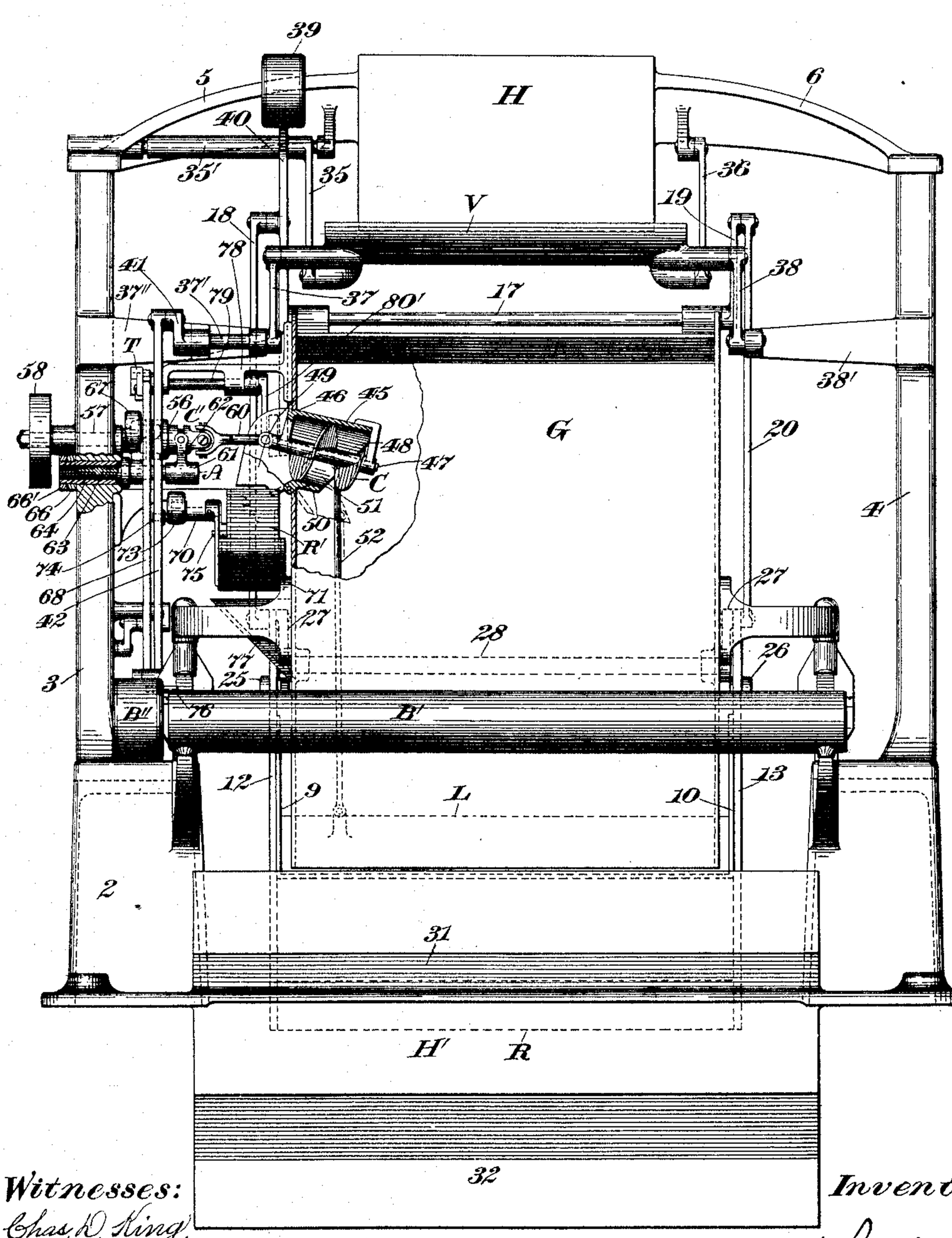
(No Model.) 4 Sheets—Sheet 1.

F. H. RICHARDS.

WEIGHING MACHINE.

No. 585,985. Patented July 6, 1897.

Fig. 1.



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4 Sheets—Sheet 2.

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Fig. 2.

