No. 616,633. Patented Dec. 27, 1898.

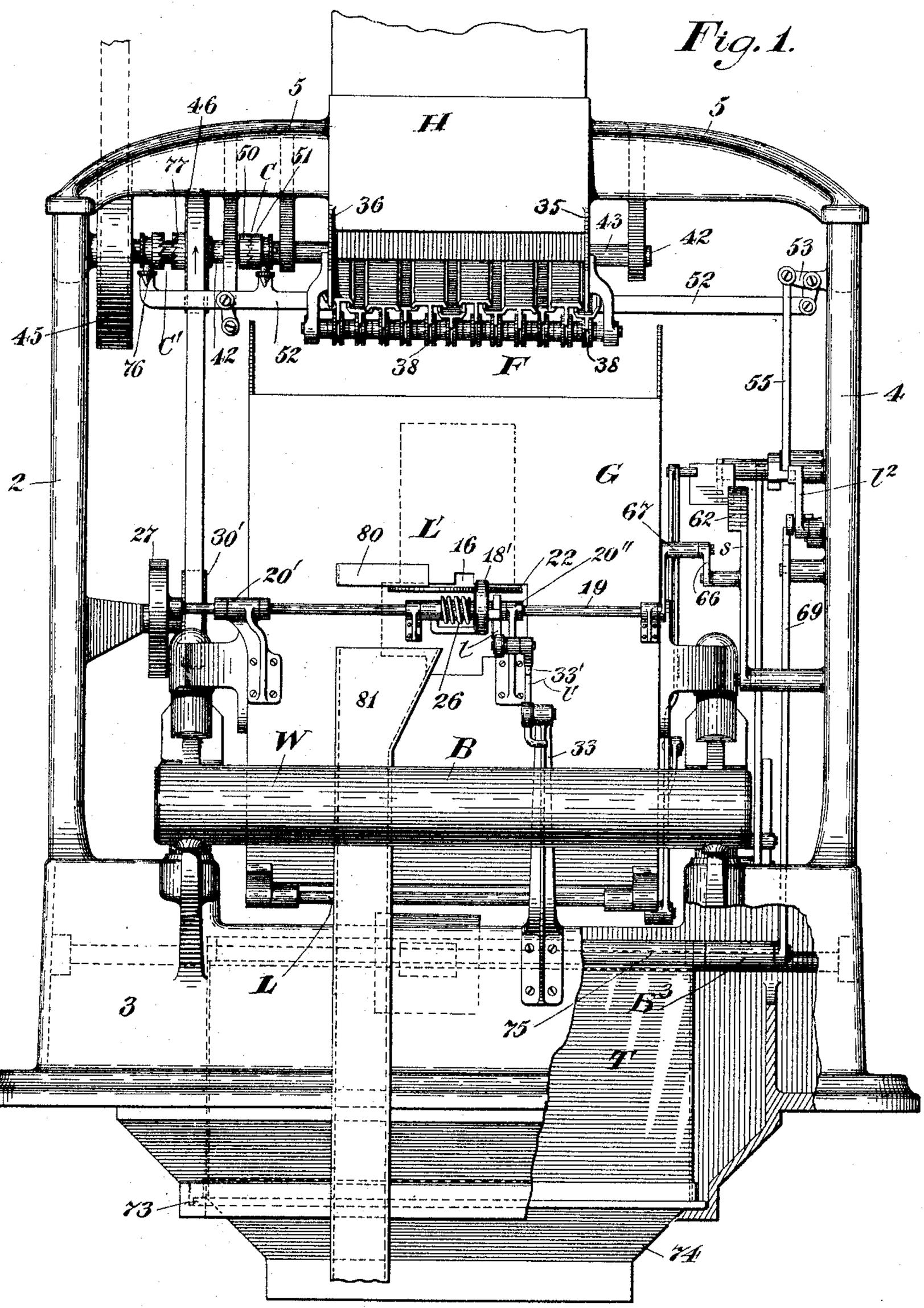
F. H. RICHARDS.

AUTOMATIC WEIGHING MACHINE.

(Application filed Nov. 26, 1897.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1.



Witnesses:
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(No Model.) 4 Sheets—Sheet 2.

Fig. 3.

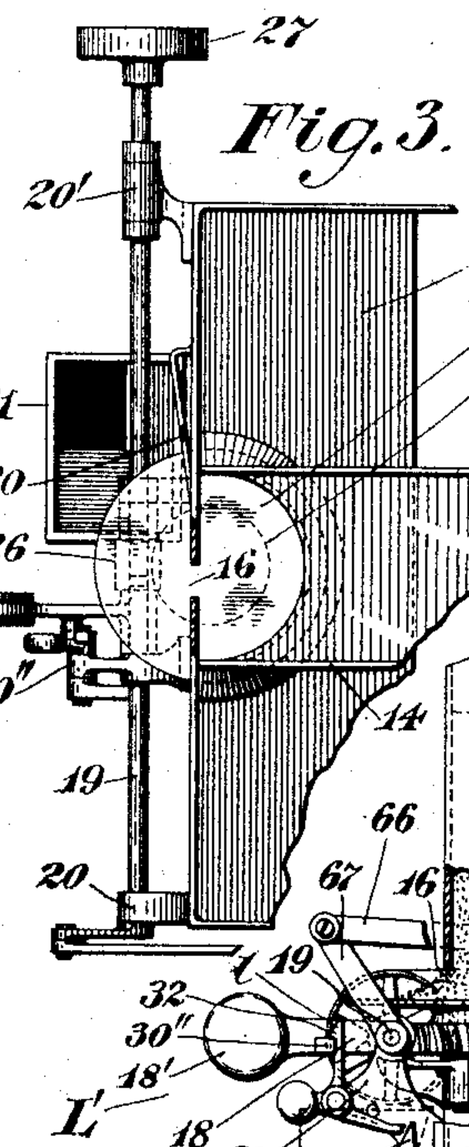

Fig. 2.

