(No Model.)

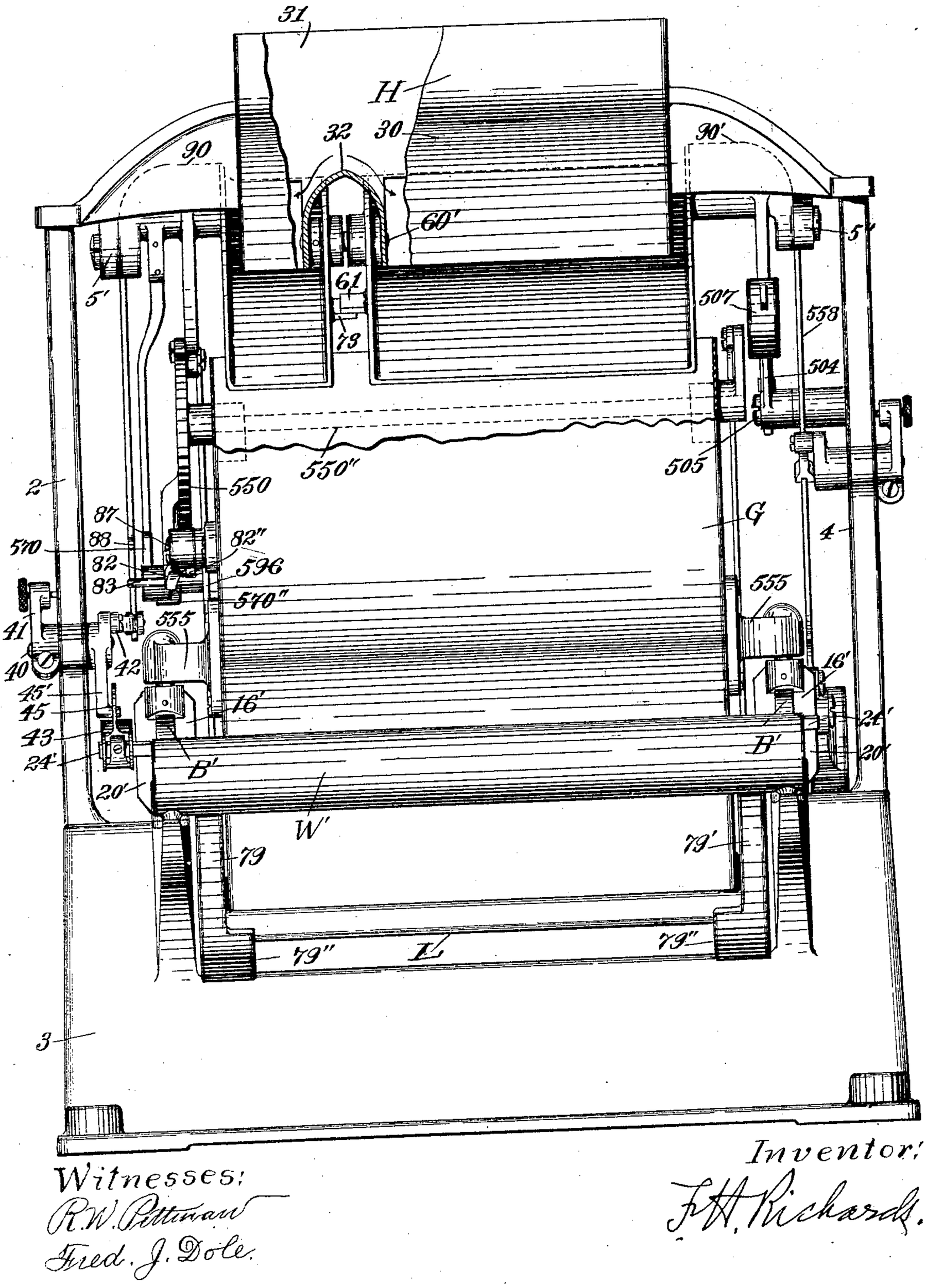
6 Sheets—Sheet 1.

F. H. RICHARDS.

WEIGHING MACHINE.

No. 559,214. Patented Apr. 28, 1896.

Fig. 1.



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Inventor:
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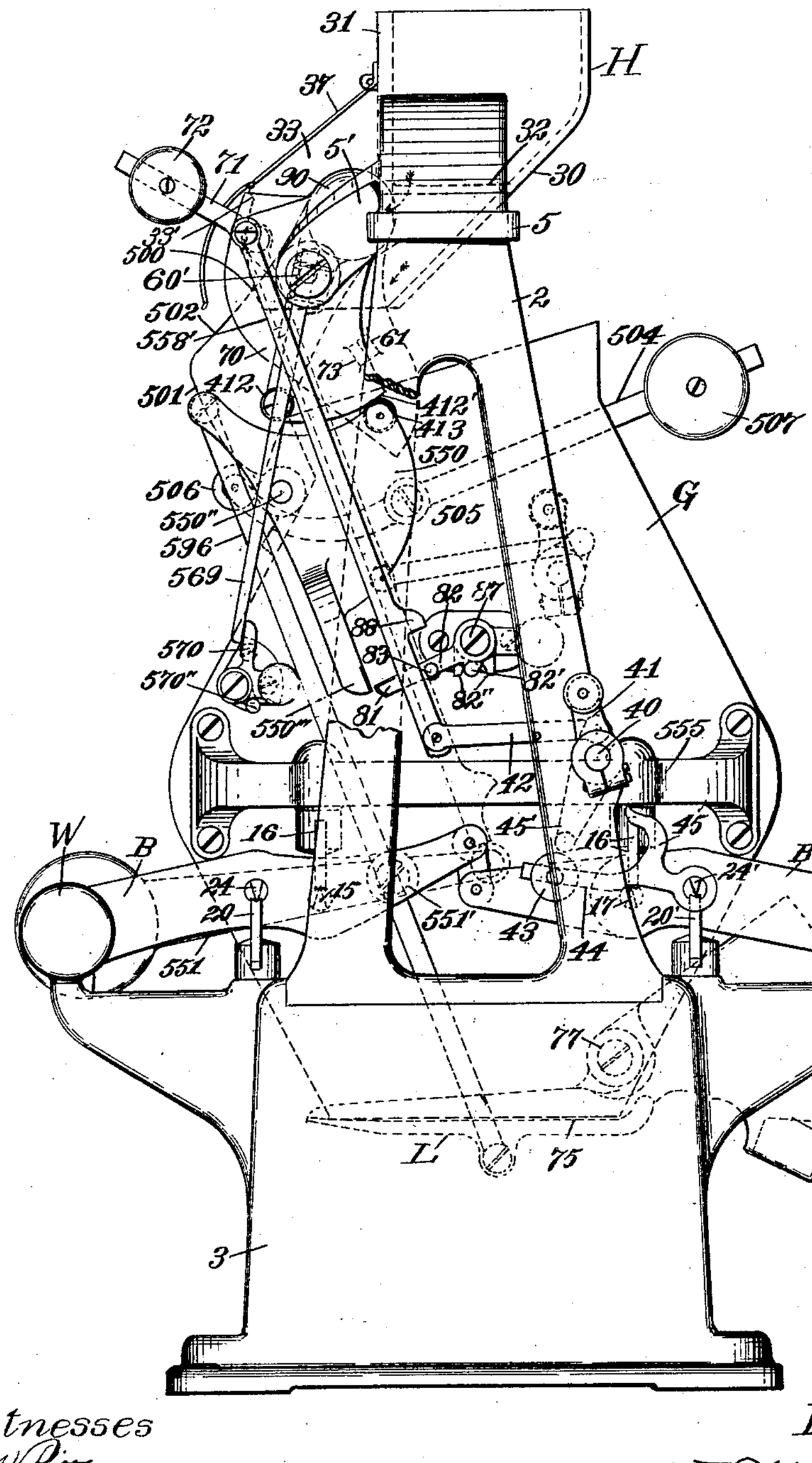
(No Model.) 6 Sheets—Sheet 2.