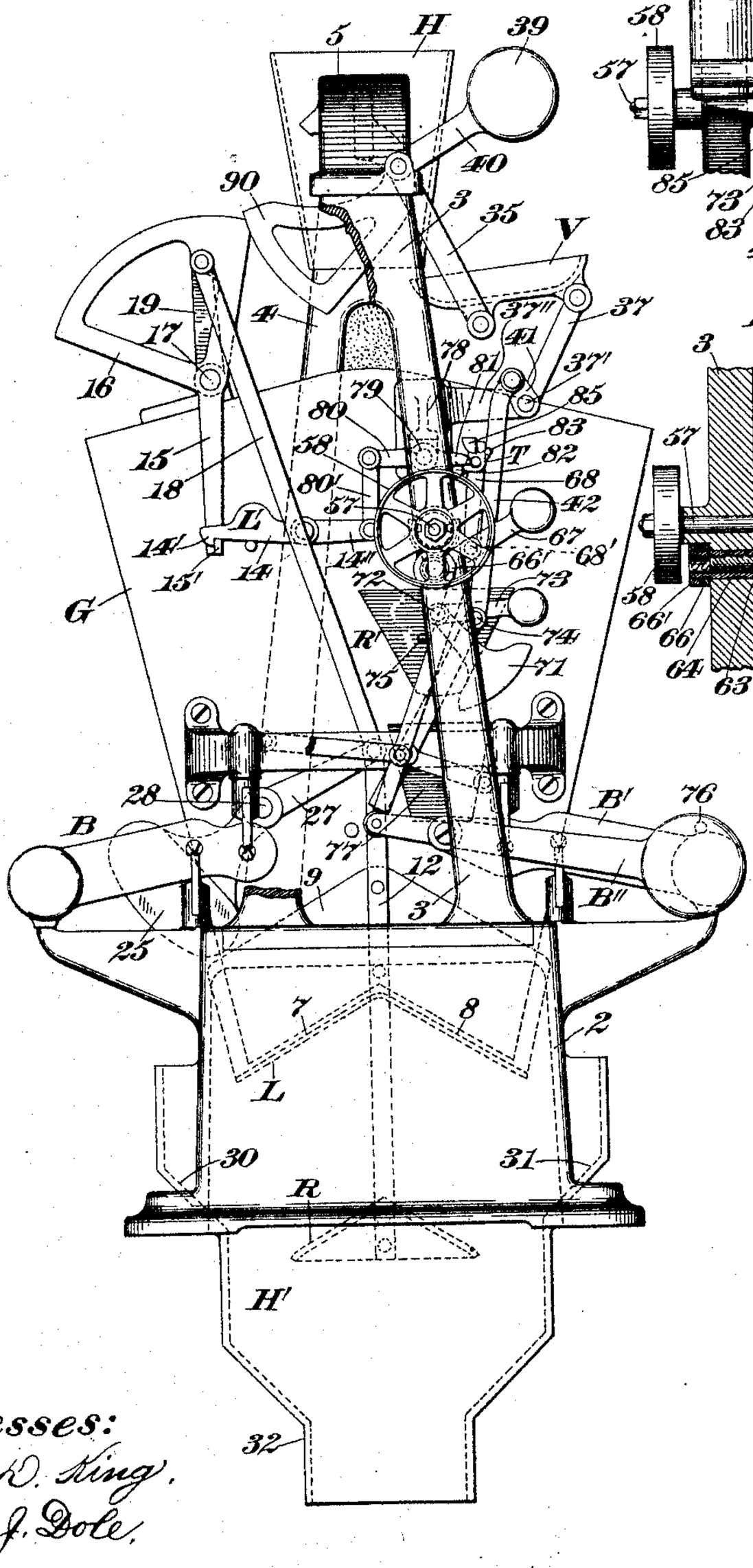


Fig. 6.

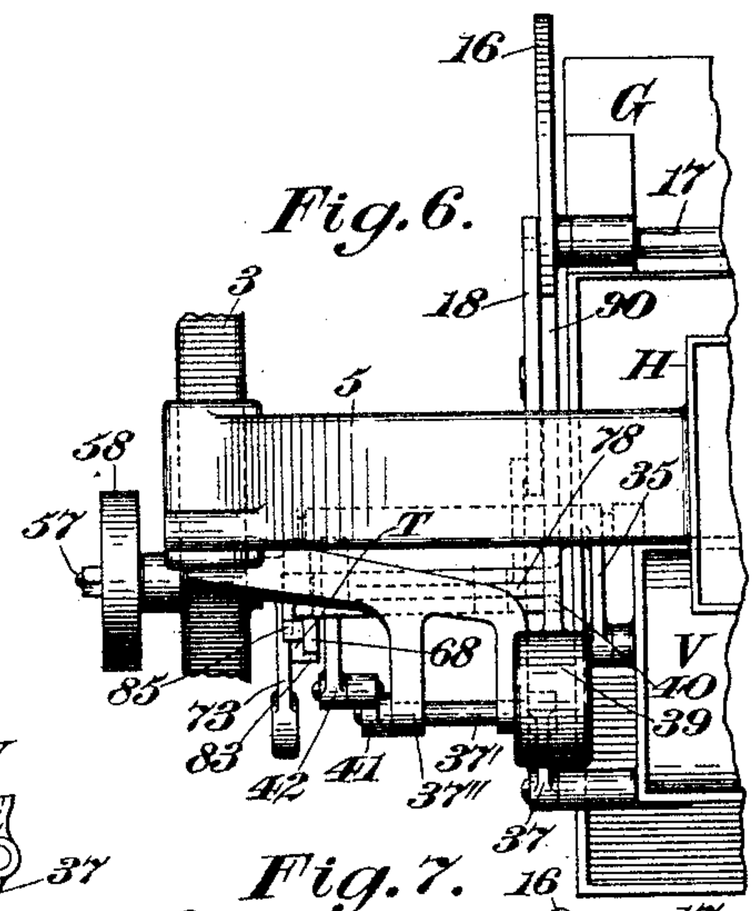
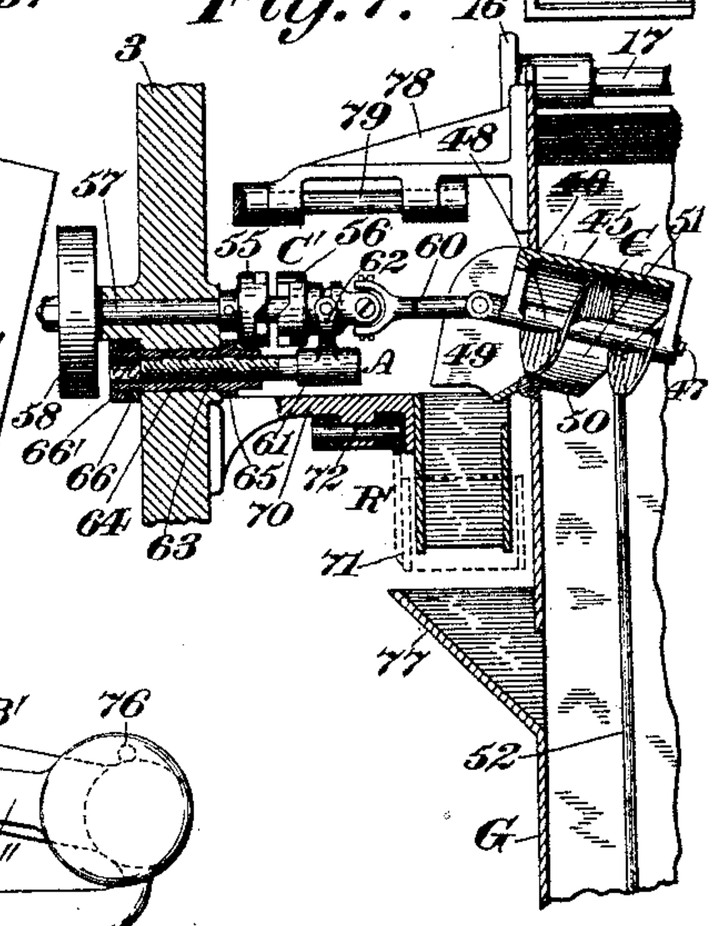


Fig. 7.



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4 Sheets—Sheet 3.

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WEIGHING MACHINE.

No. 585,985. Patented July 6, 1897.

Fig. 3.

