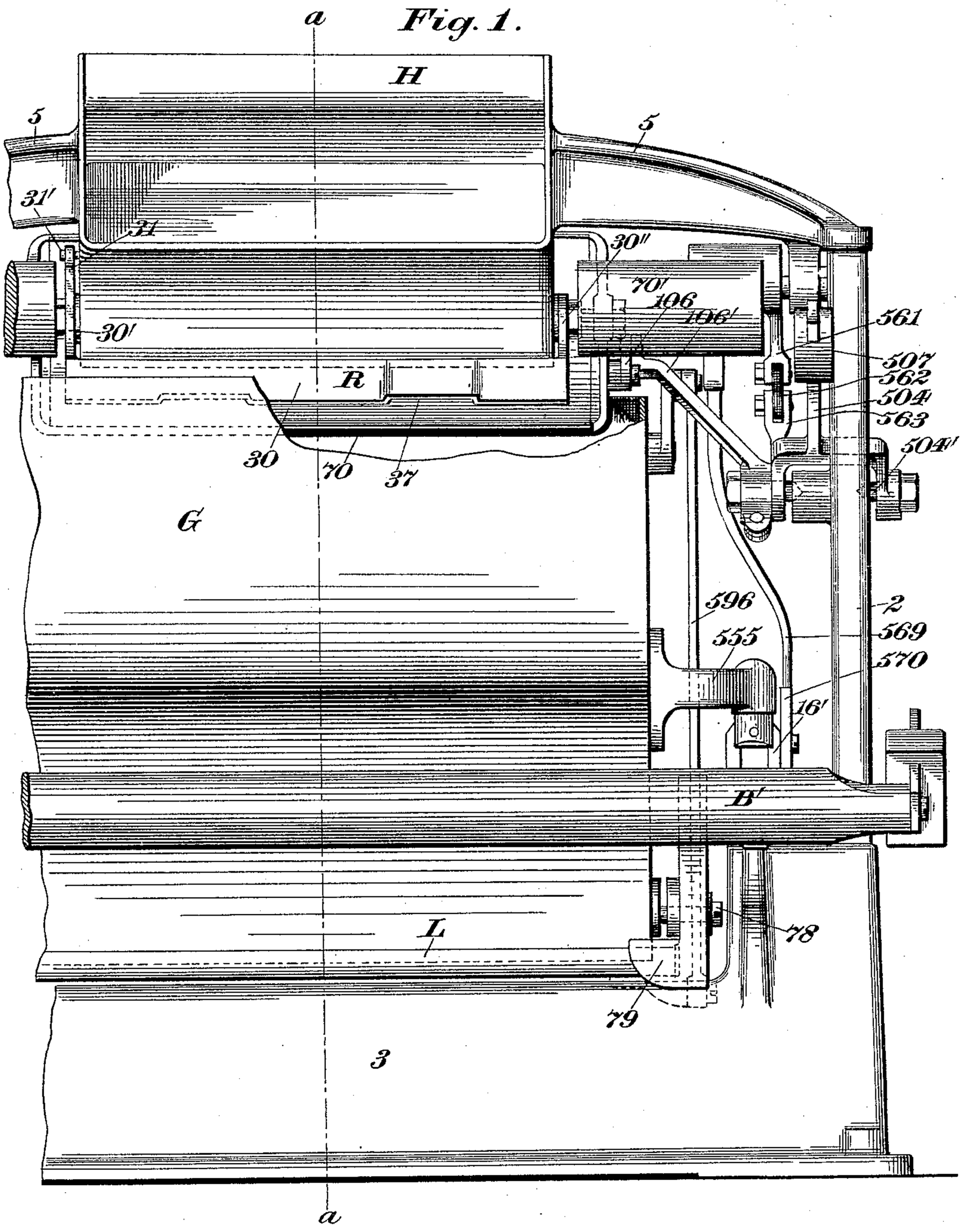
(No Model.) 4 Sheets—Sheet 1.

F. E. THOMPSON.

WEIGHING MACHINE.

No. 573,424. Patented Dec. 15, 1896.

Fig. 1.



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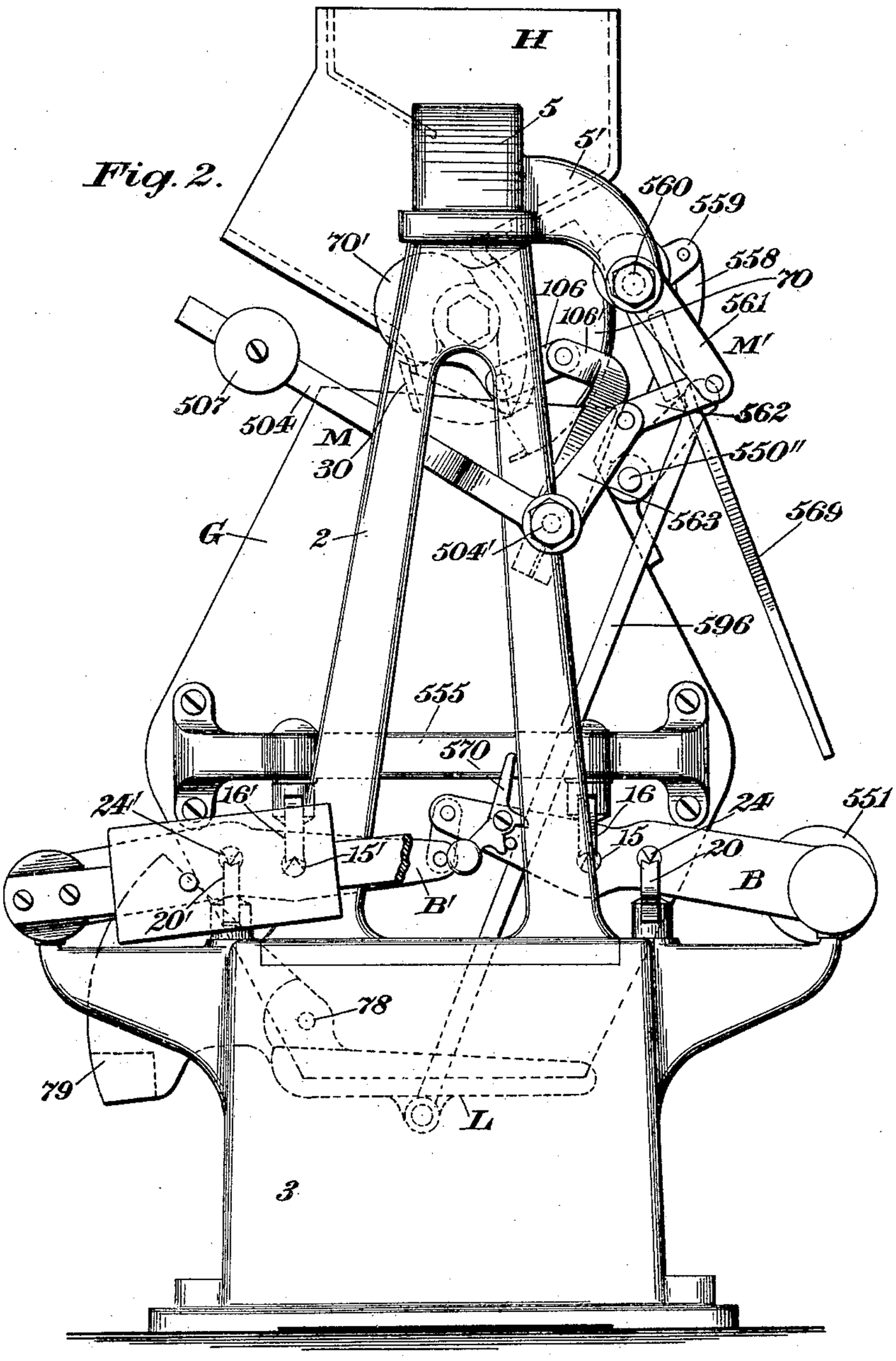
(No Model.) 4 Sheets—Sheet 2.