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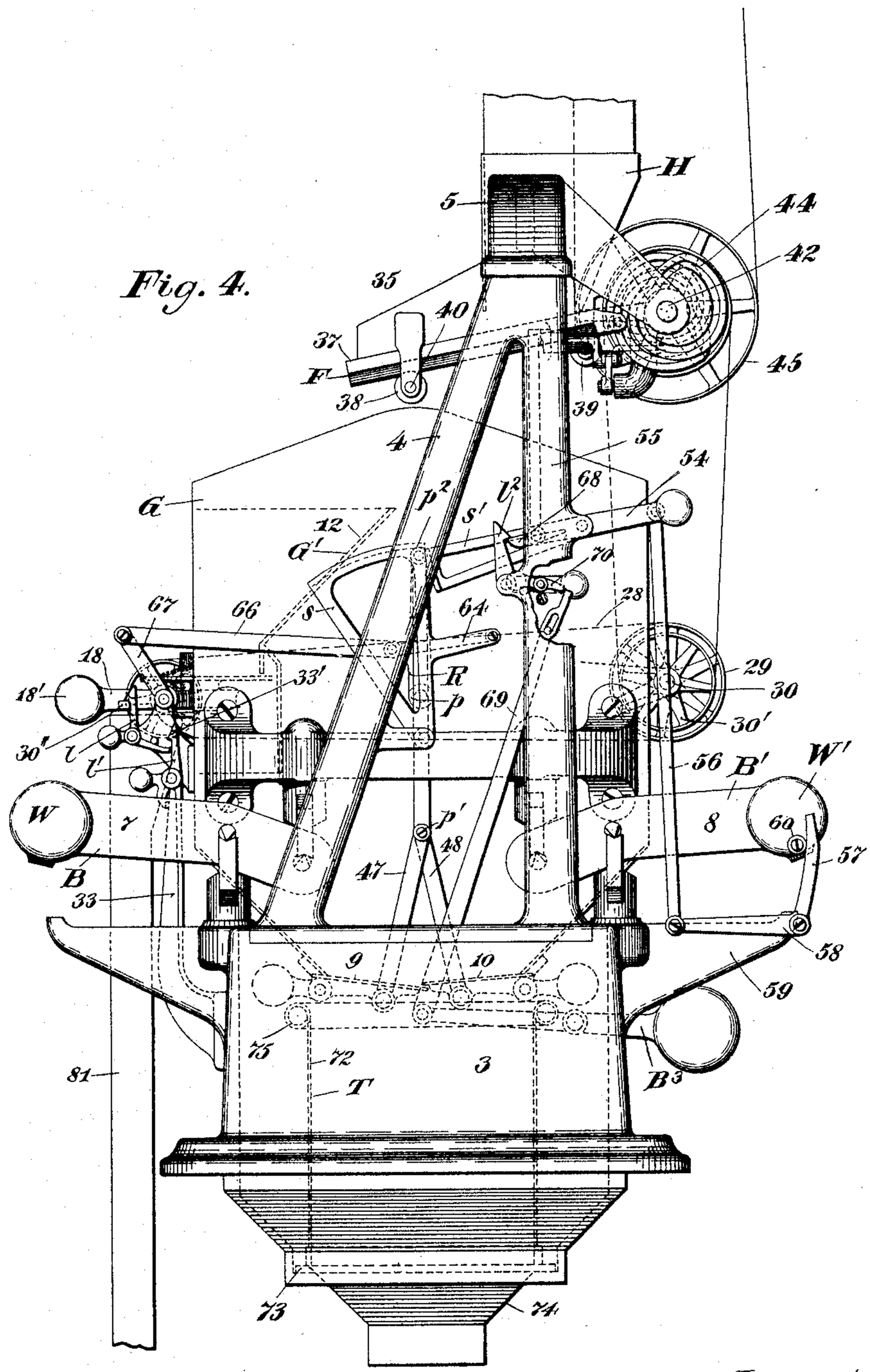
(No Model.) 4 Sheets—Sheet 3.

Fig. 4.



