valve 39 of the load-receptacle 37 will be simultaneously opened, as it is connected therewith, so that the contents of said receptacle can pass into the empty load-receiver through the spout 60 thereof.

Having described my invention, I claim—

1. The combination, with a load-receiver, of stream-supplying means; a stream-controller; a regulator located to receive and to be lowered by the contents discharged from the load-receiver and constituting an actuator for the stream-controller; a connector between the regulator and the stream-controller, for transferring the power of the former to the latter; means for throwing the connector into operative relation with the stream-controller on the depression of the regulator; and instrumentalities for temporarily blocking the return movement of the regulator.

2. The combination, with a load-receiver, of a stream-controller; means for actuating said stream-controller, said means including a regulator located to receive and to be depressed by the contents discharged from the load-receiver; a valve on said regulator; means for holding the valve against movement when the regulator is in its normal position; and instrumentalities for blocking temporarily the return of the regulator when it is depressed.

3. The combination, with weighing mechanism including a load-receiver provided with a closer, of stream-supplying means; a stream-controller; a regulator located to receive and to be depressed by the contents discharged from the load-receiver; instrumentalities for blocking the return movement of the regulator when it is depressed; a rod connected with the regulator; and means for throwing said rod into operative connection with the stream-controller on the depression of the regulator, whereby as the latter rises the valve will be opened.

4. The combination, with weighing mechanism including a load-receiver, of a hopper; a valve for controlling the passage of material from the hopper to the load-receiver; a valve-closing device; a regulator located to receive and to be depressed by the contents discharged from the load-receiver; instrumentalities for temporarily blocking the return movement of the regulator when it is depressed; a rod connected with the regulator; and a counterweighted device mounted on the framework and connected with the rod, said device being operative, on the depression of the hopper, to throw the rod into operative relation with the valve, whereby on the ascent of the regulator the valve will be opened.

5. The combination, with weighing mechanism including a load-receiver, of a stream-controller having a projection; a regulator located to receive and to be depressed by the contents discharged from the load-receiver; a thrust-transferring member connected with said regulator; means for throwing such transferring member under said projection; and a second projection on the stream-controller, adapted to throw said thrust-transferring member out of contact with the first-mentioned projection.

6. The combination, with weighing mechanism including a load-receiver, of a stream-controller having a projection; a regulator adapted to receive and to be depressed by the contents discharged from the load-receiver; a thrust-transferring member connected with said regulator; means for throwing said thrust-transferring member under said projection; a second projection on the stream-

controller, adapted to throw said thrust-transferring member out of contact with the first-mentioned projection; and means for temporarily blocking the return movement of the regulator when it is depressed.

7. The combination, with a load-receiver, of a regulator adapted to receive and to be depressed by the contents discharged from said load-receiver; a stream-controller; a thrust-transferring member; a lever connected with said thrust-transferring member; a pair of links attached, respectively, to the regulator and to the framework; and also to said lever and an operating-weight on the framework, connected with said thrust-transferring member.

8. The combination, with weighing mechanism embodying a load-receiver, of overloading and load-reducing means each including a valve; an actuator for the load-reducing valve, connected with the overloading-valve; a regulator located to receive and to be depressed by the contents discharged by the load-receiver; a thrust-transferring member connected with the regulator; and means for throwing said thrust-transferring member into operative connection with the overload-controlling valve.

9. The combination, with weighing mechanism embodying a load-receiver, of overloading and load-reducing means each including a valve; an actuator for the load-reducing valve, connected with the overload-controlling valve; means comprehending a latch, for governing the discharge of the load-receiver; a latch-tripping device coöperative with said load-reducing valve; a regulator positioned to receive and to be depressed by the contents discharged by the load-receiver; a thrust-transferring member connected with said regulator; and means for throwing said thrust-transferring member into operative connection with the overload-controlling valve.

10. The combination, with weighing mechanism including a load-receiver, of overloading and load-reducing means each comprehending a valve; an actuator for the load-reducing valve, connected with the overload-controlling valve for operation; a valved receptacle positioned to receive the material removed from the load-receiver by the load-reducing means; and a connection between the overload-controlling valve and the valve of said receptacle, whereby the latter may be operated.

11. The combination, with a load-receiver having a closer, of a stream-controller; an actuator for said stream-controller; a lever the fulcrum of which is on the closer, said lever being connected with the actuator; and a connection between the lever and the stream-controller.

12. The combination, with a load-receiver having an outlet; of a closer for said outlet, carrying a pin; a stream-controller; a stream-controller actuator; a lever adapted to bear against said pin, which constitutes a fulcrum therefor, said lever being connected with the actuator; and a connection between said lever and the stream-controller.