F. E. THOMPSON.

WEIGHING MACHINE.

No. 573,424. Patented Dec. 15, 1896.

Fig. 2.



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(No Model.)

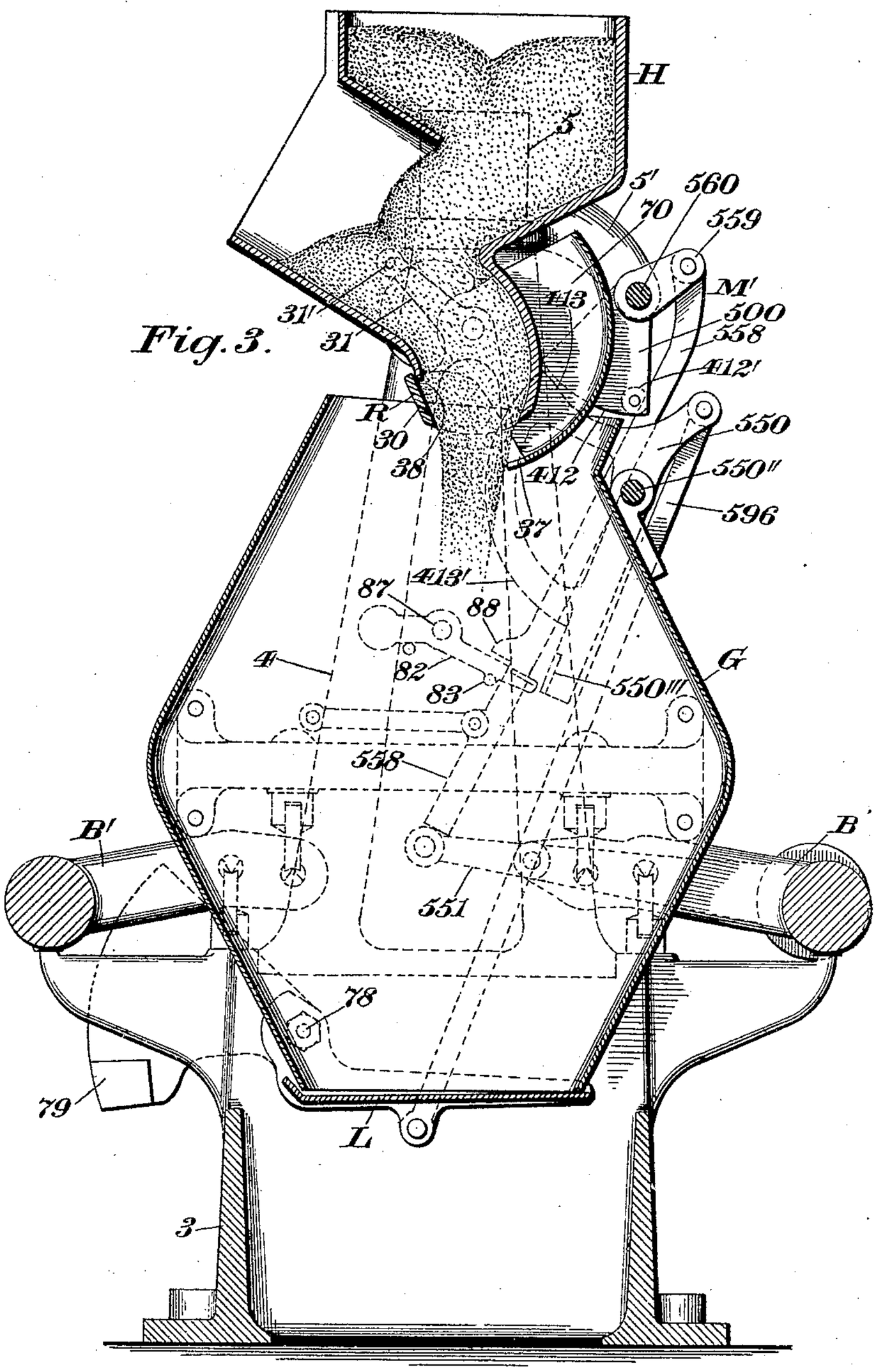
4 Sheets—Sheet 3.

F. E. THOMPSON.

WEIGHING MACHINE.