F. H. RICHARDS.

WEIGHING MACHINE.

No. 559,214. Patented Apr. 28, 1896.

Fig. 2.



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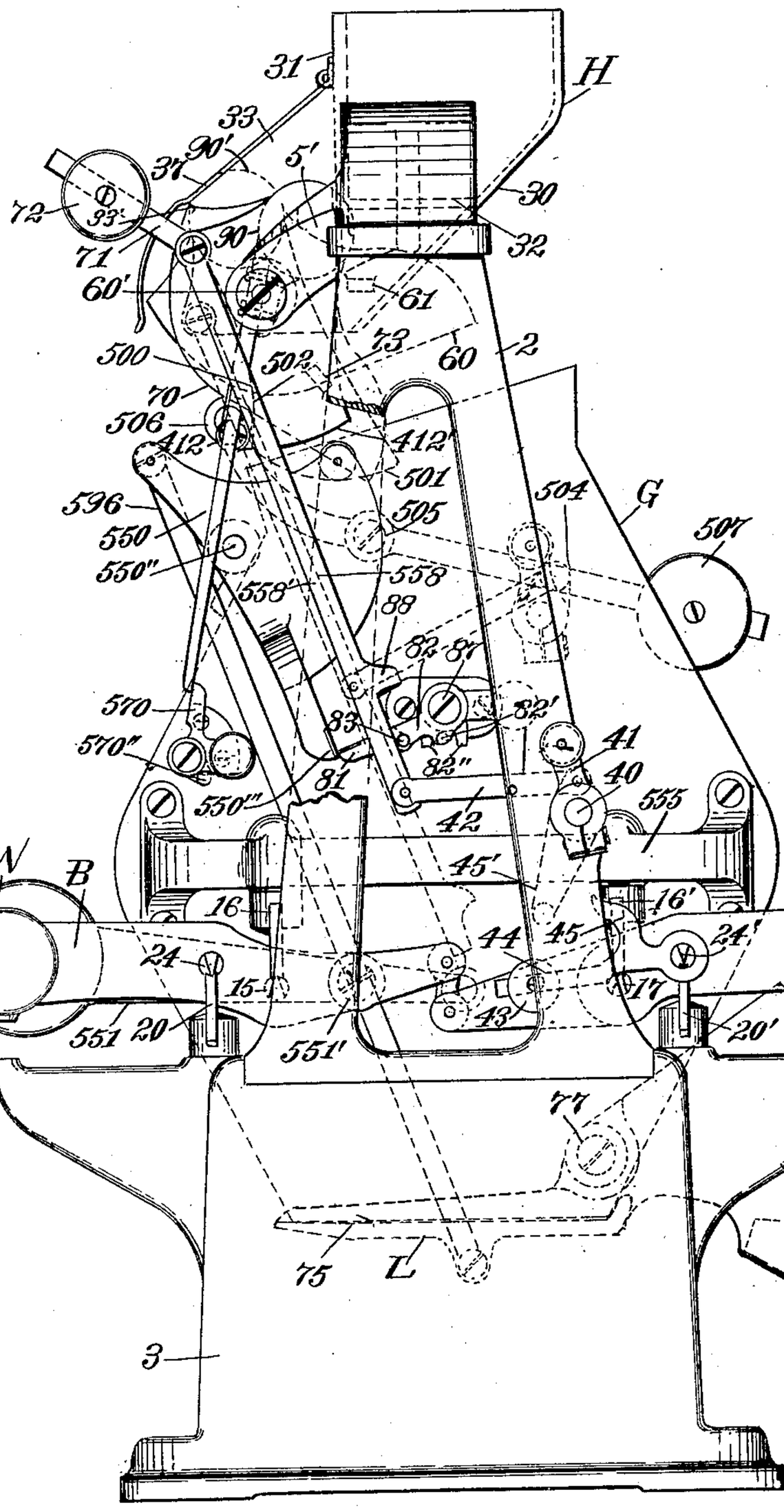
6 Sheets—Sheet 3.

F. H. RICHARDS.

WEIGHING MACHINE.

No. 559,214. Patented Apr. 28, 1896.

Fig. 3.



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6 Sheets—Sheet 4.

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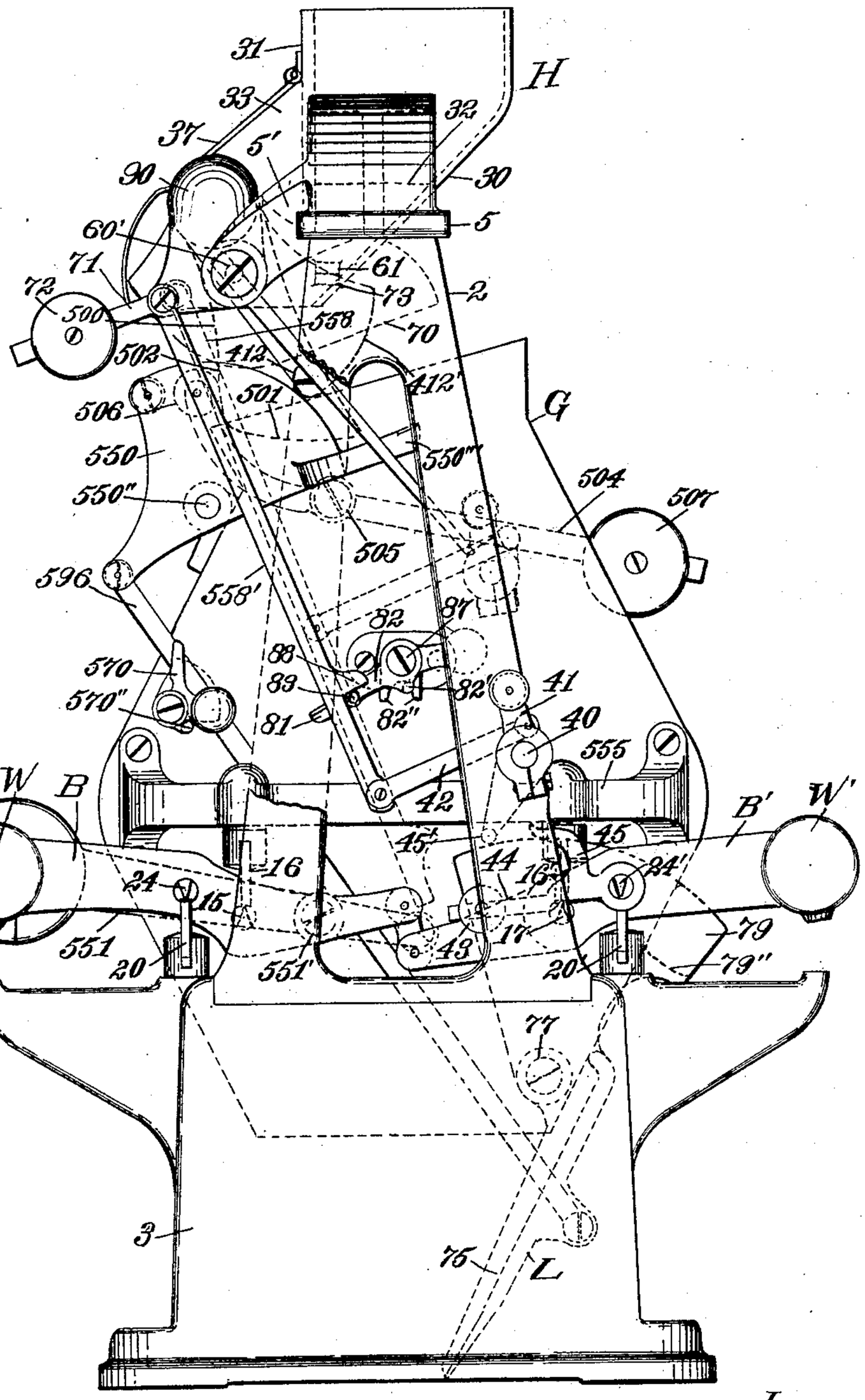
WEIGHING MACHINE.