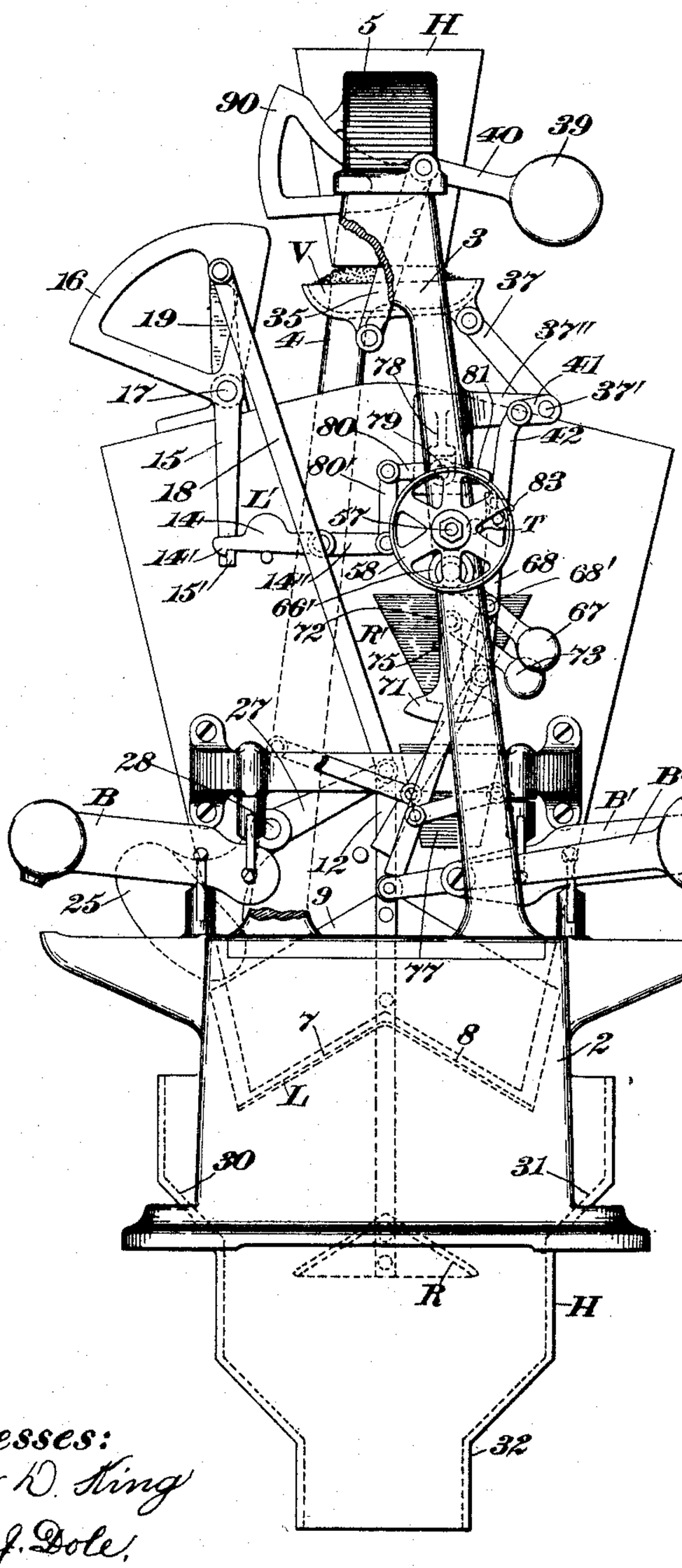
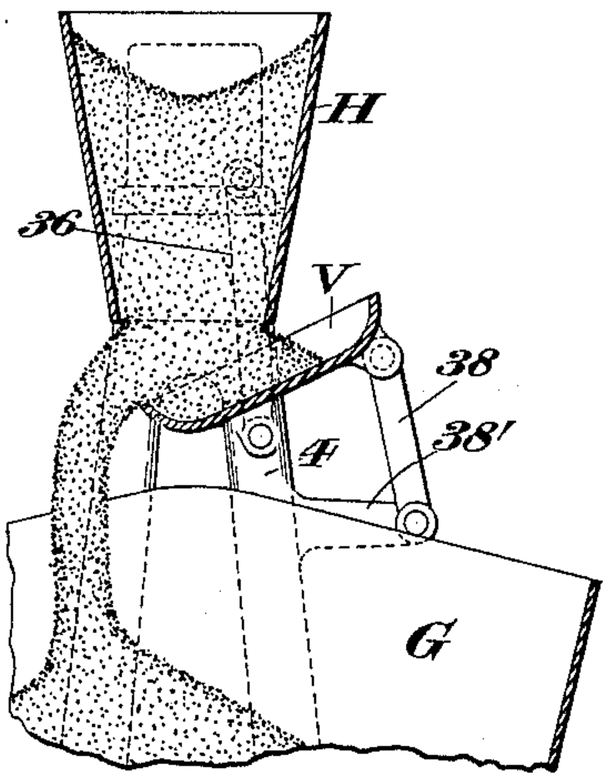


Fig. 5.



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(No Model.) 4 Sheets—Sheet 4.

F. H. RICHARDS.

WEIGHING MACHINE.

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Fig. 4.

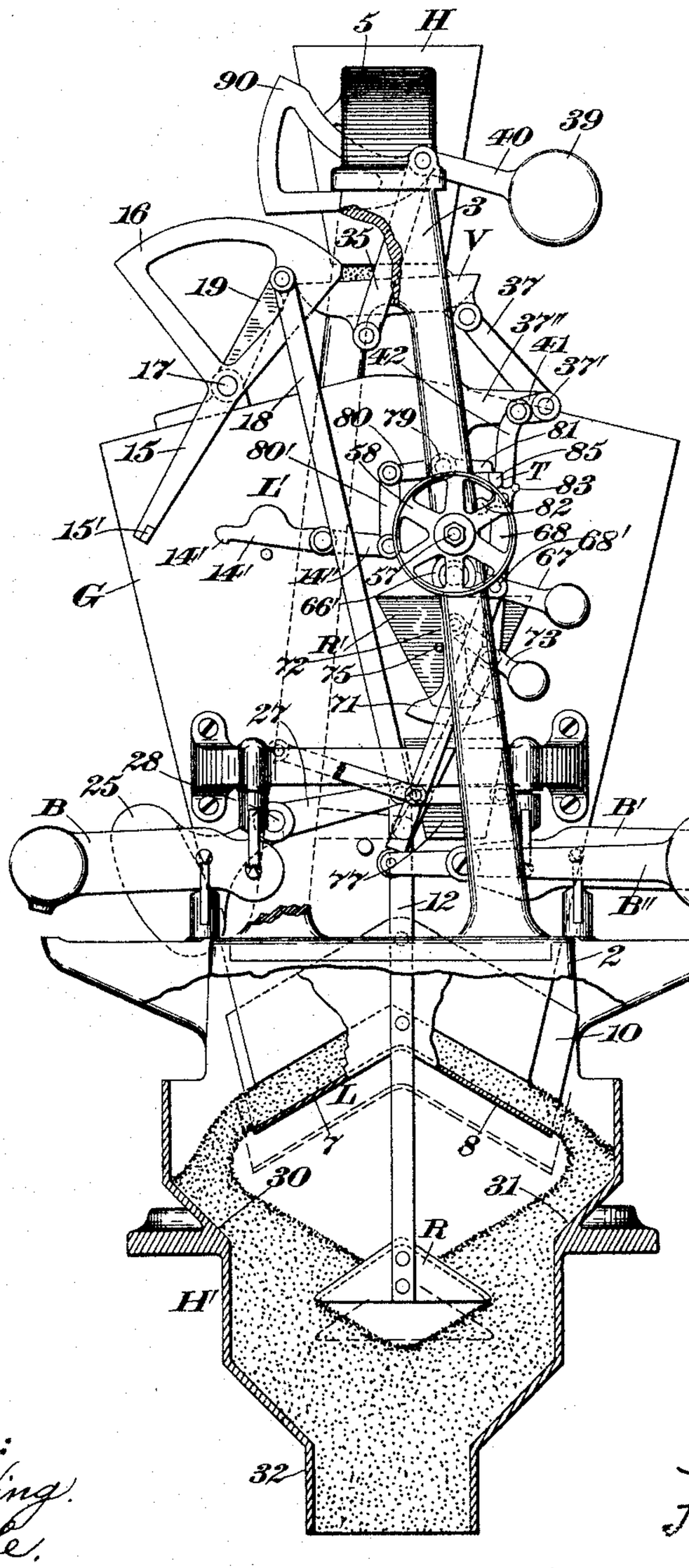
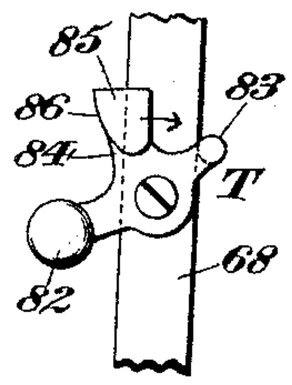