No. 573,424. Patented Dec. 15, 1896.

Fig. 3.



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(No Model.) 4 Sheets—Sheet 4.

F. E. THOMPSON.

WEIGHING MACHINE.

No. 573,424. Patented Dec. 15, 1896.

Fig. 4.

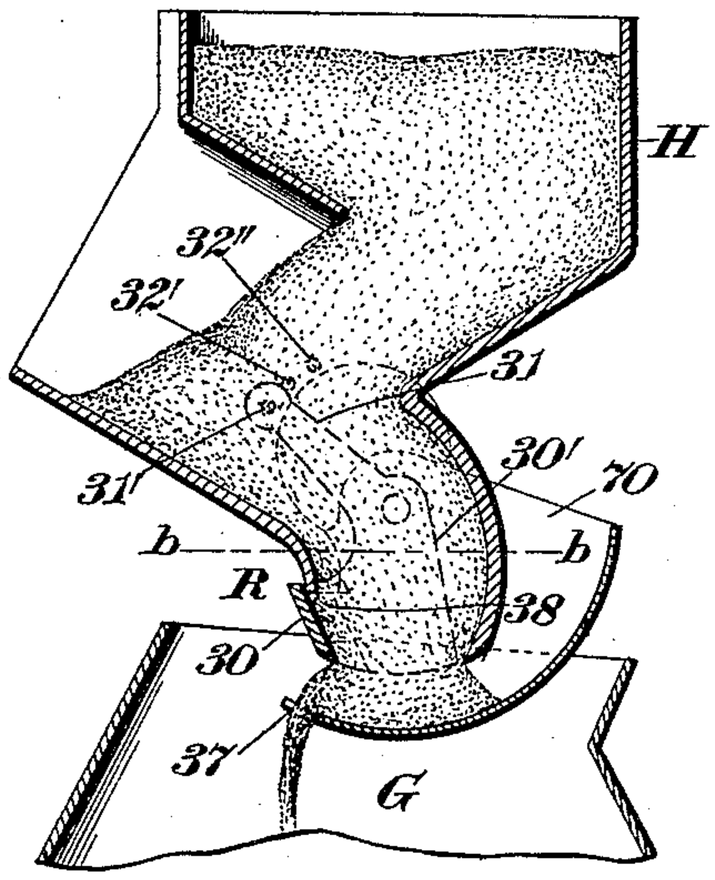


Fig. 6.

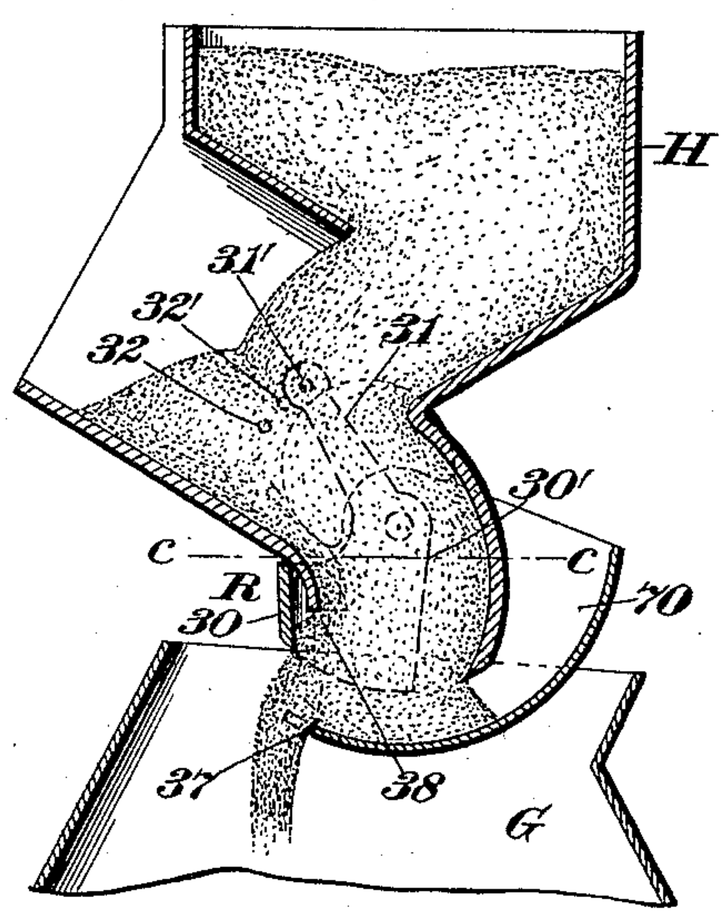


Fig. 5.

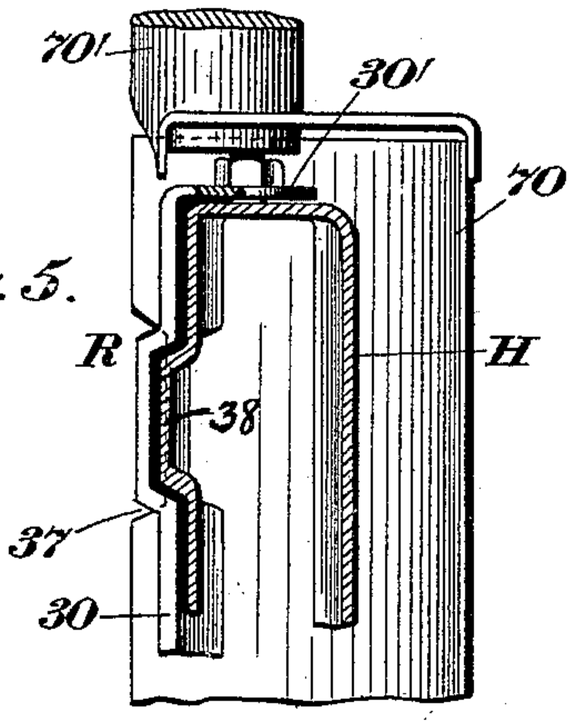


Fig. 7.