No. 559,214. Patented Apr. 28, 1896.

Fig. 4.



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6 Sheets—Sheet 5.

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WEIGHING MACHINE.

No. 559,214. Patented Apr. 28, 1896.

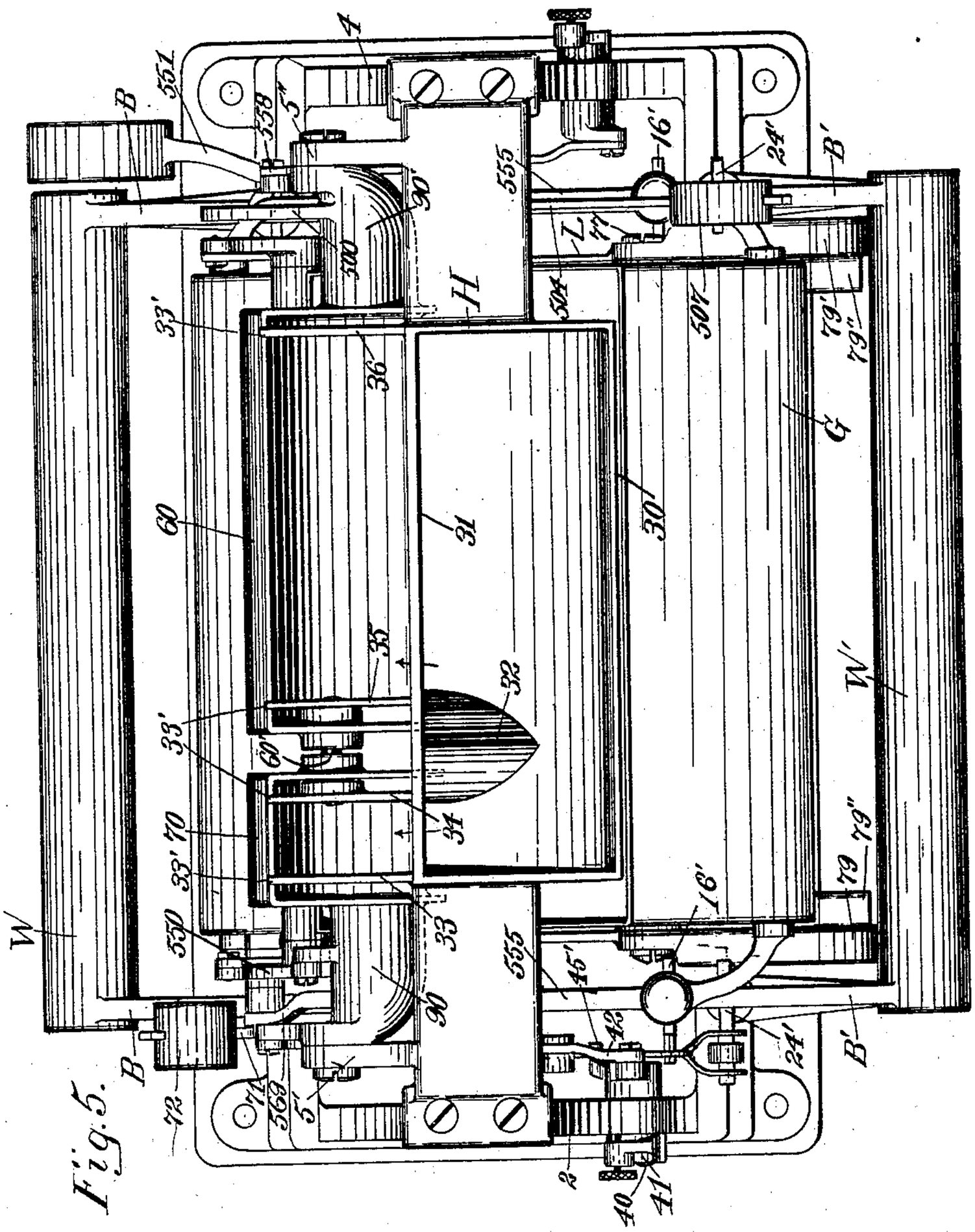

Fig. 5.

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(No Model.)

6 Sheets—Sheet 6.

F. H. RICHARDS.

WEIGHING MACHINE.

No. 559,214. Patented Apr. 28, 1896.

Fig. 6

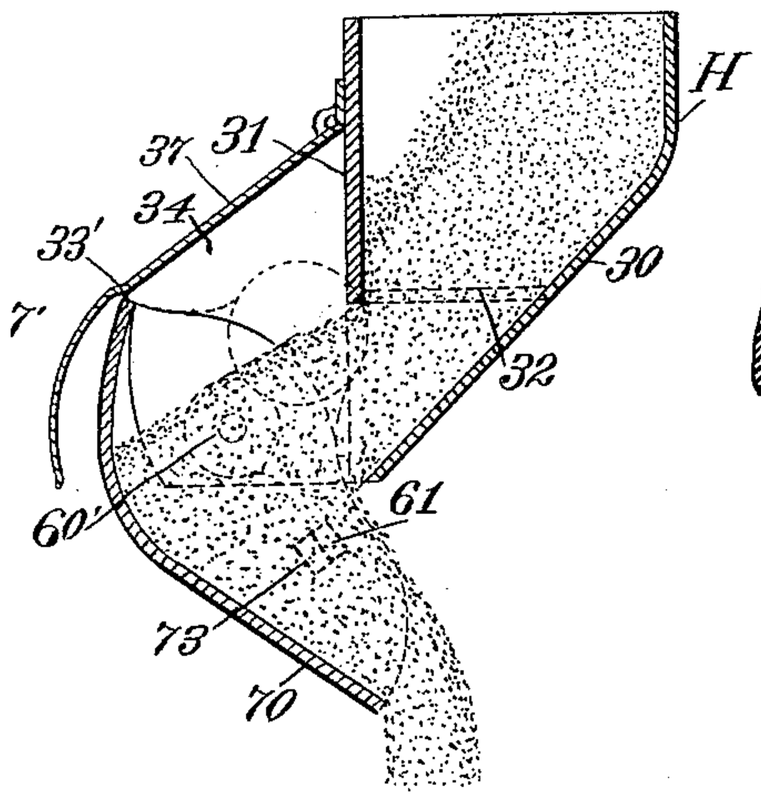


Fig. 7.

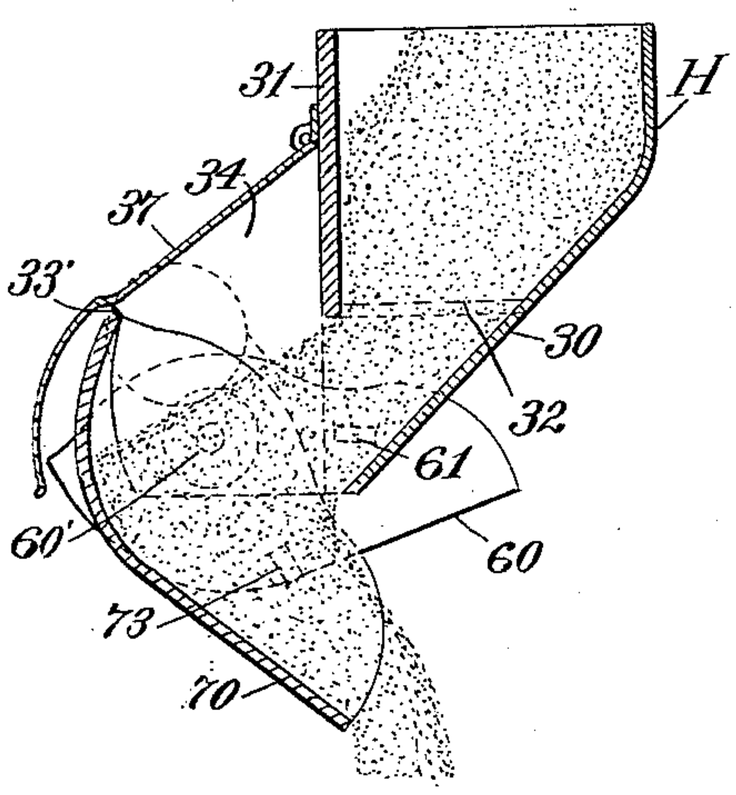


Fig. 8.