Fig. 8.



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UNITED STATES PATENT OFFICE.

FRANCIS H. RICHARDS, OF HARTFORD, CONNECTICUT.

WEIGHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 585,985, dated July 6, 1897.

Application filed February 17, 1897. Serial No. 623,789. (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 for automatically weighing and delivering various classes of granular and similar materials.

With respect to one of its features the invention comprehends the provision of improved stream-controlling means which embodies a stream-controller supported by links connected thereto at different points, said links being also preferably secured to the framework, whereby said stream-controller is given a peculiar action as it is actuated to stop the supply to the load-receiver, so that blocking or choking of the material as it issues from the hopper is prevented. In the form illustrated the stream-controller consists of a valve, and I have connected links thereto at opposite sides of one of its axes.

Another object of the invention is to provide a conveyer and a casing for said conveyer, a portion of the latter being supported for movement relatively to the former, such movable portion being preferably the floor of the casing, whereby when said floor is tilted or dropped any material that is within the casing can readily pass therefrom, the casing being preferably disposed at an inclination to facilitate this result. In the present instance such conveyer is employed for forcing from the load-receiver of the weighing mechanism a part of the material therein, the tilting floor of the casing being intermittently operated, or when the load is discharged to effect the removal of the material within the casing as it constitutes a part of the load.

Another object of the invention is to furnish improved closer mechanism comprehending a closer supported for reciprocatory movement relatively to the load-receiver and a regulator rigidly connected therewith. The closer in the present case is supported for vertical movement relatively to the load-receiver, it having affixed thereto a rod to which is fastened a regulator, said regulator being so disposed as to be acted upon by the mass discharged from the load-receiver, whereby the shutting of said closer is sufficiently retarded or prolonged as to permit the complete emptying of the load-receiver.

In the drawings accompanying and forming part of this specification, Figure 1 is a rear elevation of a weighing-machine embodying my present improvements, and it shows the positions occupied by the respective parts at the commencement of operation. Fig. 2 is an end elevation of the machine as seen from the left in Fig. 1, the parts being in positions corresponding with said figure. Figs. 3 and 4 are views similar to Fig. 2, showing the machine in two successive positions. Fig. 5 is a longitudinal central section of the stream-controlling mechanism and a fragment of the load-receiver. Fig. 6 is a detail plan view of the valve mechanism. Fig. 7 is a detail view, in rear elevation, of the load-reducing means, showing a portion of the framework and the load-receiver in longitudinal section; and Fig. 8 is a detail view in elevation of a latch-tripper.

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

As to certain of its features my present invention is in the nature of an improvement on the invention disclosed by Letters Patent No. 572,067, granted to me November 24, 1896, to which reference may be had.

The framework for supporting the various parts of the machine may be of any suitable or preferred structure, it consisting in the present case of the chambered or hollow base or bed 2, the end frames 3 and 4, which rise therefrom, and the brackets 5 and 6, which are mounted on said end frames and which extend oppositely from the supply chute or hopper H, the latter, in conjunction with a suitable stream-controller, constituting a convenient means for overloading the load-receiver of the weighing mechanism.

The weighing mechanism, as is usual, includes a load-receiver, such as G, and supporting-beam mechanism therefor, the latter comprising in the present case the oppositely-disposed counterweighted scale-beams B and B′, respectively, which are pivotally mounted on the base 2 and which are equipped with suitable supports for the load-receiver—such, for example, as shown in Letters Patent No.

548,840, granted to me October 28, 1895, to which reference may be had.

The load-receiver has in its bottom the usual discharge-outlet, through which the loads of material are intermittently discharged, said outlet being normally covered by a closer, such as L, which consists of a plate comprising two oppositely-disposed angular portions 7 and 8, which are contiguous to the similarly-shaped lower edge of the load-receiver when said closer is shut, as indicated in Figs. 2 and 3. The closer L has at each end thereof the vertical guard-walls 9 and 10, forming a part thereof, and to the same the rods 12 and 13 will be preferably secured, as by riveting, said rods extending for some distance below the closer for a purpose that will hereinafter appear.

The load-discharge-controlling means includes a latch, such as L′, mounted on the load-receiver G, and being so located as to engage a member that is connected with the closer whereby the closer can be held shut. The weighted arm 14 of the latch, the action of which is limited by a suitably-positioned stop on the load-receiver, swings downward to engage the coöperating arm 15 of the rocker 16, said latch-arm being provided with a suitable catch for engaging a lug or projection on the adjacent rocker-arm 15 when the closer is shut. The rocker 16 is fixed to the rock-shaft 17, which is mounted on the upper end of the load-receiver, and it has pivoted thereto the rod 18, which is likewise attached to the closer-rod 12. The shaft 17 has secured thereto at its opposite end the crank-arm 19, which is connected with the closer-rod 13 by the rod 20, pivoted, respectively, to these parts and which moves in parallelism with the rod 18. On the completion of a load the catch 14′ will be automatically lifted above the lug 15′ on the rocker-arm 15, thereby releasing the closer L, so that it can be forced vertically downward or open by the pressure of the mass within the load-receiver, the material promptly passing from the inclined sections 7 and 8 of the closer L, as shown in Fig. 4.

For shutting the closer L on the discharge of a load I provide a weight or weights, such as 25 and 26, at opposite sides of the load-receiver, the weights being formed on the free arms of the levers 27, which are fixed to the rock-shaft 28, that passes through the load-receiver, the non-counterweighted arms of said levers being pivoted to the rods 12 and 13 at their points of connection with the rods 18 and 20, respectively. On the opening of the closer L the two weights 25 and 26 will be raised, so that at the proper time when they drop they can raise or shut the closer L and also swing the rocker 16 about its axis, whereby its arm 15 may be engaged by the closer-latch L′.