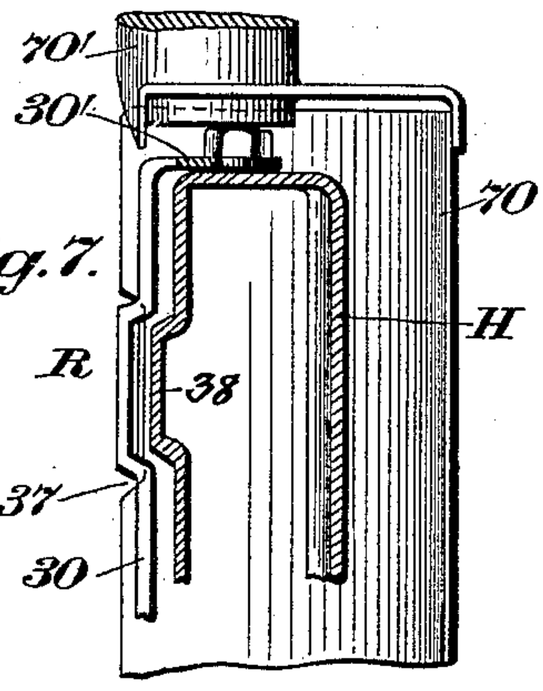


Fig. 8.

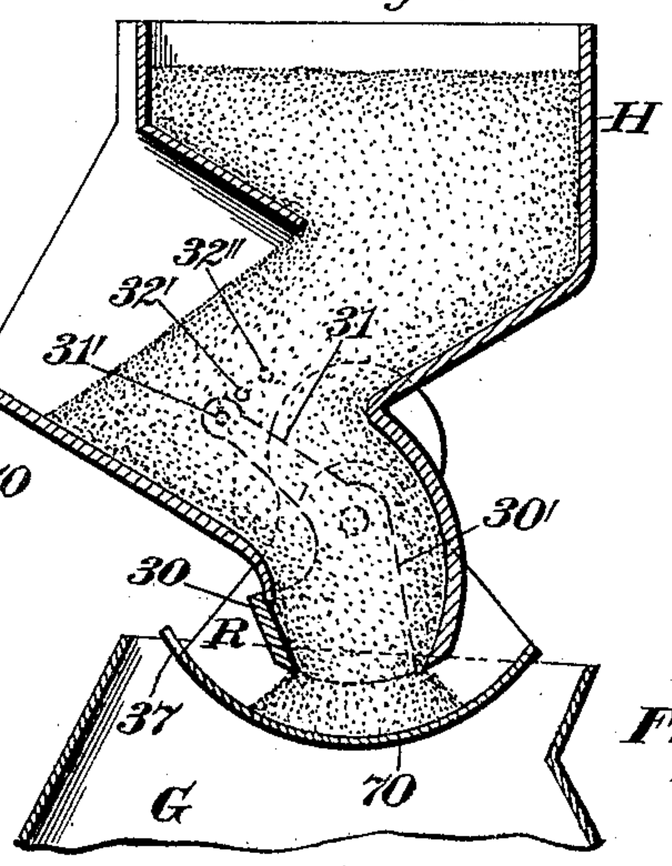


Fig. 9.

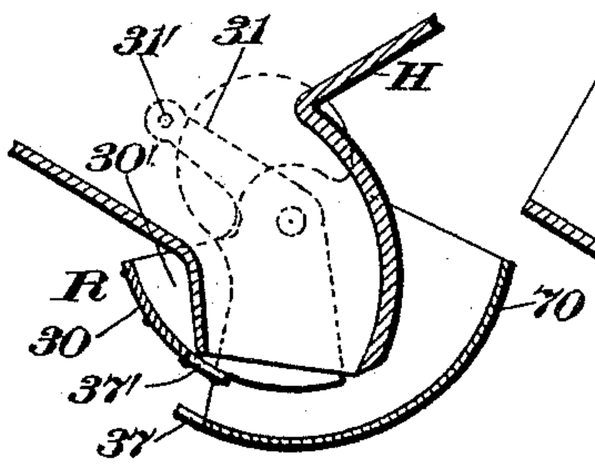
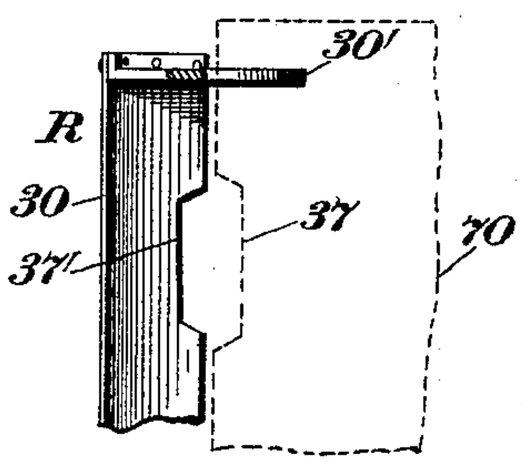


Fig. 10.



Witnesses:
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Inventor:
Frank E. Thompson.
By his Attorney,
F. A. Richards.

UNITED STATES PATENT OFFICE.

FRANK E. THOMPSON, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE PRATT & WHITNEY COMPANY, OF SAME PLACE.

WEIGHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 573,424, dated December 15, 1896.

Application filed September 8, 1896. Serial No. 605,115. (No model.)

To all whom it may concern:

Be it known that I, FRANK E. THOMPSON, a citizen of the United States, residing in 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 class referred to and briefly described in Letters Patent of the United States No. 548,855, granted to me October 29, 1895, and is, so far as it pertains to the stream-controlling means, somewhat in the nature of an improvement upon the weighing-machine constituting the subject-matter of the application for United States patent filed by me April 17, 1896, Serial No. 587,980, to which patent and application reference may be had.

One object of my present invention is to provide, in connection with the supply apparatus and bucket mechanism of the class specified, an improved organization of coöperative mechanism for operating the valve and bucket-closer and embodying coöperative and reciprocally effective locking instrumentalities or devices organized and automatically operable for locking the bucket-closer in its closed position when the valve is in its open position, and vice versa.

A further object of the invention is to provide, in connection with the discharge end of the hopper, a stream-regulating device the construction of which is such that the same may be readily adjusted to different positions transversely of the path of movement of the discharge-stream and in a plane concentric to the plane of movement of the supply-valve, whereby said stream may be practically regulated, as will be hereinafter more fully described.