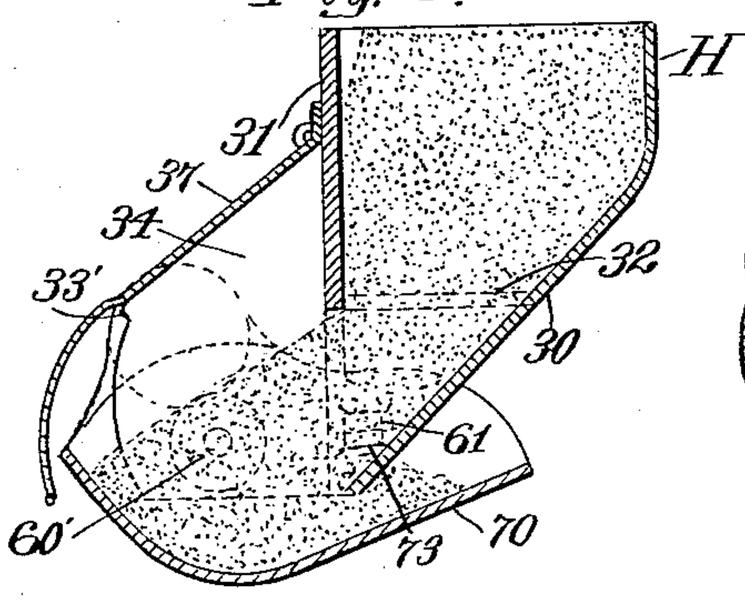


Fig. 9.

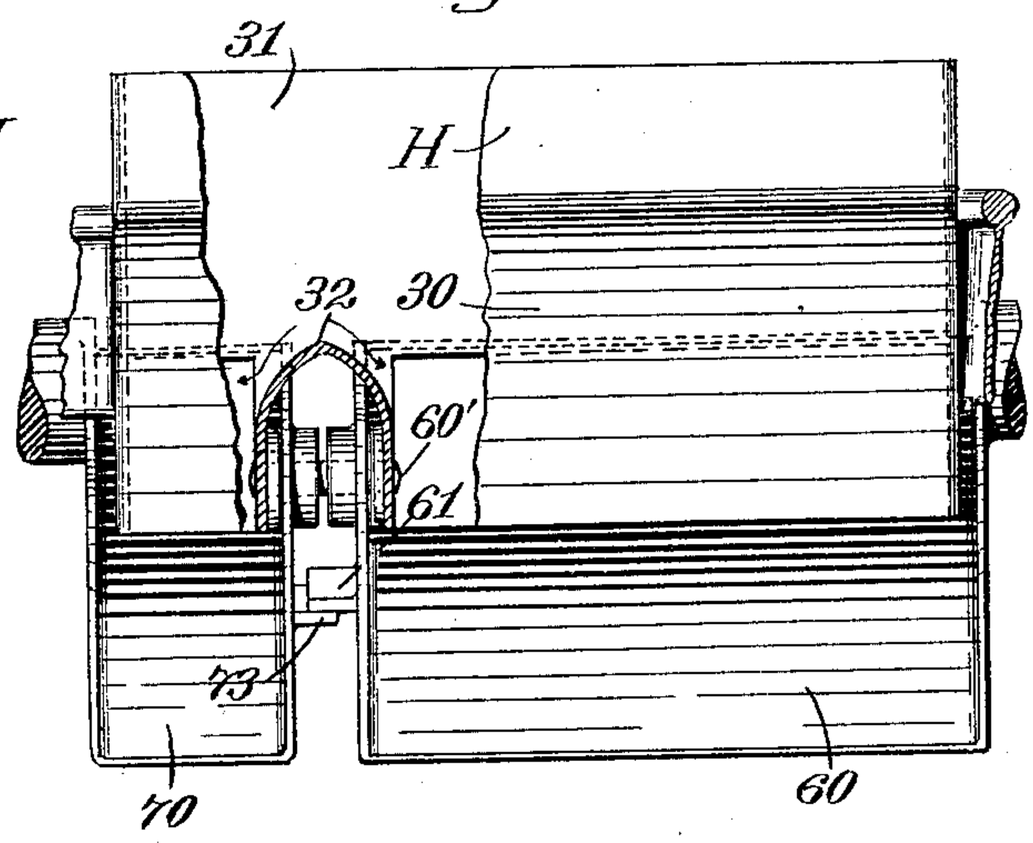


Fig. 10.

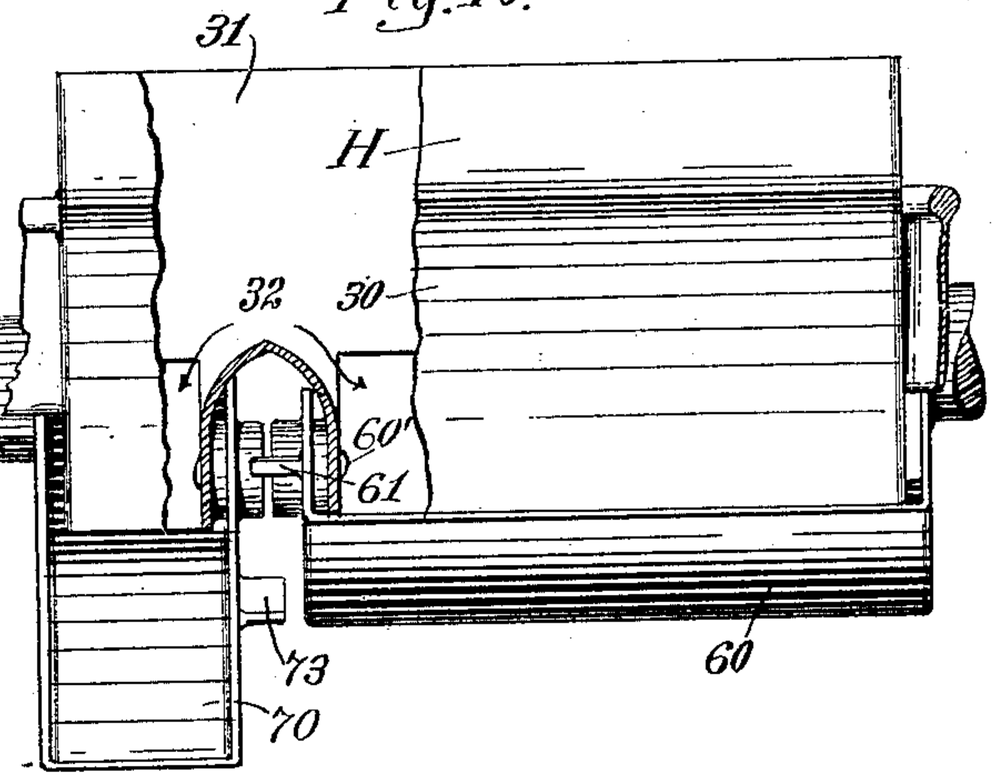
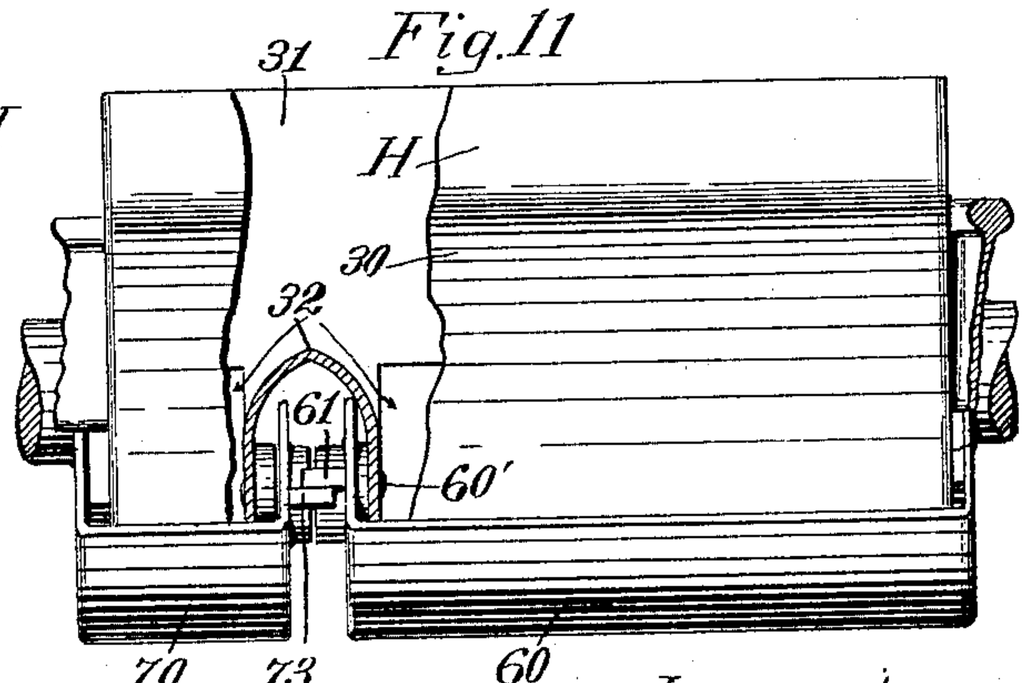