The closer L, which, it will be understood, is supported for vertical movement relatively to the load-receiver, has rigidly connected therewith a closer-retarding regulator, situated within the discharge-hopper H′, located below the load-receiver G, said hopper being suitably secured within the chambered base 2. The regulator, which is designated by R, is of a shape similar to that of the closer L and is situated below the same, it being fixed to the rods 12 and 13 in some suitable manner, as by riveting. When the load is discharged by the load-receiver G, the mass will be thrown against the oppositely-inclined portions or walls 30 and 31 of hopper H′ and, rebounding, will strike the opposite inclined faces of the regulator R, (see Fig. 4,) which are disposed approximately at a right angle to the inclined portions of the hopper, whereby the regulator is made to retain sufficient of the discharged material to hold the closer L down or open for a sufficient length of time to insure the discharge of the whole load. When the material has all passed from the regulator R, the closer L is shut by the dropping of the weights 25 and 26 and then latched in the manner hereinbefore set forth. The lower end of the discharge-hopper H′ is preferably reduced somewhat, as at 32, to confine the material within the hopper temporarily, so that the resistance thereof to the action of the regulator, and hence the closer L, will be prolonged.

The stream-controller in the present case consists of a concave valve V, reciprocatory below the discharge-opening of the hopper to cover or uncover said opening, said valve being supported by links, which are connected thereto at different points, said links being preferably pivoted to the valve at points to the front and rear, respectively, of its longitudinal axis. The links are arranged in pairs, those located at the front of the valve being designated by 35 and 36 and being connected with the brackets 5 and 6, respectively, the link 35 having at its upper end the longitudinal hub 35′, which is adapted to receive pivot-screws in its ends on the bracket 5. The second pair of links, which constitute guides, are those located at the rear of the valve and which extend downward therefrom and are designated by 37 and 38, respectively, the last mentioned being pivoted to the bracket 38′ on the end frame 4 and the link 37 being secured to the short rock-arm 37′, that is supported by the bracket 37″, which forms a part of the end frame 3.

For closing the valve to cut off the stream which emerges from the hopper H the weight 39 is employed, said weight being formed at the end of the arm 40, which extends from the hub 35′, and exerting a constant valve-closing action, which, however, is limited by the weighing mechanism, the latter constituting a means for opening the valve V. The shaft 37′ carries at its outer end the short crank-arm 41, to which is pivoted the rod 42, the free end of said rod bearing against the auxiliary beam or valve-actuator B″, that is carried by the main beam B′. The auxiliary beam B″ is shiftably supported by the main

beam B′, it being pivoted to the latter at a point near the poising end thereof. The valve V being withdrawn, as represented in Fig. 2, and the free end of the rod 42 bearing against the beam mechanism, a stream of large volume will flow from the hopper H and will enter the load-receiver G, and when a certain proportion of the predetermined charge has been received by the latter it, with the beam mechanism, will descend and the auxiliary beam B″, moving away from the rod 42, will permit the weight 39 to drop, thereby swinging the valve V under the mouth of the hopper to reduce and subsequently cut off the supply-stream, the load-receiver when the valve has been closed, as indicated in Fig. 3, having a supply of material therein exceeding that determined upon for a true charge. On the discharge of the load and the return of the auxiliary beam B″ to its normal position the latter will transmit an upward thrust to the rod 42 for opening the valve V or swinging it from under the outlet of the hopper H to permit the supply to again enter the load-receiver.

It will be understood that my present invention comprehends the provision of overloading and load-reducing means, the former being operable to deliver to the load-receiver a supply of material in excess of that determined upon for a true load, the surplus being subsequently removed by the load-reducing means, said load-reducing means, in the present case, embodying as a component thereof a conveyer for forcing or positively removing the excess from the load-receiver.

The conveyer is designated by C, and it is of the "screw" type, it being located within the casing 45, the latter being cylindrical and set within the opening 46, that is formed adjacent to the upper end of the load-receiver. The shaft of the conveyer is designated by 47, and it is supported by suitable hangers that depend from the opposite ends of the casing, such shaft being passed through and preferably keyed to the longitudinal integral sleeve 48 of the conveyer.

A spout is represented at 49, situated partly around the outlet of the conveyer-casing 45, the lip of said spout being located over an auxiliary load-receiver into which the excess removed from the main load-receiver G is delivered, said auxiliary load-receiver being preferably carried by the framework, as will hereinafter appear. The conveyer-casing and the shaft thereof project into the load-receiver to facilitate the removal of material from the same when the conveyer is in action, a portion of the floor or bottom of the casing being removed, so that material can readily drop from the conveyer when it is stopped at the conclusion of the weighing operation. To insure the complete emptying of the conveyer-casing, its partial floor 50 will be supported for tilting movement relatively to the conveyer, said floor being pivoted to the lower wall of the opening 46 in the load-receiver and having the curved or concave portion 51, which fits within a concavity in the body portion of the casing. The floor 50 will be tilted or dropped on the discharge of a load, and to effect this operation I prefer to connect it with the closer L. A rod is shown at 52, pivoted, respectively, to the tilting floor 50 and to the closer L, and on the opening of the latter the floor 50 will be promptly tripped to permit the removal of all material within the casing 45.

The driving mechanism for the conveyer C includes a clutch, such as C′, the action of one of the members thereof being preferably controlled by the weighing mechanism, whereby the conveyer can be automatically thrown into and out of action. The clutch C′ consists of two members 55 and 56, the first mentioned being affixed to the power or driving shaft 57 on the end frame 3 and the member 56 being longitudinally slidable on said shaft, so that it can be readily coupled to or uncoupled from its mate, said clutch being of ordinary construction. The shaft 57 carries the driver 58, in the form of a pulley, which can be connected by belting to a suitable motor. (Not shown.)

The shaft 47 of the conveyer C has pivoted at its outer end the coupling device 60, the opposite end of the latter being connected by a universal joint of suitable kind to the driving-shaft 57. The clutch-regulating mechanism includes two members in screw-threaded engagement, one of which is preferably connected to the clutch-actuator, the latter being designated by A.

The actuator consists of a hub or body portion 61 and a bifurcated arm 62, extending therefrom, the opposite members of said arm being furnished with projecting pins, which are located within a peripheral channel or groove on the slidable clutch member 56. The hub or body portion 61 of the clutch-actuator is secured to the longitudinally-threaded bolt or pin 63, that is seated and movable within the internally-threaded sleeve or nut 64, situated in an opening in the end frame 3 at a point just below the shaft 57. When the sleeve or nut 64 is turned or rotated by suitable means, it will be evident that the threaded bolt 63 will be moved into or out of the same, according to the direction in which the said sleeve may be turned, means being provided to prevent the endwise or longitudinal movement of the sleeve when it is thus turned. The sleeve 64 has at its inner end the annular stop-shoulder 65, a pair of stop-rings, as 66 and 66′, being driven over the opposite end of the sleeve and in contact with the frame, so that the longitudinal movement of the sleeve will be prevented. The means in the present case for turning the sleeve or nut 64 consists of a counterweighted arm 67, the action of which is controlled by the weighing mechanism, said arm being preferably cast integral with the sleeve or nut 64.