In the drawings accompanying and forming part of this specification, Figure 1 is a front elevation of a portion of a weighing-machine embodying my present invention, parts thereof being broken away to illustrate more fully certain of the details thereof. Fig. 2 is a right-hand end elevation of said weighing-machine as seen from the right in Fig. 1. Fig. 3 is a central vertical section of the weighing-machine, taken in dotted line *a a*, Fig. 1, and showing in full and dotted lines the devices at the left-hand end of said machine. Fig. 4 is a vertical section similar to Fig. 3 of a portion of the supply-hopper, the bucket, the supply-valve, and the stream-regulating device, said figure showing the supply-valve in the position it occupies when the bucket is in its poising position, said valve being in its drip position, and the stream-regulating device or cut-off being shown adjusted to a position adapted for reducing the volume of the drip-stream to a minimum. Fig. 5 is a sectional view taken in dotted line *b b*, Fig. 4, as seen from above in said figure and showing the same parts in corresponding positions. Fig. 6 is a sectional view similar to Fig. 4, showing the supply-valve in the same positions and with the stream-regulating device adjusted to a position to increase the volume of the drip-stream. Fig. 7 is a cross-sectional view taken in dotted line *c c*, Fig. 6, as seen from above in said figure and showing the same parts in corresponding positions. Fig. 8 is a vertical section similar to Figs. 4 and 5, showing the supply-valve in its closed position and showing the stream-regulating device in the position shown in Fig. 4. Fig. 9 is a vertical section of a portion of the discharge end of the hopper, the valve, and stream-regulating device, said figure showing a slightly-modified form of stream-regulating device; and Fig. 10 is a plan view of a portion of the stream-regulating device illustrated in Fig. 9, a portion of the supply-valve being shown in dotted lines.

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

For convenience my present improvements are shown embodied in a weighing-machine of the "single-bucket" type, which is similar in a general way to that shown and described in the patent and application hereinbefore referred to, which machine is more fully described in Letters Patent of the United States No. 548,840, granted to Francis H. Richards October 29, 1895, to which reference may be had for a more complete description than that herein given of certain features of the machine illustrated in the accompanying drawings, which machine will, however, be described in the present specification with sufficient particularity to enable those skilled in the art to which the invention appertains to have a clear comprehension of the con-

struction and mode of operation of those elements which are allied to the elements constituting the subject-matter of the invention.

It is distinctly to be understood that my improvements are applicable to other types of weighing-machines than that illustrated in the accompanying drawings, and that the invention is not limited to this particular form of weighing-machine.

The framework for supporting the operative parts of the machine may be of any suitable or preferred construction, and it is herein shown comprising two suitable frames 2 and 4, preferably supported upon a chambered supporting-base 3 and connected at their upper ends by a plate or beam 5, which supports the supply chute or hopper II. (See Figs. 1, 2, and 3.)

The base 3 is shown provided with some suitable supports—such as the V-shaped bearings 20 and 20′—for carrying the beam mechanism, which latter supports the bucket mechanism (consisting of the bucket and its operative devices) for ascending and descending movements therewith.

The beam mechanism is shown comprising the oppositely-disposed scale-beams B and B′, which are supported by means of pivots or knife-edges 24 and 24′, respectively, on the V-shaped bearings 20 and 20′, carried by the base 3.

The bucket or holding receptacle (designated in a general way by G) carries hangers on each end thereof, one of these, as 555, being shown carrying V-shaped bearings 16 and 16′, which are pivotally supported by the knife-edges 15 and 15′ of the scale-beams B and B′, respectively, said bucket receiving the mass of material to be weighed in the form of a stream which is supplied by the chute or hopper II.

The machine has a poising and a counterpoising mechanism. All parts of the beam mechanism located outside of the knife-edges or pivots 24 and 24′ constitute the counterpoising mechanism of the machine, and all that part of the beam mechanism between said pivots, including the bucket mechanism, constitutes the poising mechanism of the machine.

The bucket mechanism constitutes two members, one of which is shiftable relatively to the other for discharging the bucket-load, one of said members being shown as the bucket G and the other of said members as the bucket-closer L. The closer L is shown pivoted at 78 to the lower rearward side of the bucket G adjacent to the discharge-opening thereof, and is shown having a forwardly-extending counterweighted arm 79, preferably formed integral therewith and normally serving to retain the closer in its closed position.

As a means for supporting or holding the closer L against premature opening movement during the filling of the bucket, an inverted toggle connection is shown connecting the closer to the bucket and is so positioned as to be engaged by a closer-latch when said latch is in its operative position and the closer is shut.

In the form shown this toggle connection comprises a suitable rocker or stop member 550, pivotally supported on the rearward side of the bucket near the upper end thereof, and a connecting-rod 596 pivotally connected at its upper end to the rocker and at its lower end to the closer in such manner that when the closer is shut the pivotal point 550″ of the rocker 550 will lie between and approximately in alinement with the opposite pivotal points of the connecting-rod, so that when the rocker is engaged by the closer-latch hereinafter more fully described and held in that position the closer will be supported with a minimum pressure on the latch and practically all of the weight of the bucket contents will be carried by the pivot 550″ of the rocker.

The particular construction and mode of operation of the rocker or stop member 550 will be hereinafter fully described.

The closer-latch for locking the rocker in position when the closer is shut, and which is designated by 82, is shown pivoted at 87 to the bucket G in position for engaging the catch or fixture 550‴ on the rocker 550 when the parts are in the closed positions. This latch is shown counterweighted, and it will be evident by reference to Fig. 3 of the drawings that the same swings upward to engage the rocker and will be released therefrom by downward movement thereof.