Fig. 11



Witnesses:
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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. 559,214, dated April 28, 1896.

Application filed August 12, 1895. Serial No. 558,956. (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 valve mechanism having means for supplying two independent streams of material to the bucket—a main stream and a drip-stream—which will be controlled, respectively, by a main valve and a supplemental or drip valve. These valves will have successive cut-off movements, and the cut-off movement of the main valves will be in advance of that of the supplemental valve, so that when the main stream is cut off from and during the descent of the bucket the drip-stream will continue to flow therein to complete the bucket-load.

In the drawings accompanying and forming part of this specification, Figure 1 is a front elevation of a weighing-machine embodying the present improvements, both valves being shown open to permit a flow of the main and the drip streams into the bucket. Fig. 2 is an end elevation, as seen from the left in Fig. 1, with the parts in positions corresponding with Fig. 1. Fig. 3 is a similar view of the machine, showing by dotted lines the main valve closed for cutting off the main stream and by full lines the drip or supplemental valve open for permitting the continued flow of the drip-stream. Fig. 4 is a view similar to Figs. 2 and 3, both valves being closed for cutting off the supply-stream. Fig. 5 is a plan view of the machine. Fig. 6 is a cross-sectional view of the supply-chute and the valves and showing both valves open. Figs. 7 and 8 are similar views showing, respectively, the main valve closed and both valves closed. Figs. 9, 10, and 11 are each views as seen from the right in and with the valves in positions corresponding, respectively, with Figs. 6, 7, and 8.

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

For convenience in illustrating the nature of the present improvements these are shown applied to the improved weighing-machine described and claimed in Letters Patent No. 548,839, granted to me October 29, 1895; but it will be obvious that these improvements may be used as well in connection with other types of weighing-machines.

The framework for carrying the operative parts of the mechanism or machine may be of any suitable construction, and is shown in the drawings comprising two side frames or uprights 2 and 4, mounted upon a chambered supporting-base 3 and connected by a top plate or beam 5, which latter is illustrated carrying a supply-chute H, which is adapted for containing a mass of material, and which will be hereinafter more particularly described.

The base 3 is illustrated carrying beam-supports or V-shaped bearings, four in number, and two of which are shown at 20 and 20′ for supporting the beam mechanism which carries the bucket and its operative devices. The beam mechanism comprises a pair of oppositely-disposed counterweighted scale-beams B and B′. The oppositely-disposed arms of the scale-beams will each be provided with a knife-edge, adapted to rest on the beam-supports or V-shaped bearings 20 and 20′, carried by the base 3, a pair of these knife-edges being shown at 24 and 24′. The beam-arms of the scale-beams B and B′ will be provided with a second series of knife-edges, located between the knife-edges 24 and 24′, a pair of the former of which are shown at 15 and 17. These knife-edges will, it is obvious, be duplicated at the opposite side of the machine and constitute bucket-supports. The bucket at each side thereof is shown provided with a hanger 555, and these hangers will be provided with bearing-faces or V-shaped bearings 16 and 16′, corresponding in number and position with the V-shaped bearings 15 and 17 and adapted to rest on V-shaped bearings, thereby supporting the bucket.

The bucket (designated in a general way by G) is of the well-known "single-chambered" type or class and is shown supported with its receiving end or mouth in position and adapted for receiving the supply-stream from the supply-chute H.

The bucket-closer (designated in a general way by L) is shown consisting of a suitably-formed plate or closer proper, 75, shown piv-

oted at 77 to the lower forward side of the bucket G. The closer-plate 75 is shown carrying a pair of plates 79 and 79′, preferably formed integral therewith, which plates are shown provided with weights forward of the closer-pivot. The weights for said plates are illustrated at 79″. The function of said weights is to return the closer to the normal or closed position thereof, and also, when the closer is opened, to limit or prevent too great opening movement of the closer by the abutment of said weights 79″ against the forward side of the bucket. Hence it will be apparent that the weights 79″ serve a dual function: that of returning the closer to the closed position thereof and as stops for limiting the opening movement of the closer.

As a means for supporting the closer L an inverted toggle is shown in the drawings connecting the closer and the bucket, and this toggle connection is so positioned as to be engaged by some suitable holding means, such as a latch, when the closer is shut. In the form of toggle shown this consists of a rocker 550, illustrated pivoted adjacent to the upper rearward side of the bucket, the pivot being shown as a rock-shaft 550″. A long connecting-rod is shown at 596, pivoted to said rocker 550 and to the closer L in such a manner that when the closer is shut the two pivots of said connecting-rod of the toggle member 596 will be nearly in line with, and the upper of said pivots will be above, the rocker-pivot, whereby, when the rocker is engaged by the bucket-closer latch and held in that position, the closer will be supported with a minimum pressure on the latch. A second connecting-rod will also be preferably provided, and which will be operatively connected, respectively, with the closer and the rock-shaft 550″.

The closer-latch (designated by 82) for locking the rocker 550 in position when the closer is shut is shown pivoted at 87 to the bucket G and provided with a detent 81 in position and adapted for engaging a coöperating detent 550‴ on the rocker 550. The closer-latch 82 will preferably be counterweighted, and the detent 81 will engage the detent 550‴ by an upward movement. Hence it will be evident that the latch 82 may be released from engagement with the rocker 550 by a downward pressure thereon. Stops are employed for limiting the upward and downward movements of the latch 82. The bucket is shown with a pair of stops 82″ and the latch with a stop 82′, the movement of the latter, and hence the latch 82, being limited by the first-mentioned stops, which are shown fixed relatively to the bucket.