The arm 67 is pivoted at 68′ to the recipro-

catory rod 68, the free end of the latter bearing against the auxiliary beam B″, said rod being connected, preferably, by a guide-link to the framework. When the valve V is open, as represented in Fig. 2, a comparatively large stream of material will gravitate from the hopper H into the empty load-receiver to overload the same, and when a certain quantity has been received by said load-receiver it, with the beam mechanism, will descend, the auxiliary beam B″ moving away from the reciprocatory rod, which permits the counterweighted arm 67 to drop, and consequently to turn the threaded sleeve or nut 64, whereby the bolt 63 will be drawn thereinto, and the clutch member 56, through the actuator A, which is connected with said bolt 63, will be slid along the driving-shaft 57 toward the fixed clutch member 55. At about the time the weighing mechanism is near the poising-line, the load-receiver having a quantity of material approximately equal to the determined charge, the clutch member 56 will be nearly in engagement with its companion 55, so that on the further and slight descending movement of the weighing mechanism these members will be caused to engage, to thereby start the conveyer C for forcing from the load-receiver the surplus. As the load-receiver is lightened it will rise with the beam mechanism, the rod 68 and the arm 67 being also lifted to reverse the movement of the sleeve 64, and consequently to throw the clutch member 56 out of engagement with its mate, this last-mentioned operation being completed at the time the surplus has been withdrawn from the load-receiver.

As a means for receiving the surplus removed from the main load-receiver G, I provide an auxiliary load receiver or reservoir R′, which is suitably secured to a bracket, such as 70, that extends inward from the frame 3, such auxiliary load-receiver being in the form of a hopper, with its receiving end located in alinement with the discharge end 49 of the conveyer or screw casing 45, said auxiliary load-receiver being preferably valved, whereby it can contain temporarily the material withdrawn from the main load-receiver. The valve for the auxiliary load-receiver is designated by 71, and it is supported for oscillatory movement beneath the outlet of the same, it being fixed to the pivot-pin 72, that is passed through a lug on the bracket 70, said valve having fixed thereto the actuating-arm 73, that tends normally to close the same, such action, however, being limited by the pin 74 on the rod 42, which is located under said valve-closing arm.

When the various parts descend from the position shown in Fig. 2, the pin 74 will fall away from the valve-actuating arm 73 until the valve abuts against the stop-pin 75 on the auxiliary load-receiver R′, the parts continuing such movement after the valve has been thus intercepted. On the ascent of the weighing mechanism during the load-reducing period and at about the time the load is discharged the pin 74 will be nearly in contact with the arm 73. The valve 71 being closed, as shown in Fig. 3, and the conveyer C being in motion, the surplus can be removed from the load-receiver G and discharged into the auxiliary load-receiver R′. On the discharge of the load the main beams B and B′ and the load-receiver G return to their normal positions, but the return of the auxiliary beam B″ will be blocked by interlocking-stop mechanism, as will hereinafter appear, the latter being operable to hold the auxiliary beam against return to its normal position until the closer is shut. On the shutting of the closer the auxiliary beam B″ is released and can immediately drop to resume its normal position, when the stop-pin 76 thereon will reach the adjacent beam B′, and in so doing it will transfer its effect to the rod 42 to open the valve V in the manner hereinbefore set forth and at the same time to open the auxiliary valve 71 through the medium of the pin 74, engaging the arm 73, the mass contained within the auxiliary reservoir R′ being discharged into the spout 77 on the load-receiver to form the first part of a new load to be made.

The tripper for the closer-holding latch L′ is a by-pass tripper, it being in the form of a counterweighted dog pivotally supported near the upper end of the reciprocatory rod 68. (See Fig. 8.) The load-receiver has on one of its end walls the projecting bracket 78, which carries the rock-shaft 79, said rock-shaft being furnished with the oppositely-projecting arms 80 and 81, the arm 80 being connected with the arm 14″ of the latch L′ by the link 80′ and the free end of the arm 81 being disposed in the path of the by-pass tripper, which is designated by T.

The latch-tripper T is counterweighted, as at 82, and is furnished with a pin 83, which normally bears against the rod 68, it being maintained in such position by said counterweight 82. The tripper T also has the arm 84, which has a lug 85 thereon, the inside face 86 of which is curved. At the commencement of operation the lug 85 will be situated at a point above the free end of the arm 81, as shown in Fig. 2. As the weighing mechanism descends the tripper T will be carried downward therewith until the curved face 86 of the lug meets the said arm 81, whereby said tripper will be forced sidewise in the direction of the arrow, Fig. 8, so that it can pass below the arm 81, as represented in Fig. 3, without affecting the latch L′. On the upstroke of the weighing mechanism and when the load has reached completion the tripper T will impinge against the rock-arm 81 and, through the intermediate connections, will lift the weighted arm 14 of the latch and disengage its catch 14′ from the coöperating lug 15′ on the rocker-arm 15, whereby the closer L will be released and can be forced downward in the manner hereinbefore set forth. (See Fig. 4.)

In connection with the stream-controller or valve V and the closer L, I provide a pair of reciprocally-effective interlocking stops, one of which is intended to block the action of the other and consequently of the member with which it is coöperative. The rocker 16, which is in the form of an open or skeleton segment, constitutes one of said stops, the coöperating stop being designated by 90 and being similar in construction to the stop 16, it being fixed to the hub 35′. The operation of the two stops will be evident from an inspection of Figs. 2 and 4 of the drawings. The closer L being shut and the valve being open, as indicated in Fig. 2, the stop or segment 16 will be adjacent to the curved face of the coöperating stop-segment 90, this relation continuing so long as the valve V is open, so that should the latch L′ be tripped prematurely the stop 90 will block the oscillation of its companion and hence will hold the closer L against movement. As the valve shuts, the stop 90 will be swung upward simultaneously therewith, so that when it is fully closed it will have been caused to cross the plane of curvature of the stop 16, as shown at Fig. 4. When the latch L′ is tripped, the closer L will be promptly forced open and the stop 16 will be swung about its axis with its curved face substantially in contact with the stop 90, whereby retractive movement of the latter, and hence of the valve V, is prevented, this relation continuing so long as the closer L is open.

It will be understood, also, that while the load-receiver G and the main beams B and B′ can return promptly to their normal positions on the discharge of a load such movement of the auxiliary beam B″ will be prevented by the closer-operative interlocking stop 16 acting through the stop 90 and the intervening connections between said stop and the auxiliary beam. When, however, the closer is shut and latched, the auxiliary beam B″ is immediately caused to return to its primary position, and in so doing the rod 42 is forced upward thereby and is caused to open the main valve V and the auxiliary valve 71, whereby as the latter is opened the material within the auxiliary reservoir R′ is discharged into the main load-receiver G through the spout 77.