The supply-valve, or the valve which controls the supply from the hopper to the bucket G and which is designated by 70, is shown similar in a general way to the valve designated by the same character in my prior patent, No. 548,855, hereinbefore mentioned. This valve 70 is shown pivotally supported for movement in juxtaposition to the discharge end of the hopper or discharge-chute II, and is shown having a curved cut-off blade, which, during the movement of the valve, swings below the outlet or discharge-opening of the supply-hopper, said valve being so constructed and arranged relatively to the hopper that when the same is in its depending position, as illustrated in Fig. 8, the front and rear ends thereof will extend outward and upward beyond the front and rear sides of the discharge end of the hopper for substantially equal distances. This valve 70 is shown pivotally supported near the discharge end of the hopper on an axis substantially in alinement with the vertical axis of the bucket G, so that the normal tendency of the weight of material upon the valve when said valve is in either its closed or its drip position is to retain said valve against accidental opening movement, said valve being preferably provided with a counterweight 70′ for the purpose of facilitating the opening movement of said valve.

As a convenient means for automatically effecting an opening movement of the valve 70 immediately succeeding the closing movement of the bucket-closer L and as a convenient means for automatically effecting a closing movement of said valve immediately preceding the opening movement of the closer I have provided, in operative connection with the said valve, two coöperatively-connected valve-actuators, one of which (designated in a general way by M) constitutes a valve-closing actuator and the other of which (designated in a general way by M′) constitutes the valve-opening actuator, said actuators being so organized and connected that the valve-actuating movement of one actuator resets the other actuator in position for effective operation. These valve-actuators, in the preferred form thereof herein shown, are organized and connected to have interdependent movements in unison and are reciprocally effective in their actions for opening and closing the valve—that is to say, when the valve-closing actuator operates to close the valve this movement of said actuator shifts the valve-opening actuator to a position for opening the valve upon the closing movement of the bucket-closer, and vice versa.

The valve-closing actuator, in the form thereof shown in the accompanying drawings, comprises a valve-closing lever 504, pivotally connected at 504′, at the inner end thereof, to the upright 2 of the framework, a counterweight 507, adjustably carried upon said lever near the outer end thereof, and a pair of pivotally-connected links 106 and 106′, one of which is pivotally connected to the valve 70 near the forward end thereof and the other of which is fixedly connected to the inner end of the valve-actuating lever 504, said two links which connect the valve 70 to the valve-closing lever 504 acting during the descent of said lever somewhat in the nature of a toggle for closing the valve with an increasing leverage.

The valve-opening actuator, in the preferred form thereof shown in the accompanying drawings, comprises an actuator-rod 558, pivotally connected at its upper end to the crank 559, fixed to the rock-shaft 560, journaled in brackets 5′ at the upper end of the framework of the machine, and an actuating-connector between the rock-shaft 560 and the valve-closing lever 504. The actuator-rod is normally supported at its lower end upon the counterpoising or inner end of a counterweighted lever 551, connected with one of the scale-beams in such manner as to have the inner end thereof depressed by a movement of the scale-beam during the descent of the bucket. The actuating-connector is shown consisting of two pivotally-connected links 561 and 562, one of which is fixed to the rock-shaft 560 and the other of which is pivotally connected to a laterally-projecting arm 563 at the inner end of the lever 504.

Fixed to the rock-shaft 560 is a stop member 500, which in the form thereof herein shown is in the nature of a segment-disk having a stop-face 412, adapted to coact with the stop-face 413 of the rocker or stop member 550 and effective, when the valve is in its open position, for holding the rocker 550, and thereby the bucket-closer, against opening movement.

Instead of supporting the stop member with its axis of movement coincident with the axis of movement of the valve 70, as in the majority of machines of this class, said axis is located at the side and beyond the path of movement of said valve, and the stop-face 412 thereof is located in a plane intersecting the path of movement of the cut-off or material-supporting portion of said valve, as will be understood by reference to Figs. 1, 2, and 3 of the drawings.

The rocker 550, which is shown of skeleton form, has a stop-face 413, which, as before stated, coacts with stop-face 412 of the stop-plate 500 when the parts are in the positions shown in Fig. 3, said rocker also having a convex stop-face 413′, which, when the valve is in the closed position shown in Fig. 8, coacts with the antifriction-roll 412′ on the stop member 500 and holds the valve, through the medium of the intermediate connections between the shaft of the stop member 500 and the valve-actuator lever 504, against accidental opening movement.

When the weighing mechanism is coming very near to the poising period, it is important instantly to bring about a shifting movement of the closer L to thereby discharge the bucket-load. The latch 82, hereinbefore described, normally holds the closer, through the medium of the rocker 550 and the toggle member or closer-actuator 596, against opening movement.

For tripping the latch 82, to thereby release the closer, a latch-actuator controlled by the closing movement of the valve 70 will be employed. This latch-actuator is shown in dotted lines in Fig. 3 as a projection 88 on the valve-opening rod 558, which is, as before stated, in operative connection with the valve-closing actuator M, which latch-actuator 88 is so located on the rod 558 as to be adaptable for engaging a laterally-projecting pin 83 on the latch 82 at the close of the poising period to drop said latch and therefore release the rocker and through it the closer L.

By the provision of valve-actuating interlocking mechanism such as herein described, embodying a valve, a stop operative with said valve, a valve-closing actuator, and a valve-opening actuator embodying a rocker and supporting said elements for oscillatory movement about independent axes, I am enabled to secure a unitary action of the valve and the stop member connected therewith and at the same time secure relatively varying ranges of movement of a predetermined ratio, which cannot be obtained if the valve and stop member are fixed to the same shaft.

For a more detailed description of the construction, organization, and general operation of these elements not herein fully described, and which constitute no essential part of my present invention, reference may be had to the patents hereinbefore referred to.

As shown most clearly in Figs. 4 to 9, inclusive, the valve-blade is parti-circular and is concentric to the axis of the valve and has in the forward edge thereof the drip-opening 37, the function of which is similar to the drip instrumentalities described in the patents hereinbefore referred to.

The valve 70 in closing swings from the rear to the forward side of the discharge end of the chute or hopper II, as will be understood by a comparison of Figs. 6 and 8 of the drawings.

In the preferred form thereof shown in the accompanying drawings the discharge end of the hopper has its front and rear walls in planes intersecting the path of movement of the valve-plate, and the end walls of the outlet end of said hopper are preferably curved to correspond to the curvature of the valve-plate.