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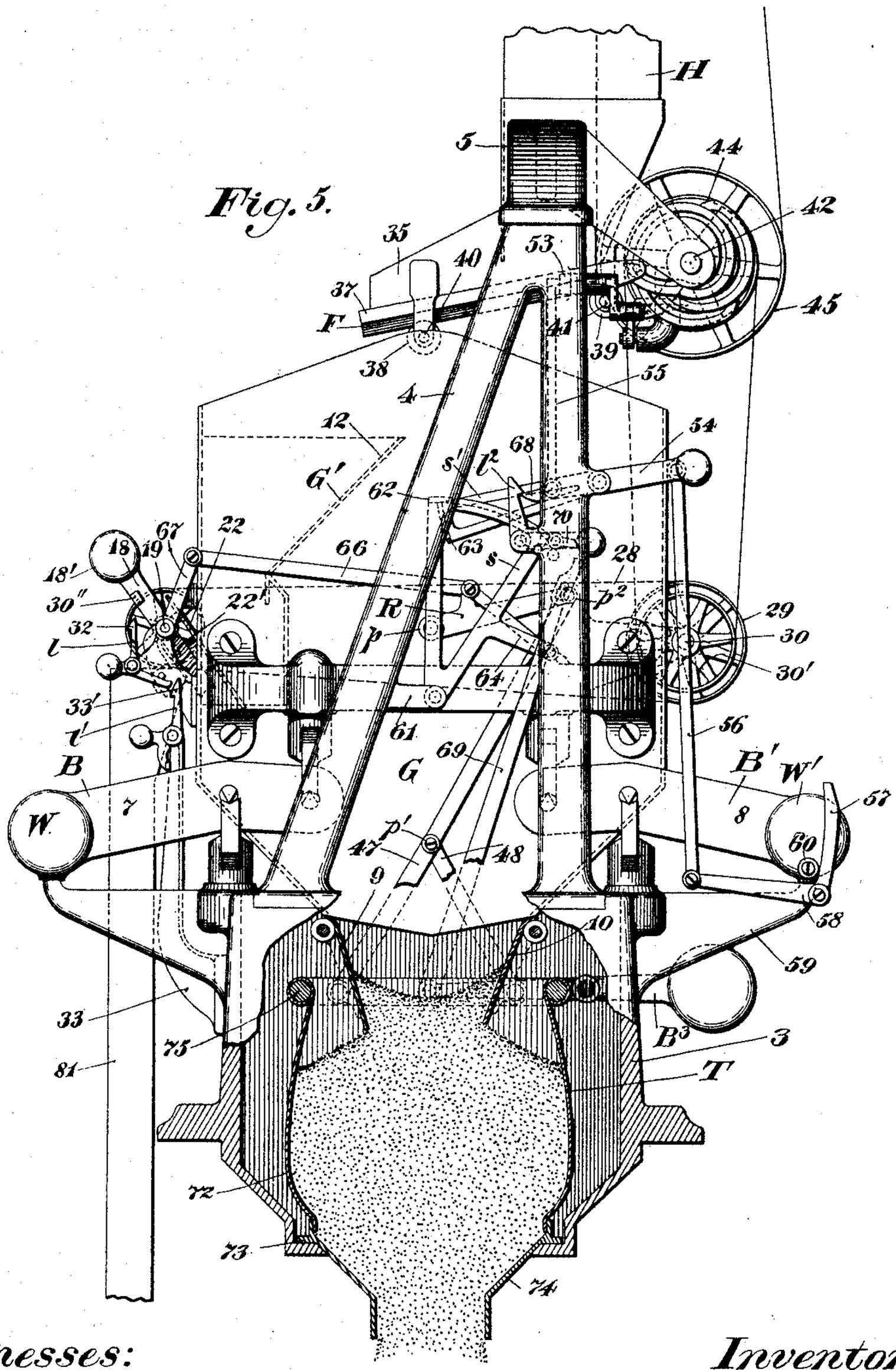
(No Model.) 4 Sheets—Sheet 4.

Fig. 5.



Witnesses:
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UNITED STATES PATENT OFFICE.

FRANCIS H. RICHARDS, OF HARTFORD, CONNECTICUT.

AUTOMATIC WEIGHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 616,633, dated December 27, 1898.

Application filed November 26, 1897. Serial No. 659,835. (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 Automatic Weighing-Machines, of which the following is a specification.

This invention relates to automatic weighing-machines of the "rising-poise" class described, for instance, in Letters Patent of the United States No. 572,067, granted to me November 24, 1896, to which reference may be had, one object of my present invention being to furnish a weighing-machine of the class specified comprehending improved overload-supply means and also improved instrumentalities for controlling the reduction of the load.

A further object of the invention is to provide, in connection with the supply mechanism of the weighing-machine, a vertically-expansible load-receiving regulator and means operable by the weighing mechanism and controlled by the regulator for governing the operation of the supply mechanism.

A further object of the invention is to provide, in connection with the load-receiver of a weighing-machine, improved load-reducing means comprehending a vertically-oscillatory discharge-plate carrier and a horizontally-rotative discharge-plate mounted on said carrier and located partially within and partially outside of the load-receiver, and also to provide, in operative relation with the load-reducing means, a power-actuated feeder and means controlled by the weighing mechanism and operative at predetermined points in the movements of the load-receiver for actuating the feeder and rotating the discharge-plate alternately.

In the drawings accompanying and forming part of this specification, Figure 1 is a front elevation of a weighing-machine embodying my present improvements as seen from the left in Fig. 2, parts thereof being broken away and certain other parts being shown in dotted line. Fig. 2 is a side elevation of the weighing-machine as seen from the right in Fig. 1, the parts thereof being in the positions they occupy during the supply of an overload to the load-receiver. Fig. 3 is a plan view of a portion of the left-hand side of the weighing-machine shown in Fig. 2 and illustrates the load-reducing mechanism. Fig. 4 is a side elevation similar to Fig. 2 of the weighing-machine, showing the parts in the positions they occupy when the load-receiver has descended below its poising-line and when the load-reducing means are effective for removing the suplus; and Fig. 5 is a similar side elevation of the weighing-machine, showing the parts in the positions they occupy during the discharge of a load.

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 construction and is shown comprising the chambered supporting base or bed 3 and the two side frames or uprights 2 and 4, connected together at their upper ends by the top plate 5, which supports a supply-hopper H in the usual manner.