The operation of the hereinbefore-described machine, briefly stated, is as follows: Fig. 2 represents the positions occupied by the various parts at the commencement of operation, the closer L being shut and held in such position by the latch L′, which is in engagement with the arm 15 of the rocker 16, and the valve V being wide open a stream of material of large volume will flow from the hopper H and enter the load-receiver to overload the same. When a certain quantity of material has been received by the weighing mechanism, it will descend, and the auxiliary beam B″, moving away from the rod 42, will permit the closure of the valve by the dropping of the counterweight 39, said valve being fully closed when the load-receiver is overloaded or has received a supply of material in excess of that determined upon for a charge. As the rod 42 is moved downward the pin 74 will fall away from the counterweighted arm 73, thereby permitting the latter to drop for closing the auxiliary valve 71, the rod simultaneously descending and being pivoted at 68′ to the counterweighted arm 67 the latter will be caused to fall, and being attached to the sleeve 64 will turn the same to run the bolt 63 into said sleeve, whereby the actuator A for the clutch C′, which is connected with said bolt, can slide the clutch member 56 along the driving-shaft 57, and at about the time the weighing mechanism has passed below the poising-line the two clutch members 55 and 56 will be coupled, thereby starting the conveyer C, so that it can remove the material from the main load-receiver, which is directed into the auxiliary load-reservoir R′, the valve 71 of the latter being shut at this time, as shown in Fig. 3. As the load-receiver is lightened it will of course rise, the auxiliary beam B″ lifting the rod 68, and consequently the arm 67, so that the clutch member 56 will be slowly disengaged from the clutch member 55, this operation being completed at the time the true load is in the load-receiver.

In Fig. 2 the tripper T is represented above the rock-arm 81, but when the weighing mechanism passes below the poising-line said tripper will have descended below said arm in the manner hereinbefore specified, so that on the upstroke of the rod 68, which carries the same and which is operated from the beam mechanism, the arm 81 will be raised by said latch-tripper, thereby lifting the weighted arm 14 of the latch L′ through the intermediate connections, so that said latch will be disengaged from the arm 15 of the rocker 16 and the release of the closer L will follow, whereby the latter can be forced downward to effect the discharge of the load into the hopper H′, where the material acts on the regulator R to prolong the shutting of the closer L. On the shutting of the closer L the remaining parts of the weighing mechanism will be returned to their initial positions, and the pin 74 on the rod 42, as the weighing mechanism rises, will impinge against and lift the counterweighted arm 73, whereby the auxiliary valve 71 will be opened to permit the contents of the auxiliary receiver R′ to pass into the empty main load-receiver G.

Having described my invention, I claim—

1. The combination, with weighing mechanism including a load-receiver, of a conveyer; a casing for said conveyer, said casing being mounted on the load-receiver and having a part supported for movement relatively to the conveyer; driving mechanism for operating said conveyer during the weighing of a load, to remove material from the

load-receiver; and means for shifting said movable casing part at a predetermined point.

2. The combination, with weighing mechanism including a load-receiver, of a conveyer; a casing for said conveyer, mounted on the load-receiver, the floor of said casing being supported for tilting movement relatively to the conveyer; driving mechanism for operating said conveyer during the weighing of a load, to remove material from the load-receiver; and means for shifting the casing-floor at a predetermined point.

3. The combination, with weighing mechanism including a load-receiver, of a conveyer; a casing for said conveyer, having a tilting floor; driving mechanism for operating said conveyer during the weighing of a load, to remove material from the load-receiver; and means for shifting said tilting floor on the discharge of a load.

4. The combination, with weighing mechanism including a load-receiver provided with a closer, of a conveyer; a casing for said conveyer, mounted on the load-receiver and having a tilting floor; driving mechanism for operating said conveyer during the weighing of a load, to remove material from the load-receiver; and a connection between said tilting floor and the closer, whereby on the opening of the latter the floor will be shifted.

5. The combination, with weighing mechanism embodying a load-receiver; of a conveyer mounted on the load-receiver, for effecting the removal of material therefrom; stream-supplying means; a valve; links carrying said valve; a rod connected with the valve; driving mechanism for said conveyer; and means operative with said rod, for controlling the action of the conveyer.

6. The combination, with weighing mechanism embodying a load-receiver, of overloading and load-reducing means, the load-reducing means including a conveyer; and a casing for said conveyer, said casing having a part thereof supported for movement relatively to the conveyer.

7. The combination, with weighing mechanism including a load-receiver, of a conveyer and its driving mechanism embodying a clutch; a clutch-actuator; two members in screw-threaded engagement, one of said members being coöperative with the clutch-actuator; and means controlled by the weighing mechanism, for operating the other screw-threaded member during the weighing of a load, whereby the clutch members will be coupled to start the conveyer.

8. The combination, with weighing mechanism embodying a load-receiver, of a conveyer; driving mechanism for said conveyer, including a clutch; an actuator for said clutch; two members in screw-threaded engagement, one of said members being connected with the clutch-actuator and the other being mounted on the framework; and means controlled by the weighing mechanism, for operating said last-mentioned member during the weighing of a load.

9. The combination, with weighing mechanism including a load-receiver, of a conveyer and its driving mechanism comprehending a clutch; an actuator for said clutch; an interiorly-threaded sleeve mounted on the framework; a bolt seated in said sleeve and connected with the clutch-actuator; and means controlled by the weighing mechanism, for turning said sleeve during the weighing of a load.

10. The combination, with weighing mechanism including a load-receiver, of a conveyer mounted on the load-receiver; driving mechanism for said conveyer, including a clutch; an interiorly-threaded sleeve on the framework, furnished with means for limiting its longitudinal movement; a threaded bolt seated within said sleeve and connected with the actuator; and means controlled by the weighing mechanism, for turning said sleeve, during the weighing of a load, whereby the members of the clutch can be coupled to start the conveyer.

11. The combination, with weighing mechanism including a load-receiver, of a conveyer mounted on the load-receiver; driving mechanism for said conveyer, including a clutch; an actuator for said clutch; two members in screw-threaded engagement, one of said members being connected with the clutch-actuator and the other member being mounted on the framework; a counterweighted arm for turning said last-mentioned member; and means operative with the weighing mechanism, for controlling the action of said arm.

12. The combination, with weighing mechanism including a load-receiver, of a conveyer mounted on the load-receiver; driving mechanism for said conveyer, embodying a clutch; a clutch-actuator; two screw-threaded members in engagement, one of them being connected with the clutch-actuator and the other being carried by the framework; a counterweighted arm connected to said last-mentioned member, for turning the same; and a reciprocatory rod pivoted to said arm and controlled by the weighing mechanism.