In machines of this class it is, for reasons hereinafter stated, necessary, in weighing different kinds of materials or similar materials possessing different characteristics, to regulate the volume of the supply-stream as it emerges from the chute or hopper II, it being understood that a stream of given volume of one kind of material will fill a bucket in a certain period, while the filling of the bucket with a stream of like volume of a different material will require more or less time, in accordance with the peculiarity or density of the material being discharged into the bucket. For instance, if the machine is set to weighing grain, such as dry wheat, the bucket will be filled and discharged at practically uniform periods, which determine the weighing speed of the machine, whereas if the material is damp or soggy I may increase the volume of the stream as it emerges from the hopper so as to compensate for frictional retardation and sticking and complete the bucket-load in the same length of time as is required with dry wheat.

For the purpose of regulating the volume the stream as it emerges from the supply-hopper to insure the filling of the bucket in a predetermined length of time I have provided, in connection with the supply-hopper and supply-valve, a settable regulating device of improved construction adapted not only for regulating the volume of the stream of material as it flows from the discharge end of the hopper II, but also adapted for coöperation with the supply-valve for regulating the volume of the drip-stream.

In the preferred form thereof shown in the accompanying drawings the regulating device, which is designated in a general way by R, comprises a plate 30, having end flanges 30′ and 30″, which are pivoted at their upper inner ends to the end walls of the hopper in substantial concentric relation with the valve 70, the axis of movement of said regulating device, or what will be hereinafter preferably termed the "stream-regulator" being preferably coincident with the axis of said valve and midway between the front and rear walls of the discharge end of the chute or hopper II.

As a means for adjusting the stream-regulator and for holding the same in its adjusted position to increase or decrease the volume of the discharge-stream as required, I have provided, in operative connection with said regulator preferably, a resilient actuator-arm 31, having a pin 31′ at the free end thereof adapted for entering notches or openings 32, 32′, and 32″, formed in the wall of the chute, said actuating-arm and pin constituting a detent device for holding the regulator in adjusted positions. This actuator-arm extends upward from the inner pivoted end of said regulator. It will be obvious, however, that the particular construction of the stream-regulator may be variously modified within the scope and limits of this invention, provided the regulator effects the variation in volume of the supply, as will be hereinafter more fully described. The chief object of this feature of the invention is to provide a settable stream-regulator operable for regulating the volume of the stream as it emerges from the discharge end of the supply-hopper, and to accomplish this end the stream-regulator is so constructed that that end of the plate 30 which is next adjacent the valve-plate will, during the adjustment of said regulator, have a movement in a path concentric to the path of movement of the valve-plate, as will be readily understood by a comparison of Figs. 4, 6, 8, and 9 of the drawings.

In the form thereof shown in the accompanying drawings in Figs. 4, 6, and 8 the regulator-plate 30 lies in a plane concentric with the path of movement of the valve-plate and is shiftable to the two extreme positions shown in Figs. 4 and 6, respectively, in one of which positions, Fig. 4, the regulator is adjusted to decrease the volume of the stream to a minimum extent, and in the other of which positions, Fig. 6, the regulator is adjusted to increase the volume of the stream to the maximum extent required, said regulator being also adjustable to an intermediate position between the minimum and maximum positions shown in Figs. 4 and 6 of the drawings, respectively.

It will be noticed that the regulator has its inner edge and drip-opening 37′ in juxtaposition to the drip-opening 37 of the valve-plate, and it will also be seen that when the stream-regulator is adjusted from the position shown in Fig. 6 to that shown in Fig. 4 the walls of the drip-opening 37′ of the regulator-plate and the drip-opening 37 of the valve-plate will be brought in closer relation for reducing the volume of the drip-stream,

the space between said walls being reduced or increased as the regulator is adjusted to its different positions, as required under conditions hereinbefore mentioned.

In the construction shown in Figs. 4 and 6 the front wall of the discharge end of the hopper H is cut away at the lower end thereof, as at 38, and terminates at a point considerably above the lower end of the rear wall of said hopper. The regulator-plate 30, when in the position shown in Fig. 4, practically constitutes a continuation of the front wall of the discharge end of the hopper to deflect the stream of material into the proper channel, said plate constituting a closer for the opening at the front side of the discharge end of the hopper.

A substantially straight rod is shown at 569, depending from, and rigidly secured to, the transverse shaft 560, said rod being engaged by the by-pass 570 at the commencement of the drip period, whereby the valve 70 will be momentarily held. The by-pass 570 is mounted on the beam mechanism, and when the latter passes below the poising-line—indicating the completion of a load—the rod 569 will be released in the usual manner and as disclosed in the Richards patent, No. 548,840, hereinbefore referred to, so that the valve may be given its final closing movement by the counterweighted lever 504.

Briefly stated, the operation of the machine is as follows: Fig. 3 represents the positions occupied by the respective parts at the commencement of operation, the closer L being shut and held in such position by the latch 82, which is in engagement with the arm 550‴ of the rocker 550, the valve 70 being in its wide-open position to permit the flow of the supply-stream into the empty bucket G from the chute or hopper H. When a certain proportion of the load has been received by the bucket, it will descend, the beam mechanism descending in unison therewith, and the counterweighted lever 551, falling away from the thrust-rod 558, will permit the closure of the valve by the counterweighted lever 504 through the interposed connections between said lever and valve, it being understood that the closure of the valve by such lever is limited in correspondence with the movement of the beam mechanism. As the lever 504 moves downward the shaft 560 will be rocked, the rod 558 being thrust downward. At the commencement of the drip period the depending rod 569, which is oscillatory with the shaft 560, will be engaged by the by-pass 570 and momentarily held. On the descent of the beam mechanism below the poising-line the rod 569 and valve 70 will be released, so that the latter may be given its final closing movement. When the valve 70 has reached its cut-off position and the roll 412′ has intersected the plane of curvature of the stop-face 413′, the rocker or stop member may oscillate. The rod 558 will have a slight further downward movement until the projection 88 thereon is carried into engagement with the pin 83 of the latch 82, and on the continuation of such movement the latch 82 will be depressed and disengaged from the rocker-arm 550‴, so that the rocker, and consequently the bucket-closer L, are released, at which time the latter will be forced open by the weight of the contents in the bucket to discharge the same, after which the bucket rises and the parts resume their normal positions.