My invention comprehends improved overloading and load-reducing means operative in connection with weighing mechanism, the overloading means being adapted for supplying to the load-receiver a quantity of material in excess of the predetermined load and the load-reducing means being adapted for subsequently effecting the removal of the surplus to bring the load-receiver to a true poise.

The weighing mechanism comprises a load-receiver and counterpoising means therefor—such as a plurality of scale-beams—and is shown substantially similar to the weighing mechanism described in Patent No. 572,071, granted to me November 24, 1896, to which reference may be had. This weighing mechanism is shown consisting of a load-receiver or bucket G and two oppositely-disposed scale-beams B and B′, upon the poising end of which said load-receiver is mounted in the usual manner, the scale-beams being supported for oscillatory movement, in the manner described in the patent last mentioned, upon the base 3 of the machine. Each of the scale-beams consists of a pair of arms joined at their outer ends by a counterweight, the arms of the beam B being designated by 7

and the counterweight therefor by W and the arms of the beam B' being designated by 8 and its counterweight by W'.

The load-receiver G has in the lower end thereof the usual discharge-opening and is provided at this end with an oscillatory load-discharger, which is designated in a general way by L, said load-discharger consisting of two oppositely-disposed closer-plates 9 and 10, pivotally supported on brackets at opposite sides, respectively, of the load-receiver, and each closer-plate being furnished with a weight for effecting a closing movement thereof.

The load-receiver G is preferably furnished on the interior thereof with a relatively small auxiliary load-receiver G', the discharge end of which is located considerably above the discharge end of the receiver G, said receiver G' consisting, in the form shown in the accompanying drawings, of the inclined inner wall 12 and two side walls 13 and 14, which abut at their outer ends against the front wall of the load-receiver. A surplus-discharge opening 16 is formed in a front wall of the load-receiver G and communicates with the discharge end of the surplus-receiver G'.

For the purpose of providing a space below the discharge end of the surplus-receiver G' unobstructed by material contained in the main load-receiver G, I have provided a chute or spout 17, which depends below and is of somewhat larger diameter than the discharge end of said surplus-receiver.

The load-reducing means or surplus-discharger, which is designated by L', comprises, in the preferred form thereof shown most clearly in Figs. 2 and 3 of the drawings, a discharge-plate carrier 18, pivotally supported for oscillatory movement in a vertical plane on a shaft 19, journaled in suitable bearings formed in brackets 20 and 20', secured to the front wall of the load-receiver, and a discharge-plate 22, mounted on the inner end of the carrier for rotation in a plane intersecting the plane of oscillation of said carrier and extending partially within the load-receiver G and normally covering the discharge-opening of the surplus-receiver and constituting a supporting-plate for the material contained in said receiver G'. This plate 22 is preferably mounted on a stud 23, journaled in a vertical bearing 24 at the inner end of the carrier 18, the plate being so disposed with relation to the front wall of the load-receiver that approximately one-half of said plate extends within and the other outside of said load-receiver, as will be understood by reference to Fig. 3 of the drawings, an opening being formed in the front wall of the load-receiver below the surplus-receiver G' of sufficient size to permit an unobstructed oscillatory movement of the surplus-discharger or load-reducing device.

While the surplus-receiver G constitutes a convenient accessory to the load-reducing means, it will be seen that it is not an indispensable factor, for the reason that the discharge-plate 22, if extended into the main load-receiver G in the manner shown, would be operative for removing a portion of the load even if the surplus-receiver G' were dispensed with, and therefore I do not desire to limit this invention to the employment of a surplus-receiver in connection with the specific load-reducing device illustrated.

As a convenient means for actuating the rotary member of the load-reducing device the hub or spindle of the discharge-plate 22 is shown furnished with a worm-wheel 22', which meshes with a worm 26, fixed to the shaft 19, and which shaft is furnished with a pulley 27, driven by a belt 28, (shown in dotted lines in Fig. 2,) extending around an intermediate pulley or idle-wheel 29, carried on a shaft 30, journaled in suitable bearings on the framework, the idle-wheel 29 being shown supported in substantially horizontal alinement with the shaft 19 at the rear side of the load-receiver. This idle-wheel or pulley 29 will be intermittently rotated through means controlled by the weighing mechanism, as will be hereinafter fully described.

The carrier 18 for the discharge-plate 22 of the load-reducing device is counterbalanced, preferably, by a weighted arm 18' and normally locked in the position shown in Fig. 2, with the surplus-discharge plate 22 in a horizontal plane, by means of an angle-latch *l*, fulcrumed on a bracket 20'' and having a catch 32 on one arm thereof, which engages a projection 30'' on the weighted arm 18' of the plate-carrier 18, and as a means for actuating the latch to release the same from engagement with the carrier 18 at a predetermined point in the ascending movement of the load-receiver I have provided a by-pass latch-tripper *l'*, pivotally supported at the upper end of an upwardly-extending arm 33, fixed to the base 3 of the machine, said by-pass latch-tripper having a projection 33' for engaging one arm of the latch *l* to release the same.

The overload-supplying means, in the preferred form thereof illustrated in the drawings, comprises, in addition to the hopper H, which is furnished with inclined forwardly-projecting guard-walls 35 and 36, respectively, at the lower end thereof, a power-driven material-feeder (designated in a general way by F) consisting of a series of feed-bars 37, each of which is supported for reciprocatory movement on rolls 38 and 39, mounted upon shafts 40 and 41, respectively, supported in brackets fixed to and depending from the side walls of the supply-hopper H. These bars are preferably T-shaped in cross-section, the central vertical webs thereof being seated in peripheral grooves in bar-supporting rolls, and the material-supporting plates or flanges of said bars are so disposed that alternating supporting-plates will overlap the supporting-plates of adjacent bars.