13. The combination, with weighing mechanism including a load-receiver, of a conveyer mounted on the load-receiver; driving mechanism for said conveyer, embodying a clutch; a clutch-actuator; two members in screw-threaded engagement, one of them being connected with the clutch-actuator and the other being mounted on the framework; a counterweighted arm for turning said last-mentioned member; means including a latch, for governing the discharge of the load; and a reciprocatory rod pivoted to said counterweighted arm and controlled by the weighing mechanism, said rod being furnished with a tripper for said latch.

14. The combination, with weighing mechanism, of load-discharge means therefor em-

bodying a latch; a conveyer and its driving mechanism, comprehending a clutch; an actuator for said clutch; two screw-threaded members, one of which is connected with said actuator; an arm connected with the other screw-threaded member; and a rod controlled by the weighing mechanism, said rod having a tripper for the latch and being also connected with said arm.

15. The combination, with weighing mechanism including a load-receiver, of a hopper in position to supply a stream of material to the load-receiver; a valve situated below the hopper; links connected to said valve at opposite sides of one of its axes, said links projecting in reverse directions from the valve and being connected with the framework; a device for operating the valve, to stop the flow of material to the load-receiver; and means operative with the weighing mechanism, for actuating the valve.

16. The combination, with weighing mechanism including a load-receiver, of a hopper; a valve for said hopper; links extending rearwardly from the valve and at opposite sides of one of its axes, said links being attached to the framework; a shaft to which one of the links is attached; a valve-closing device mounted on said shaft; and connections between the valve and the weighing mechanism, for controlling the action of the valve.

17. The combination, with weighing mechanism including a load-receiver, of a hopper in position to supply a stream of material to the load-receiver; a valve for the hopper; a valved spout on the framework; a reciprocatory rod provided with a pin and connected with the hopper-valve and bearing against the weighing mechanism; and a counterweighted arm connected to the valve of said spout and adapted to engage said pin.

18. The combination, with weighing mechanism including a load-receiver, of a hopper in position to supply a stream of material to the load-receiver; a valve situated below the hopper; links arranged in pairs and connected to the valve at opposite sides of one of its axes, said links projecting in reverse directions from the valve and being connected to the framework; a shaft secured to one of the links and provided with a crank-arm; a rod pivoted to said crank-arm and bearing against the weighing mechanism; a valved hopper, the valve of which is furnished with an arm adapted normally to engage a pin on said rod; load-reducing means; and a second reciprocatory rod having means operative therewith for controlling the action of the load-reducing means.

19. The combination, with weighing mechanism embodying a load-receiver; of a valved spout; a conveyer mounted on the load-receiver; a hopper situated to supply material to the load-receiver; driving mechanism for the conveyer, embodying a clutch; a valve; links connected with said valve; a shaft secured to one of the links and provided with a crank-arm; a rod pivoted to said crank-arm and furnished with a pin; an arm connected with the valve of said spout and adapted normally to rest on said pin; and a second rod controlled by the weighing mechanism and having means coöperative therewith for coupling and uncoupling the members of the clutch.

20. The combination, with weighing mechanism including a load-receiver; of means embodying a latch, for governing the discharge of a load; a conveyer mounted on the load-receiver; a valved spout secured to the framework; a hopper located to deliver a stream of material to the load-receiver; a valve for said hopper; a rod connected with said valve and provided with a pin; an arm on the valve of said spout, normally engaging said pin; a conveyer mounted on the load-receiver; driving mechanism for said conveyer, comprehending a clutch; a second reciprocatory rod bearing against the weighing mechanism and having means coöperative therewith for coupling and uncoupling the members of the clutch; and a tripper for the latch, mounted on said last-mentioned rod.

21. The combination, with a load-receiver provided with a closer; of means including a latch, for holding the closer shut; a supply-hopper located to deliver a stream of material to the load-receiver; a valve for said supply-hopper; a conveyer mounted on the load-receiver; driving mechanism for said conveyer, including a clutch; a reciprocatory rod governed by the weighing mechanism and connected with the valve, said rod having a pin; a valved spout mounted on the framework, the valve thereof being furnished with an arm normally engaging said pin; a second rod furnished with a tripper for the latch, said rod being also controlled by the weighing mechanism and having means operative therewith for coupling and uncoupling the clutch; a stop connected with the valve for the hopper; and a coöperating stop connected with the closer, each of said stops being adapted to block the action of the other.

22. The combination, with weighing mechanism including a load-receiver; of overloading and load-reducing means therefor, the overloading means embodying a valve; an auxiliary load-receiver; a valve for said auxiliary load-receiver; a rod having a device for operating the auxiliary valve and connected with the first-mentioned valve; a shiftable actuator in position for imparting a stroke to said rod; a stop connected with the overload-controlling valve; and a coöperating stop mounted on the weighing mechanism.

23. The combination, with weighing mechanism including a load-receiver, of stream-supplying means; a valve having supporting-links connected thereto at different points; a shaft to which one of said links is attached; a rod coöperative, respectively, with said shaft and the weighing mechanism; means for removing material from the load-receiver;

a valved receiver; a device on said rod, for operating the valve of said receiver; an interlocking stop coöperative with the first-mentioned valve; and a coöperating interlocking stop on the weighing mechanism.

24. The combination, with weighing mechanism including a load-receiver having a discharge-outlet, of a closer consisting of two oppositely-inclined sections adapted, when shut, to fit against the similarly-shaped lower end of the load-receiver; longitudinal rods secured to opposite ends of the closer; a closer-retarding regulator fixed between said rods; and counterweighted levers mounted on the opposite ends of the load-receiver and connected, respectively, to said rods.

25. The combination, with a load-receiver having a discharge-outlet; of a closer for said outlet, supported for reciprocatory movement relatively to the load-receiver; a rod fixed to said closer; and a counterweighted lever supported on the load-receiver and connected with said rod.

26. The combination, with weighing mechanism embodying a load-receiver provided with a closer, of stream-supplying means; a valve controlled by the weighing mechanism; supporting-links for said valve, connected thereto at different points; an interlocking stop coöperative with said valve; rods fixed to said closer at opposite ends thereof; counterweighted levers mounted on the load-receiver and pivoted to said rods; a regulator fixed to said rods; and an interlocking stop coöperative with the first-mentioned interlocking stop and connected with said rods.

27. The combination, with weighing mechanism embodying a load-receiver; of overloading and load-reducing means therefor, the load-reducing means including a conveyer; driving mechanism for said conveyer, comprehending a clutch; two members in screw-threaded engagement; an actuator connected with one of said screw-threaded members; means for turning the other screw-threaded member; and a shiftable device mounted on the weighing mechanism, for controlling the action of the means that turn said screw-threaded member.

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