13. The combination, with a load-receiver, of a stream-controller; an actuator for said stream-controller; a pair of links connected, respectively, with the framework and with said actuator; a lever jointed to said links; and a connection between said lever and the stream-controller.

14. The combination, with a stream-controller, of an actuator for said stream-controller; an intermediate thrust-transferring member connected with the actuator and disconnected from the stream-controller; a shaft carried by the framework and furnished with an operating-weight; and a connection between said shaft and thrust-transferring member.

15. The combination, with a load-receiver, of a stream-controller; a regulator positioned to receive the contents from the load-receiver, and constituting an actuator for the stream-controller; a thrust-transferring member situated between the regulator and the stream-controller; a shaft on the framework, carrying two crank-arms, one of which is counterweighted and the other of which is connected by a link to said thrust-transferring member.

16. The combination, with a load-receiver having a discharge-outlet; of a closer for said outlet, provided with a pin; a valve supported for opening and closing movements, and having a projection; a regulator located to receive the contents discharged from said load-receiver; a lever bearing against said pin, which acts as a fulcrum therefor; a pair of links connected, respectively, with the framework and with said regulator, said links being joined to said lever at their point of connection; a rod pivoted to said lever and cooperative with the projection on the valve; a rock-shaft carried by the framework, furnished with two crank-arms, one of which is weighted and the other of which is connected by a link to said rod; and a second projection on said valve, adapted to engage said rod on the opening movement thereof.

17. The combination, with a load-receiver having a closer, of a stream-controller; means for actuating said stream-controller, said means including a load-receiving hopper supported for descending and ascending movements beneath the load-receiver; and a device independent of the closer, for temporarily blocking said hopper against ascending movement.

18. The combination, with a load-receiver and with load-discharging means therefor, of a stream-controller; means for actuating said stream-controller, said means including a hopper supported for descending and ascending movements beneath said load-receiver, said hopper having a gate; and locking means

for said gate, operable on one of the strokes of said hopper and adapted to prevent the immediate ascent of said hopper.

19. The combination, with a load-receiver and with load-discharging means therefor, of an oscillatory hopper situated to receive the contents discharged from said load-receiver; a gate carried by said hopper, having a crank-arm fixed thereto provided with a projection; and a stop having a longitudinal curved face along which said projection is adapted to travel, said curved face being concentric with the axis of said hopper.

20. The combination, with a load-receiver and with load-discharging means therefor, of an oscillatory hopper situated to receive the contents from the load-receiver and having a gate provided with a crank-arm equipped with a projection; a stop-rib on the framework, having a curved face along which said projection travels, said stop-rib also having an oblique portion at its lower end under which the said projection can be thrust on the movement of the gate.

21. The combination, with a load-receiver and with load-discharging means therefor, of an oscillatory hopper situated to receive the contents discharged from the load-receiver; a gate carried by said hopper and having a crank-arm provided with a projection; a rib having a curved face along which said projection is adapted to travel, said rib having stop portions at its ends.

22. The combination, with weighing mechanism including a load-receiver, of overloading and load-reducing means operative in this order during the weighing of the load, the load-reducing means embodying a valve; and an actuator for said valve, connected with the overloading means.

23. The combination, with weighing mechanism including a load-receiver, of overloading means and load-reducing means each embodying a valve; and an actuator for the load-reducing valve, connected to the overload-controlling valve.

24. The combination, with a load-receiver, of a supply-hopper; a valve for said hopper, the shaft of said valve having a crank-arm; an auxiliary valve carried by the load-receiver; an actuator for said auxiliary valve; and a link connected, respectively, to said crank-arm and actuator.

25. The combination, with a load-receiver, of load-discharging means therefor including a latch; overloading and load-reducing means, each comprehending a valve; and a tripper connected with the auxiliary valve and adapted to trip the latch through the momentum acquired by the auxiliary valve in closing.

26. The combination, with weighing mechanism including a load-receiver, of overloading and load-reducing means therefor, the first-mentioned embodying a valve; a receptacle situated to receive the contents removed from said load-receiver during the weighing of a load; and a valve for said receptacle, connected with the overload-controlling valve for operation.

27. The combination, with a load-receiver and with load-discharging means therefor, of overloading and load-reducing means operative during the weighing of a load, the load-reducing means including a valve; and means operative on the discharge of a load, for positively blocking the opening movement of said valve.

FRANCIS H. RICHARDS.

Witnesses:
FRED. J. DOLE,
HEATH SUTHERLAND.