As a convenient means for reciprocating the material-supporting bars of the feeder and for imparting slow advancing movements to certain bars of the series and simultaneously imparting quick return movements to other bars of said series I have provided feed-bar-actuating mechanism, which in the preferred form thereof shown in the accompanying drawings comprises a driving-shaft 42, journaled on the framework, a cam-carrying sleeve 43, loosely mounted upon the shaft 42, a series of feed-bar-actuating cams or driving members 44, fixed to said sleeve and having differently-disposed working faces in operative connection with said feed-bars, respectively, a continuously-rotative driver or driving-pulley 45, fixed to the shaft 42, and a clutch device C for intermittently coupling the cam-carrying sleeve 43 to the shaft 42.

For the purpose of rotating the discharge-plate 22 of the load-reducing device through the medium of the driving-shaft 42 of the feeder-actuating mechanism the shaft 30, on which the intermediate or idle-wheel 29 is mounted, is furnished with another intermediate or idle-wheel 30′, which is belted to a pulley 46, loosely mounted upon the shaft 42 of the feeder-driving mechanism, and a clutch C′ is provided, supported for coupling the pulley 46 to said driving-shaft 30 intermittently.

The means for operating the clutches C and C′ will be hereinafter fully described.

As a means for sustaining the closer-plates of the load-discharger I have provided a toggle device, which in the form thereof shown most clearly in Figs. 1, 2, and 3 of the drawings comprises a rocker R, pivotally supported at p on the side wall of the load-receiver above the load-discharger and substantially midway between the front and rear walls of said receiver, two angularly-disposed links 47 and 48, pivoted together at p' at their upper ends and pivotally connected at their lower ends to the closer-plates 9 and 10 near the inner ends of the plate, and a link 49, pivotally connected at p' at its lower end to the upper ends of the links 47 and 48 and pivotally connected at p^2 at its upper end to the rocker R in such manner that when the load-discharger L is in its closed position the pivots p' and p^2 will be in substantial vertical alinement and the sustaining toggle members will be in their dead-center positions.

The clutch C for controlling the operation of the feeder F comprises two complementary clutch members 50 and 51, respectively, the former of which is fixed to the driving-shaft 42 and the latter is splined to the cam-carrying sleeve 43, and as a means for actuating the clutch to start and stop the feeder I have provided a clutch-actuator comprehending a reciprocatory clutch-member shifter 52, supported for reciprocatory movement by links at opposite ends thereof and having a projection engaging in a groove in the clutch member 51, a crank-arm 53, fixed to one of the shifter-supporting links, a counterweighted actuating-lever 54, fulcrumed on the framework and operatively connected to the crank-arm 53 by a link 55, which link is pivotally connected to the lever 54 in advance of the fulcrum thereof; a thrust-rod 56, pivotally connected at its upper end to the lever 54 in the rear of the fulcrum thereof, and an angle-lever 58, fulcrumed on a bracket 59, secured to the base 3 of the machine and having an arm 57, pivotally connected at its outer end to the lower end of the link 56, and having a vertically-disposed arm 57′, the inner face of which is disposed in the path of a roll 60, carried on the counterweighted end of the scale-beam B′, the angle-lever 58 being so disposed with relation to the roll 60 on the scale-beam that during the ascending movement of the counterweighted end of said beam the lever will be actuated to impart an upward thrust to the thrust-rod 56, and through the medium of the lever 54 and connecting-link 55 disengage the clutch members 50 and 51 and stop the operation of the feeder.

As a means for preventing a material-feeding operation of the feeder F when the closer-plates 9 and 10 are in their open positions and until the load is completely discharged from the load-receiver and for preventing a gravitative movement of both the discharger L and the load-reducing device or surplus-discharger L′, I have provided, in operative connection with the feed-actuating device, main discharger L, and auxiliary or surplus discharger L′, interlocking mechanism, which in the form thereof shown in the accompanying drawings comprises two oscillatory stop members s and s', respectively, the one, s, of which is pivotally supported on a bracket 61 on the framework and has its pivotal point in substantial vertical alinement with the pivots p, p', and p^2 of the discharger-sustaining toggle when the toggle is in its dead-center position, and the one, s', of which constitutes, preferably, a part of the actuating-lever 54 of the clutch-actuator, said stop members having curved flanges 62 and 63, respectively, concentric with their axes of movements and adapted for reciprocally engaging one another for holding the stop member s against movement when the load-discharger is in its closed position, and holding the stop member s' against movement when the feeder is inactive and the main discharger is in its open position. The stop member s is shown having an upwardly-extending arm 64, to which is pivoted a link 65, which in turn is pivoted at its opposite end to a projection on the rocker R intermediate the pivoted and outer ends of said rocker. This rocker is operatively connected with the shaft 19 of the load-reducing device or surplus-discharger by means of a link 66, pivotally connected at its inner end to the projection on the rocker R and pivotally connected at its opposite end to a crank-arm 67, fixed to the shaft 19, as shown most clearly in Figs. 2, 3, and 5 of the drawings.