The supply-stream will be composed of two independent streams, the main stream, which will be controlled by a main valve, and the drip-stream, which will be controlled by a supplemental or drip valve, and which valves will be hereinafter fully described. For supplying these two streams of material, which form the supply-stream to the bucket G, the supply-chute H shown will preferably be employed.

The front wall 30 of the supply-chute is shown inclined, and it will be evident that the supply-stream, and hence the two independent streams, will be directed in a rearward direction and away from the front of the cut-off valves, and consequently the force or impact of the descending column or mass will thereby be materially reduced. The rear wall of the supply-chute H is shown at 31 and relatively straight and with the lower edge thereof located above the lower edge of the forward wall 31 of the supply-chute, thereby leaving an opening which constitutes a feed or supply opening at the rear of the supply-chute. The supply-stream, prior to its egress from the supply-chute, will be separated into two independent streams, a large and a small stream, the larger stream constituting the main stream, which will be controlled by a main valve, and a smaller stream constituting the drip-stream, which will be controlled by a drip or supplemental valve.

The interior of the supply-chute H is shown provided with a separator 32, which will preferably be formed by two connected plates forming a wedge-shaped separator, and which will have the apex thereof in position to divide the supply-stream into the two streams hereinbefore mentioned. The separator 32 is shown located within and will extend from front to rear of the supply-chute, and the separator-plates are shown secured to the front and rear walls of the supply-chute H, and the valve end walls may have free movement between the two plates forming the separator 32. It will be evident that by means of the separator 32 two rearward stream or supply openings are formed in the supply-chute H. The supply-chute H is also illustrated provided with a series of rearwardly-projecting plates, (designated, respectively, by 33, 34, 35, and 36,) each of which constitutes a scatter-guard for preventing lateral flow of the supply-stream and waste of the material when this leaves the supply-chute, and each of these plates will be provided with stop-abutments, which are shown at 33′, and which are adapted for limiting the rearward or opening movement of the valves 60 and 70.

As a means for controlling the supply-stream the single-stroke valves illustrated will preferably be employed. These valves will be located end to end, and will preferably be opened in synchronism to permit the flow of the two independent streams of material into the bucket, and when the load therein is nearly completed the main valve will be closed for cutting off the main stream. On the cut-off of the main stream the drip-stream will continue to flow into the bucket G undiminished to complete the bucket-load, and when the latter is completed the supplemental valve will also be closed for cutting off the drip-stream. Hence it will be evi-

dent that the main valve has its cut-off movement in advance of that of the supplemental valve. Both valves are adapted, when the supply-stream is cut off, for sustaining or supporting the mass of material contained in the supply-chute.

The main valve is shown at 60 and the supplemental or drip valve at 70, each of which valves is substantially similar to the improved valve described and claimed in Letters Patent No. 535,727, granted to me March 12, 1895. The valves 60 and 70 will move about a common axis, and are shown located beneath the mouth of the feed-opening of the supply-chute and extending sufficiently far beyond the forward edge of the wall 30 of the supply-chute to support the descending column or mass of material contained in said supply-chute. The valves 60 and 70 are shown pivoted for oscillatory movement about a common axis and will cut off the stream by a gradual movement, and if there be any large particle in the stream or mass these will be shifted rearwardly and away from the front of the valve and will lie in a relatively deep concavity, which will preferably be formed in each of the valves and opposite the rear feed-openings in the supply-chute. A guard 37 is shown hinged to the rear wall of the supply-chute, and is adapted for preventing the escape and consequent waste of particles of material between the valves and the supply-chute H.

The top plate 5 of the framework is shown provided with two arms depending therefrom, (designated, respectively, by 5′ and 5″,) balance-weights 90 and 90′, respectively, of the two valves being shown pivoted between these arms 5′ and 5″. By means of the two balance-weights 90 and 90′, projecting laterally from the end walls of the valves 60 and 70 and each pivoted to the arms 5′ and 5″, the valves will normally have in themselves no tendency either to open or close.

The inner walls of each of the valves 60 and 70 are shown supported for oscillatory movement about a common pivot pin or member 60′, the opposite ends of which are shown bearing in the two plates or scatter-guards 34 and 35, carried by the supply-chute H. The valves are shown provided with independent actuators for closing the same. As a means for actuating the main valve to close the same a lever is shown at 504, pivoted to the frame at 505 and having at its forward end a friction-roller 506, adapted to engage the cam-surfaces 501 and 502 of a cam-lever and to oscillate the cam-lever and thereby the main valve itself.

The cam-lever is shown at 500, depending from and oscillatory with the main valve 60, and also having two cam-faces, a reducing cam-face 501 and the cut-off cam-face 502. The lever 504 is shown weighted at its forward end at 507, the weight being preferably adjustable along the forward arm of the lever.

It will be obvious that, by reason of the riding up of the roller 506 on the cam-faces 501 and 502 of the cam-lever 500, a progressively decreasing leverage will be exerted on the main valve 60 for actuating the same during the closing movement thereof, and that, by reason of the peculiar curvature of the cam-faces 501 and 502, the force exerted by the weight 507, acting through the lever 504, will be applied to the valve in a peculiar ratio of decreasing efficiency, it being obvious that the cut-off cam-face 502 will have a relatively greater efficiency than the reducing cam-face 501, and that therefore the valve-closing actuator will be effective to close the valve quickly as soon as the friction-roller 506 passes off the reducing cam-face 501.

As a means for closing the supplemental or drip valve to cut off the drip-stream a counterweighted actuator will be employed. The supplemental valve 70 is shown provided with a rearwardly-extending arm 71, which in turn is shown provided with a weight 72, adjustable along said lever, and which will be effective for closing the supplemental valve 70.

The machine, as is usual, has bucket-poising and bucket-counterpoising mechanisms. All that portion of the beam mechanism lying or located between the beam-supports constitutes the poising mechanism, and the bucket G is shown supported from and by the poising mechanism, and consequently forms a part of the bucket-poising mechanism. The counterpoising mechanism comprises all that portion of the beam mechanism lying or located outside of said beam-supports.

The means shown for actuating the main valve to open the same will now be described. A long connecting-rod 558 is shown operable with the main valve 60 and pivoted to the upper rear portion of the balance-weight 90′, and having its lower or free end in position and adapted to be engaged by a valve-opening actuator. The connecting-rod 558 is illustrated constituting the means for transmitting to the main valve 60 the valve-opening movement or thrust of a valve-opening actuator, and that actuator, which has for its function the operation of opening the main valve 60, is shown herein pivotally mounted on the scale-beam B.

The valve-opening actuator is shown consisting of a lever 551, pivoted at 551′ to the scale-beam B, and counterweighted at its rear end. This valve-opening actuator 551 is also shown constituting a supplemental counterpoise and normally forms a part of the bucket-counterpoising portion of the scale-beam B and is automatically shiftable onto the bucket-poising portion of the scale-beam B. It will be noticed that the pivot 551′ of this actuator is shown located between the bucket-supports, so that any downward pressure exerted upon the inner end of the lever 551 will oscillate the same, and that a very slight oscillatory movement will shift the same from the counterpoising to the poising portion of the beam mechanism.

The connecting-rod 558 has been described having its lower end in position and adapted to be engaged by a valve-opening actuator, and hence it will be evident that the lever 551 constitutes the valve-opening actuator for engaging said rod on the return of said lever to the normal position thereof. When free for actuating the valve to open the same, this rod 558 forms a part of the actuating means, and therefore a part of the valve-opening actuator; but when the opening movement of the valve is prevented it will also be evident that this rod forms a stop device for limiting or checking the opening movement of the valve-opening actuator 551.