Having described my invention, I claim—

1. In a weighing-machine, the combination with a supply-chute and with an oscillatory valve therefor, of a stream-regulator supported for oscillatory movement in a plane concentric to the path of movement of the valve; and a holding device for said regulator.

2. In a weighing-machine, the combination with a supply-chute, of a valve pivotally supported for oscillatory movement with its axis in substantially vertical alinement with the middle portion of the discharge end of said chute; and a stream-regulator supported for oscillatory movement in a path concentric to the path of movement of the valve; means whereby the regulator may be adjusted inwardly and outwardly with respect to the discharge end of the hopper; and means for holding said regulator in its adjusted position.

3. In a weighing-machine, the combination with a supply-chute; of a settable stream-regulator supported for adjustment in the arc of a circle transversely of said chute; a hand-operable adjusting device in connection with said regulator; and means for fixedly holding the regulator in its adjusted position.

4. In a weighing-machine, the combination with a chute and with an oscillatory valve having a drip-opening; of a stream-regulator supported for adjustment in a path concentric to the path of movement of the valve and having a drip-opening which is coöperative with the drip-opening of said valve; means for actuating said valve; and means for adjusting the regulator and holding the same in its adjusted positions.

5. In a weighing-machine, the combination with a supply-chute having an opening at the lower end of the front wall thereof; of a stream-regulator having a plate located in position for closing said opening and supported on said chute for adjustment in the arc of a circle transversely of said chute; and means for adjusting said regulator to increase or decrease the effective area of the discharge end of the chute.

6. In a weighing-machine, the combination with a supply-chute; of a supply-valve and a stream-regulator pivotally supported for movement in concentric paths and having pivotal points substantially midway between the front and rear walls of the supply-chute; a settable actuator in connection with the

stream-regulator; and means for holding the stream-regulator in a set position with relation to the chute.

7. In a weighing-machine, the combination with a supply-chute having a recessed front wall and with an oscillatory valve having a drip-opening; of a stream-regulator having a plate normally located with the upper end thereof in advance of the front wall of the chute and effective for closing the opening of said front wall, and which regulator is pivotally supported on the chute and embodies means whereby said regulator may be adjusted transversely of the discharge end of said chute in a path concentric to the path of the valve and may be fixedly held in its adjusted position.

8. In a weighing-machine, the combination with a chute; of an automatically oscillatory valve pivotally supported in relation to the discharge end of said chute; and a settable regulator pivotally supported in concentric relation with said valve.

9. In a weighing-machine, the combination with a supply-chute and with a supply-valve supported for oscillatory movement in operative relation with the discharge end of said chute; of a stream-regulator supported on said chute for adjustment transversely thereof and in a plane concentric to the path of movement to the valve; and a detent for holding said regulator in its adjusted positions.

10. In a weighing-machine, the combination with a supply-chute having its front and rear walls terminating in different planes; of a regulating device pivotally supported on said chute for movement in an arc of a circle and in a plane transversely of said chute and comprising a plate located in position to constitute a continuation of the shorter wall of said chute and in a plane intersecting the path of movement of the valve; means for supporting said plate; and a supply-valve supported for oscillatory movement below and in a path concentric to the path of adjustment of said plate.

11. The combination with weighing mechanism, of a bucket having a closer; a supply-chute; a valve supported for oscillatory movement in operative relation with said chute; reciprocally effective actuators, one of which has a linkage connection with the valve and is automatically operable for closing said valve, and the other of which has a linkage connection with the first-mentioned actuator and is automatically operable for simultaneously opening the valve and for resetting said first-mentioned actuator upon the ascent of the bucket; and means operable by the movements of the valve-actuator and the bucket, for locking the closer in its closed position when the valve is open, and the valve in its closed position when the closer is open.

12. In a weighing-machine, the combination with a bucket having a closer, scale-beams supporting said bucket, and a supply-chute; of a bucket-closer actuator embodying a rocker having a stop-face; a latch for engaging the rocker when the closer is in its closed position; a valve supported for oscillatory movement relatively to the supply-chute; a bucket-closer stop having a pivotal support at one side the valve and having a stop-face in coöperative relation with the stop-face of the rocker; a valve-closing actuator having a linkage connection with the valve; a valve-opening actuator operatively connecting the bucket-closer stop and the valve and also operatively connecting said stop and one of the scale-beams and embodying means for engaging the latch and thereby tripping the rocker.

13. In a weighing-machine, the combination with a supply-chute and an oscillatory valve; of a valve-closing actuator comprising a counterweighted lever pivotally supported on the framework below the valve; and a toggle connecting said actuator and valve; a valve-opening actuator comprising a rock-shaft located outside of the pivotal point of said valve and having a linkage connection with the valve-closing actuator; and means for operating the valve-opening actuator.

14. In a weighing-machine, the combination with bucket mechanism embodying a bucket and a bucket-closer, and with a supply-chute; of a valve pivotally supported for oscillatory movement below the discharge end of the supply-chute and having its axis of movement in substantial vertical alinement with the longitudinal axis of the bucket; an oscillatory bucket-closer stop pivotally supported outside the axis of the valve and adapted for engaging and preventing the opening movement of the closer while the valve is open; and a valve closing and opening mechanism operatively connecting the bucket-closer stop and valve.

15. In a weighing-machine, the combination with bucket mechanism embodying a bucket and a bucket-closer, and with a supply-chute; of a valve pivotally supported for oscillatory movement below the discharge end of the supply-chute and having its axis of movement in substantial vertical alinement with the longitudinal axis of the bucket; an oscillatory bucket-closer stop pivotally supported outside the axis of the valve and adapted for engaging and preventing the opening movement of the closer while the valve is open; a valve closing and opening mechanism operatively connecting the bucket-closer and valve; a stream-regulator pivotally supported on the chute for adjustment in the path concentric to the path of the valve; and means for adjusting said regulator and for holding the same in its adjusted position.

FRANK E. THOMPSON.

Witnesses:
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HENRY BISSELL.