For the purpose of locking the clutch-actuator against premature movement I have provided a counterweighted angle-latch l^2, which when the actuating-lever 54 and its stop member s' are in position for preventing a feed movement of the feeder F engages a catch 68 on said lever and prevents a clutch-shifting movement of the clutch-actuator, and as a means for operating the latch l^2 subsequently to the discharge of material from the load-receiver I have provided a vertically-extensible load-receiving regulator, (designated in a general way by T,) the upper end of which is pivotally supported on the poising ends of a regulator-distending lever or beam B^3, fulcrumed on the base of the machine and having a counterweight for normally retaining the regulator in a distended position, and I have also provided in connection with said regulator T a latch-tripper 69, pivotally supported, preferably, at the inner end of the lever B^3 and having its upper end in position for engaging a by-pass 70, pivotally carried on one arm of the latch l^2, the by-pass 70 and latch 69 being so disposed that on the ascending movement of the regulator T the upper end of the latch-tripper will operate the by-pass and cause the same to trip the latch l^2 and release the clutch-actuator, the by-pass 70 permitting the descending movement of the latch-tripper 69 without interfering with the position of the latch l^2.

The load-receiver regulator will preferably consist of a flexible or elastic body portion 72, the lower ends of which are fixed to a flange 73 of a discharge-chute 74, constituting a part of the base 3 of the machine, and will be fixed at its upper end to a rigid frame or ring 75, which is pivotally supported on the poising end of the beam or lever B^3, the receiving and discharging ends of the regulator being of non-changeable diameters, whereas the body portion 72 will be expanded intermediate the upper and lower ends thereof by the material as it flows from the load-receiver, such expanding of the body portion of the regulator diametrically causing a contraction of the regulator in a vertical direction, bringing the receiving end of said regulator downward in closer proximity to the discharge end thereof. This depression of the regulator vertically causes the counterweighted end of the beam B^3 to be lifted, thus drawing the latch-tripper 69 downward to a position for operating the latch l^2 on the return movements of said regulator. After the material has flowed entirely out of the regulator the beam B^3 will straighten out or extend the regulator vertically, bring the body portion thereof to its normal position, and will simultaneously elevate the latch-tripper 69, which will release the latch l^2 from the clutch-actuator, permitting said clutch-actuator to effect an operative engagement of the clutch members and start the feeder, the closer-plates 9 and 10 having before this been returned to their normal closed positions through the medium of the counterweights carried by said closer-plates. During the closing movement of the main load-discharger the auxiliary discharger or load-reducing device will, through the medium of the connections before described, be returned to the position shown in Fig. 2.

For the purpose of returning the rotation of the discharge-plate 22 of the load-reducing device in proper relation with the feeder F, the rotation of said plate only taking place after the load-receiver has descended to a point below its true poised position, one of the clutch members, as 76, of the clutch C', which controls the rotation of the discharge-plate 22, is splined to the shaft 42, and the complementary clutch member 77 of said clutch is fixed to the hub of a pulley 46, which is loosely mounted upon said shaft, and the clutch-shifter 52 is provided with a projection which engages in a circumferential groove in the clutch member 76 and is adapted, when the clutch members 50 and 51 of the clutch C are shifted thereby out of engagement with each other, to shift the clutch members 76 and 77 into operative engagement and effect a rotative movement of the plate 22. Thus it will be seen that when the clutch-actuator is operated through the medium of the weighing mechanism to stop the material-feeding operation of the feeder F it simultaneously effects a rotation of the discharge-plate 22 of the load-reducing device, which rotation continues until sufficient material has been discharged from the load-receiver and the same has ascended to its truly-poised position, when it will trip the latch l out of engagement with the carrier of said plate, allowing said carrier to gravitate and at the same time, through the connections 66 and 67 with the regulator R and stop member s', break the sustaining-toggle of the main load-discharger, allowing the closer-plates 9 and 10 thereof to gravitate and discharge the load into the load-receiving regulator T.

As the surplus is carried outward by the plate 22 of the load-reducing device it is forced over the outer edge of said plate, preferably by a scraper-plate 80, connected to the outer wall of the load-receiver, and descends, preferably, into a conduit 81, whence it is conducted to any suitable place of deposit.

It will be obvious that the construction and organization of the several mechanisms constituting my present improvements may be variously modified without departure from this invention.

Having described my invention, I claim—

1. A weighing-machine comprehending two receivers one of which is supported by, and within, the other and each of which has a gravitative load-discharger openable by the weight of material resting thereon.

2. A weighing-machine comprehending two reciprocatory load-receivers one of which is supported by, and within, the other; two gravitative load-dischargers one in connec-

tion with each receiver and openable by the weight of material resting thereon; a discharger-shutting actuator in connection with one discharger; and an actuating-connector between the two load-dischargers.

3. A weighing-machine comprehending two receivers supported one by the other, with their discharge ends in different horizontal planes, and each having a gravitative load-discharger openable by the weight of material resting thereon; means for normally locking the load-dischargers in their closed positions; a discharger-closing actuator in connection with one discharger; and means operative on the closing movement of one discharger for closing the other discharger.

4. The combination, with weighing mechanism including a receiver, of a rotary gravitative discharger coöperative with said receiver; means operable by the weighing mechanism for controlling the vertical movements of said discharger; and means operative when the discharger is in a horizontal position for rotating the same.

5. The combination, with weighing mechanism including a receiver, of a discharger coöperative with said receiver and including a vertically-oscillatory plate-carrier and a horizontally-rotative discharger-plate operable for discharging material alternately at opposite sides of the axis of rotation thereof; means operable by the weighing mechanism for controlling the oscillatory movement of the plate-carrier; and means for rotating the closer-plate.