The supplemental valve 70 will preferably be opened from and by power derived from the main valve 60. The inner end wall of the supplemental or drip valve 70 is shown provided with a laterally-projecting arm or stop member 73 in position and adapted to be engaged by a supplemental valve-opening actuator, which will preferably be carried by the main valve 60. The main valve 60 is illustrated carrying also a laterally-projecting member or stop 61, which is illustrated constituting the means for imparting to the supplemental valve the opening movement to, and hence constitutes a supplemental valve-opening actuator. On the closure of the supplemental valve 70, the main valve being at that time closed, the stop-arm 73 will be carried under and into engagement with the stop 61 of the main valve 60, and it will be evident that when the main valve 60 is opened by its valve-opening actuator 551 the arm 61 will be effective for opening the supplemental valve 70, and hence the two valves will have their opening movements in synchronism. The main valve 60 will have its closing movement in advance of that of the supplemental valve. In connection with the supplemental valve 70, which is open when the main valve is closed, and the bucket-closer L two coacting stops will be employed, one of which is shown at 412′, operative with the supplemental valve 70, and the other at 413, operative with the closer, and in such positions that each is adapted to serve as a stop device for the other while the supplemental valve is open, (see Fig. 2,) and a second pair of stops, one of which is shown at 412, operative with the supplemental valve 70, and the other of which is illustrated as the rocker 550, operative with the closer, and which are also positioned so that each serves as a stop device for the other (see Fig. 4) while the closer is open. At the commencement of operation both the main and the supplemental valves will be open to permit the flow of the full supply-stream, the main and the drip streams, into the bucket.

Means will be provided for preventing the closing movement of the supplemental valve 70 during the closing movement of the main valve 60 to permit the undiminished flow of the drip-stream. The supplemental valve 70 is shown provided with a depending arm 569, oscillatory therewith and shown secured to the balance-weight 90 of said supplemental valve 70. The lower end of this depending arm 569 is in position and adapted to be engaged by a stop carried by the poising mechanism of the machine, the purpose of the latter being to control the duration of the drip-stream by holding said arm 569, and thereby the supplemental valve 70, against closing movement during the closing movement of the main valve 60. A by-pass stop is shown at 570, carried by the bucket and positioned at such a point on the bucket to engage the lower end of the connecting-rod 569 to thereby hold the valve 70 against closing movement. This by-pass stop 570 will be pivotally supported on the bucket and will have its upper arm adapted to swing freely toward the rear, and will have its forward movement limited by a suitable stop, as 570″, also carried by the bucket, and will also be counterweighted forward of its pivot. The length of the upper arm of this by-pass stop 570 relatively to the depending arm 569 of the supplemental valve 70 is such that said upper arm will be effective to hold the supplemental valve 70 against closing movement until, at a point just prior to the completion of the bucket-load, the bucket G in descending will carry the by-pass stop 570 beyond the depending arm 569, whereby the supplemental valve-closing actuator may be then effective to quickly close said supplemental valve 70.

When the weighing mechanism has come very near to the close of the poising period, it is important to instantly bring about the release of the closer for discharging the bucket-load. It will be remembered that a latch has been described as holding the closer L against opening movement by engagement of a detent 81 thereof with a detent 550‴, carried by the rocker 550, which is operatively connected with the closer L. This latch-detent 81 will be released by a downward pressure. For releasing the latch 82, and thereby the closer L, I prefer to employ a releaser device or latch-actuator operable by the power of the closing supplemental valve, which releaser device shall be so located as to be normally effective for releasing the latch 82 at the close of the poising period and by the power of the closing supplemental valve 70.

The latch 82 to the rear of its pivotal point on the bucket is shown provided with a stop or laterally-projecting pin 83, which is adapted to be engaged by a releaser device for releasing the closer L in the manner just described. The supplemental valve 70 is shown provided with a long depending rod 558′, which will be pivotally carried by the supplemental valve 70, and this connecting-rod 558′ is shown provided with a releaser device 88, so positioned relatively to the stop 83, carried by the latch 82, as to normally engage said stop, thereby tripping the latch 82 and

releasing the closer to discharge the bucket-load.

The weighing mechanism will also be provided with testing devices for ascertaining the accuracy of the completed bucket-load. A supplemental or poise weight will be normally carried by the poising mechanism of the machine, and the function of this supplemental poise-weight is to cause a descent of the nearly-loaded bucket at a point just prior to the completion of the bucket-load. This supplemental or poise weight should approximately agree in weight with the material that is necessary to complete a partial bucket-load. It will be apparent then that this is an added weight, and that it will cause the descent of a nearly-loaded bucket, the residue of the stream necessary to complete the bucket-load flowing into the bucket before this reaches the poising-line and before the discharge of the bucket-load. When it is desired to make a test, it will only be necessary to shift this supplemental or poise weight from off the poising mechanism, when it will then be ineffective as a poise-weight.

A shifter is illustrated as operable for simultaneously shifting this supplemental or poise weight from off the poising mechanism and for rendering the releaser device ineffective for discharging the bucket-load.

The side frame 2 is shown provided with a relatively short rock-shaft 40, the outer end of which is shown provided with a crank or actuating lever 41, which may be secured thereto in some suitable manner. The opposite end of this rock-shaft will be provided with a crank-arm, (not shown,) which will be operatively connected with a suitable guide connection, such as the connecting-link 42, which is shown pivotally connected with the lower end of the connecting-rod 558′.

A supplemental or poise weight is shown at 43, adjustable along the lever 44, which latter constitutes the means for carrying said supplemental or poise weight 43. The lever 44 is shown normally carried by the beam-supporting knife-edge 24′ for oscillatory movement, and resting on or supported by the knife-edge 17, both which knife-edges are shown located on the beam B′. The lever 44 is also shown provided with a rearwardly-curved arm 45, which is adapted to be engaged by means carried by the shifter to raise said lever 44 and thereby the weight 43 from off the knife-edge 17, and hence from off the poising mechanism of the machine, whereby said weight will then be ineffective as a poise-weight. A depending arm 45′ is shown carried by the shifting means, and is adapted to engage the under rearwardly-curved arm 45 of the lever 44 to lift said lever from off the poising mechanism of the machine. It will be obvious that when this weight is so shifted the connecting-rod 558′ and also the releaser device 88 will also be shifted rearwardly, so that on the closing movement of the supplemental valve 70 the releaser device 88 will be carried out of its normal latch-releasing path and will then be ineffective for releasing the latch 82 when so shifted. The connecting-rod 558 will also be provided with substantially similar shifting means for shifting it out of operative relation with the valve-opening actuator; but this connecting-rod 558 will not be shifted out of operative relation with the valve-opening actuator 551 until the completion of the bucket-load, so that said connecting-rod 558 may serve one of its dual functions—that of limiting the too-rapid closing movement of the main valve 60.

The operation of the machine embodying the present improvements, briefly described, is as follows: The normal position of the machine is illustrated by Fig. 2, and both valves are shown open for the flow of the full supply-stream made up of the two independent streams, the main and the drip. When a sufficient quantity of the material has been received by the bucket, this tends to slowly descend. The bucket in descending permits the falling from under the connecting-rod 558 of the valve-opening actuator 551 by the slow oscillation of the latter, and during this time the valve-closing actuator will be effective to close the main valve 60, first, by the riding up of the friction-roller 506 on the reducing cam-face 501 and then, the volume of the stream having been reduced materially, on the cut-off cam-face 502, at which time the main valve 60 will be quickly closed, thereby cutting off the main stream. During this operation the supplemental valve 70 has been held against closing movement by engagement of the depending arm 569 thereof with the by-pass stop 570, carried by the bucket. When the bucket has nearly reached the close of the poising period, the depending arm 569 will be nearly disengaged from the by-pass stop 570. At the close of the poising period the by-pass stop will be carried wholly out of engagement or beyond the depending arm 569 by the descent of the bucket, at which time the supplemental-valve-closing actuator (shown as the counterweighted arm 71) will be effective to quickly close the supplemental or drip valve 70 to cut off the drip-stream. At the close of the poising period, or during the final closing movement of the supplemental valve 70, the releaser device 88, which is operable by said supplemental valve 70, will be carried into engagement with the stop 83 on the latch 82. The power of the closing valve will then be effective to trip the latch and to release the detent 81 thereof from engagement with the rocker-detent 550‴. When these detents are disengaged, the weight of the mass supported on the closer L will instantaneously open the same for discharging the bucket-load.