6. The combination, with weighing mechanism including an oscillatory receiver, of a rotative discharger supported for independent oscillatory movement in coöperative relation with the receiver; means for normally locking the discharger in its shut position; means operative at a predetermined point in the movements of the receiver for releasing the discharger to effect a gravitative movement thereof by the weight of material resting thereon; a discharger-elevating actuator operative for elevating the discharger at a predetermined point in the movements of the weighing mechanism; and means operative on the elevation of the discharger for rotating the same.

7. A weighing-machine comprehending two receivers one of which is supported by, and within, the other; a gravitative discharger in operative connection with the external receiver; a rotary gravitative discharger in operative relation with the internal receiver; means controlled by the weighing mechanism for effecting opening and closing movements of the two dischargers simultaneously; and means operative at a predetermined point in the descending movements of the receivers for rotating the discharger of the internal receiver.

8. The combination, with weighing mechanism including a main load-receiver having a surplus-discharge opening intermediate the upper and lower ends thereof, of a surplus-receiver supported within the load-receiver with its discharge end in juxtaposition to the surplus-discharge opening of the main receiver; a rotative discharger supported for gravitative movement in the surplus-discharge opening of the load-receiver and normally covering the discharge-opening of the surplus-receiver; a discharger in operative connection with the main load-receiver; and means, including an actuating-connector between the two dischargers and operative by the weighing mechanism, for simultaneously imparting closing movements to the two dischargers; and means operative on the shutting of the dischargers for rotating the discharger of the surplus-receiver to remove a portion of the material from said surplus-receiver and for discharging the same outside the main load-receiver.

9. The combination, with weighing mechanism including a main load-receiver having a surplus-discharge opening intermediate the upper and lower ends thereof and with overload-supplying means, of load-reducing means including a surplus-receiver supported by, and within, the main receiver and having its discharge end in juxtaposition to the discharge-opening of said main receiver, and a rotary discharger supported in operative connection with the discharge end of the surplus-receiver for gravitative movement in a plane intersecting the plane of rotation thereof; means controlled by the weighing mechanism for rotating the discharger, when the same is in its closed or horizontal position, to discharge a portion of the contents of the surplus-receiver outside of the main receiver; means for normally locking the discharger in its shut position; means operative at a predetermined point in the movements of the main receiver for effecting a gravitative movement of the discharger whereby the remainder of the load in the surplus-receiver will be discharged into the main receiver; and means for shutting the discharger on the discharge of the load from the main receiver.

10. The combination, with weighing mechanism including a main and an auxiliary receiver, the discharge end of the latter being located above the discharge end of the former, of a rotary gravitative discharger disposed in operative relation with the surplus-receiver and in position normally to cut off communication between the two receivers; means controlled by the weighing mechanism for rotating said discharger when the same is in its normal closed position; a discharger in connection with the main receiver; and an actuating-connector between the two dischargers and operative for effecting corresponding movements of the two dischargers simultaneously.

11. The combination, with weighing mechanism including a main load-receiver, of overload-supplying means including a power-driven feeder; load-reducing means includ-

ing an auxiliary receiver and a coöperative rotary gravitative discharger; and actuating mechanism connecting the feeder and rotary discharger and effective at predetermined points in the movements of the weighing mechanism for alternately actuating said feeder and rotating said discharger.

12. The combination, with weighing mechanism including a main load-receiver having a closer, of overload-supplying means including a reciprocatory feeder; load-reducing means carried by the main load-receiver and including an auxiliary receiver and a coöperative rotary-discharger-actuating mechanism connecting the feeder and rotary discharger and effective at predetermined points in the movements of the load-receiver for reciprocating the feeder and rotating the discharger alternately; and means connecting the closer and discharger and effective at a predetermined point in the movement of the main load-receiver for simultaneously effecting opening movements thereof.

13. The combination, with weighing mechanism including a main load-receiver having a load-discharger and with overload-supplying means, of load-reducing means including a rotatable gravitative surplus-discharger supported partially within the main load-receiver.

14. The combination, with weighing mechanism including a main load-receiver having a load-discharger and with overload-supplying means, of load-reducing means including a rotatable gravitative surplus-discharger supported partially within the main load-receiver; means for rotating the surplus-discharger to remove a portion of the load; and means for effecting a gravitative movement of the two dischargers simultaneously to empty the main load-receiver.

15. The combination, with weighing mechanism including a main load-receiver having an oscillatory load-discharger and with overload-supplying means including a reciprocatory feeder, of load-reducing means including a surplus-discharger supported for rotative and oscillatory movements in relatively transverse planes; actuating mechanism connecting the feeder and surplus-discharger, and effective for reciprocating said feeder and rotating said discharger alternately; and means connecting the two dischargers and operable at predetermined points in the movements of the load-receiver for concurrently effecting corresponding oscillatory movements of the two dischargers.

16. The combination, with weighing mechanism including a load-receiver having an oscillatory load-discharger and with overload-supplying means, of load-reducing means including a surplus-discharger supported for rotative and oscillatory movements in relatively transverse planes; means controlled by the weighing mechanism and effective at predetermined points in the movements of the load-receiver for actuating the feeder and rotating the surplus-discharger alternately; actuating instrumentalities connecting the two dischargers and operable, at predetermined points of the load-receiver, for simultaneously effecting corresponding oscillatory movements of said dischargers; and reciprocally-effective stop devices in operative connection with, and controlling the movements of, the feeder and the two dischargers.

17. The combination, with weighing mechanism including a load-receiver having a surplus-discharge opening intermediate the upper and the lower ends thereof and with overload-supply means including a reciprocatory force-feeder, of load-reducing means including a discharge-plate carrier supported for vertical oscillations in bearings on the load-receiver, and a discharge-plate supported for horizontal rotative movements on the carrier at one side the axis of oscillation thereof and having one portion extended through the surplus-discharge opening of, and into, the load-receiver, and actuating mechanism controlled by the weighing mechanism and effective for reciprocating the feeder and rotating the discharger intermittently and in alternating order.

18. The combination, with weighing mechanism including a load-receiver and with overload-supplying means, of load-reducing means including a counterbalanced plate-carrier pivotally supported on the load-receiver for vertical oscillation and having one end thereof extended into an opening in the side wall of said receiver, and a discharge-plate journaled on the carrier for rotation in a plane intersecting the path of oscillation of said carrier; and driving mechanism for the rotative plate, consisting of a power-driven wheel and a train of gears operatively connecting said wheel and rotative plate.

19. The combination, with weighing mechanism including a load-receiver and with overload-supplying means, of load-reducing means including a counterbalanced plate-carrier pivotally supported on the load-receiver for vertical oscillation and having one end thereof extended into an opening in the side wall of said receiver, and a discharge-plate journaled on the carrier for rotation in a plane intersecting the path of oscillation of said carrier; and driving mechanism controlled by the weighing mechanism and effective for intermittently rotating the discharge-plate and consisting of a rotative driver having its axis of movement coincident with the axis of oscillation of the carrier, a worm mounted on the driver-shaft, and a worm-wheel carried by the rotative plate and meshing with said worm.

20. The combination of weighing mechanism embodying a load-receiver; supply and discharge mechanisms therefor; a load-receiving regulator supported below the load-receiver and extensible in the plane of the flow

of material from said receiver; and means operative with the regulator for governing the action of one of said mechanisms.

21. The combination, with weighing mechanism including a load-receiver, of supply mechanism; a vertical extensible load-receiving regulator supported below the load-receiver; and means operative with the regulator for governing the action of the supply mechanism.

22. The combination, with a weighing device, of supply and discharge mechanisms therefor; a load-receiving regulator supported below the weighing device and extensible in the plane of the material discharged therefrom; and means including a regulator-supporting actuator for governing the action of one of said mechanisms.

23. The combination, with weighing mechanism including a load-receiver having a discharger, of a flexible load-receiving regulator supported below said load-receiver and having receiving and discharging ends of unchangeable diameters, and a shiftable support in connection with the upper or receiving end of the regulator.

24. The combination, with weighing mechanism including a load-receiver having a discharger and with stream-supplying means, of a vertical extensible load-receiving regulator supported below the load-receiver and having receiving and discharging ends of unchangeable diameters, and means including a regulator-supporting actuator operating for governing the action of the stream-supplying means.

25. The combination, with a load-receiver, of a regulator having receiving and discharging ends of unchangeable diameters connected together by flexible intermediate walls, and a counterweighted lever pivotally connected at its non-counterweighted end with the receiving end of the regulator.

26. The combination, with a load-receiver, of a regulator having receiving and discharging ends of unchangeable diameters connected together by flexible intermediate walls; a counterweighted lever pivotally connected at its non-counterweighted end with the receiving end of the regulator; a stream-supply device; and means operative with the regulator and counterweighted lever for controlling the action of the supply device.

27. The combination, with weighing mechanism including a load-receiver having a discharger, of a supply device including a feeder; power-driven actuating mechanism in connection with said feeder and including a clutch for controlling the effective operation of said feeder; interlocking mechanism including a clutch-actuator between the feeder-controlling clutch and the discharger of the load-receiver; a latch for normally locking the interlocking mechanism against movement; a vertically-extensible load-receiver regulator supported below the discharger of the load-receiver; and means operative on the extending movement of the regulator for releasing the latch to facilitate a clutch-operating movement of the interlocking mechanism.

28. The combination, with weighing mechanism including a load-receiver having a closer, of a power-driven feeder; actuating mechanism in connection with said feeder and embodying a clutch for controlling the effective operation thereof; a clutch-actuator including a stop device operative with the weighing mechanism; means for normally locking the clutch-actuator against movement; a toggle in connection with the closer embodying a stop member coöperative with the stop member of the clutch-actuator; a vertically extensible and collapsible load-receiving regulator supported below the load-receiver; and means controlled by the regulator on the extending load-discharging movement thereof for actuating the clutch-actuator-locking means to thereby control the operation of the feeder.

29. The combination, with beam mechanism and with a load-receiver supported thereon and having a discharger, of stream-supplying means; two coöperative and reciprocally-effective stop devices in connection with, and operable for, controlling the reciprocal actions of the supply device and discharger; and a stop-device actuator comprising an angle-lever fulcrumed on the framework and having an arm disposed in the path of movement of the beam mechanism; and a thrust-rod connecting the other arm of the angle-lever to one of the stop members.

30. The combination, with beam mechanism, of a load-receiver supported thereon and having a closer; a toggle in connection with the closer and embodying an oscillatory stop member; a supply device; an oscillatory stop member coöperating with the closer and stop member and operatively connected with the supply device; an actuator in operative connection with the supply-device stop member and including an angle-lever fulcrumed on the framework and having a vertically-disposed arm located in the path of movement of a pin on the beam mechanism; and a thrust-rod pivotally connected at its lower end to the other arm of the angle-lever and at its upper end to one end of the stop member of the supply device.

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Witnesses:
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