Having thus described my invention, I claim—

1. In a weighing-machine, the combination with a supply-chute, of synchronously-opening main and supplemental valves; valve-

actuating mechanism; and a stop operative for holding said supplemental valve against closing movement on the opening movement thereof, and for releasing the same on the closure of the main valve.

2. In a weighing-machine, the combination with a supply-chute, of main and supplemental valves therefor; actuating mechanism for opening and closing the main valve, and for closing the supplemental valve; and means, operated by the power of the opening main valve, for opening the supplemental valve.

3. In a weighing-machine, the combination with its ascending and descending poising mechanism, and a bucket forming part of said poising mechanism; of a supply-chute for supplying main and drip streams of material to the bucket; a main valve for controlling the main stream; a supplemental valve for controlling the drip-stream; a depending rod operative with said supplemental valve; valve-actuating mechanism for said valve; a stop carried by the poising mechanism of the machine, and operative for engaging said depending rod, to thereby hold the supplemental valve against closing movement during the closing movement of the main valve, and for also releasing said depending rod at the close of the poising period.

4. In a weighing-machine, the combination with a bucket having a closer, of a supply-chute; a pair of successively-closing valves for said chute; actuating mechanism for said valves; and stops operative, respectively, with the last closed valve and with the closer for reciprocally limiting the movements of said valve and closer.

5. In a weighing-machine, the combination with a bucket having a closer, and with a latch for normally holding said closer against movement; of a supply-chute; a pair of successively-closing valves for said chute; actuating mechanism for said valves; and a device operative with the last closed valve for tripping said latch to thereby release the closer.

6. In a weighing-machine, the combination with a supply-chute, of main and supplemental stream-controlling valves therefor; a laterally-projecting pin carried by the supplemental valve; a second laterally-projecting pin carried by the main valve, and constituting a supplemental-valve-opening actuator for engaging the first-mentioned pin to open the supplemental valve; and actuating mechanism for opening and closing the main valve, and for closing the supplemental valve.

7. In a weighing-machine, the combination with beam mechanism, and with bucket mechanism supported thereon; of a supply-chute, a pair of valves therefor, constituting respectively, a main valve and a supplemental valve; a connecting-rod carried by said main valve; a shiftable member having two strokes, and operative on one stroke thereof for imparting a thrust to said connecting-rod to thereby open the main valve; and means, operated by the power of the opening main valve, for opening the supplemental valve.

8. In a weighing-machine, the combination with beam mechanism, and with bucket mechanism supported thereon; of a supply-chute, a pair of valves therefor, constituting respectively, a main valve and a supplemental valve; mechanism for opening said main valve; means operated by the power of the opening main valve for opening the supplemental valve; a cam operative with one of said valves; and an actuator for engaging the cam-surface of said cam to thereby open said valve.

9. In a weighing-machine, the combination with a bucket and supporting-beam mechanism therefor; of means for supplying the material to the bucket in the form of two independent streams, constituting, respectively, a main stream and a drip-stream; of a main valve in position for controlling the main stream; a supplemental valve in position for controlling the drip-stream; a laterally-projecting pin carried by the supplemental valve; a second laterally-projecting pin carried by the main valve, and constituting a supplemental-valve-opening actuator for engaging the first-mentioned pin to open the supplemental valve; a main-valve-opening actuator; and means for successively closing the main and the supplemental valves, whereby when the main valve has cut off the main stream from, the drip-stream will be permitted to flow into the bucket, substantially as described.

10. In a weighing-machine, the combination with a bucket and a closer therefor, and supporting-beam mechanism for the bucket; of means for supplying the material to the bucket in the form of two independent streams, constituting, respectively, a main stream and a drip-stream; a main valve in position for controlling the main stream; a supplemental valve in position for controlling the drip-stream; holding means in position and adapted for holding the closer against opening movement; means for successively closing the main and the supplemental valves, whereby when the main valve has cut off the main stream from, the drip-stream will be permitted to flow into, the bucket; and a releaser device operable by the power of the closing supplemental valve, and adapted to release the closer-holding means, and thereby the closer to discharge the bucket-load, substantially as described.

11. In a weighing-machine, the combination with a bucket and a closer therefor, and supporting-beam mechanism for the bucket; of means for supplying the material to the bucket in the form of two independent streams constituting, respectively, a main stream and a drip-stream; a latch in position and normally adapted for holding the closer against opening movement; a main valve in position for controlling the main stream; a supplemental valve in position for controlling the drip-stream; a latch-actuator normally ef-

fective for releasing the latch and thereby the closer on the closing movement of the supplemental valve to thereby discharge the bucket-load; means for successively closing the main and the supplemental valves, whereby when the main stream has been cut off from, the drip-stream will be permitted to flow into, the bucket; and a shifter in position and adapted for shifting the latch-actuator out of the path of said latch, whereby said actuator will then be ineffective for releasing said latch, substantially as specified.

12. In a weighing-machine, the combination with a bucket and a closer therefor, and supporting-beam mechanism for the bucket; of means for supplying two independent streams of material to the bucket, constituting, respectively, a main stream and a drip-stream; a latch in position and adapted for holding the closer against opening movement; a main valve in position for controlling the main stream; a supplemental valve in position for controlling the drip-stream; a latch-actuator normally effective for releasing the latch and thereby the closer on the closing movement of the supplemental valve to thereby discharge the bucket-load; means for successively closing the main and supplemental valves, whereby when the main stream has been cut off from, the drip-stream will be permitted to flow into, the bucket; a poise-weight normally carried by the poising mechanism; and a shifter in position and adapted for simultaneously shifting the poise-weight from off the poising mechanism and the latch-actuator out of the path of the latch, whereby said actuator will then be ineffective for releasing the latch, substantially as specified.

13. In a weighing-machine, the combination with a supply-chute having an inclined front wall and a mass-confining rear wall, and having the lower edge of said last-mentioned wall located over the inclined wall; and a series of rearwardly-projecting plates constituting the scatter-guards carried by said chute, and said plates having stop-abutments to limit the opening movement of the valves; a pair of oscillatory valves for said chute; and a pivot member carried by, and between, two of said rearwardly-projecting plates for pivotally supporting, at one end, each of said valves; and valve-actuating mechanism for said valves.

14. In a weighing-machine, the combination with a bucket, of a closer therefor having opening and closing movements, said closer having plates at opposite sides thereof; each of said plates having a weight for returning the closer to the closed position thereof; said weights also constituting stops for limiting the opening movement of the closer by the abutment thereof against the bucket; means for normally holding the closer against opening movement; and a releaser device operative for releasing said means and thereby the closer for discharging the bucket-load.

15. In a weighing-machine, the combination with a bucket; of a supply-chute adapted for supplying a stream or streams of material to the bucket; a valve or valves in position for controlling said stream or streams of material; a closer for the bucket, said closer having plates at opposite sides thereof, and each having a weight adapted for returning the closer to the closed position thereof, and also constituting stops for limiting the opening movement of the closer by the abutment of said stops against the bucket; holding means in position and normally adapted for holding the closer against opening movement; and a releaser device in position and adapted for releasing said holding means, and thereby the closer for discharging the bucket-load, substantially as specified.

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Witnesses:
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