

No. 632,659.

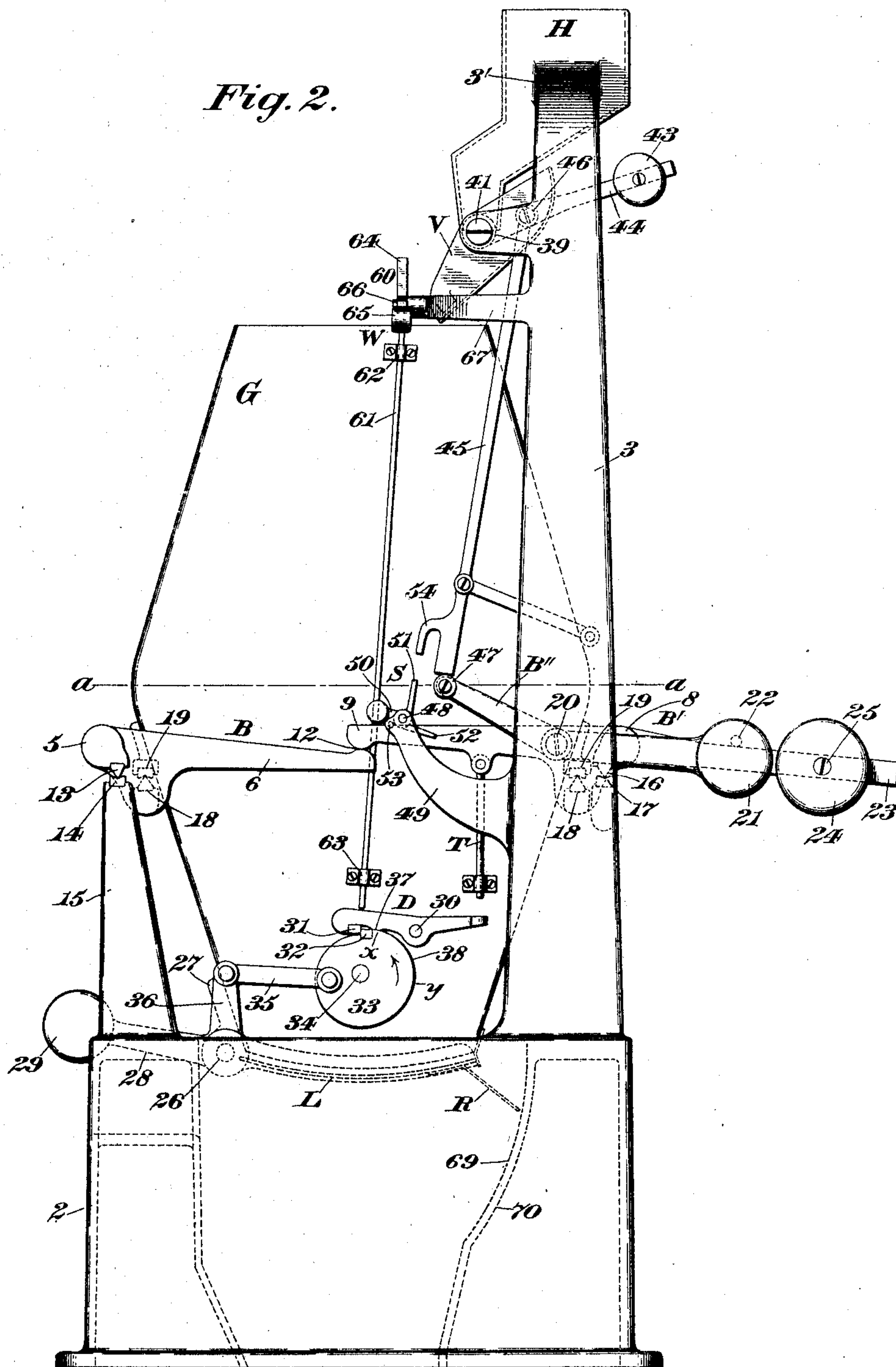
Patented Sept. 5, 1899.

F. H. RICHARDS.
WEIGHING MACHINE.

(Application filed Aug. 21, 1897.)

(No Model.)

5 Sheets—Sheet 2.



Witnesses:
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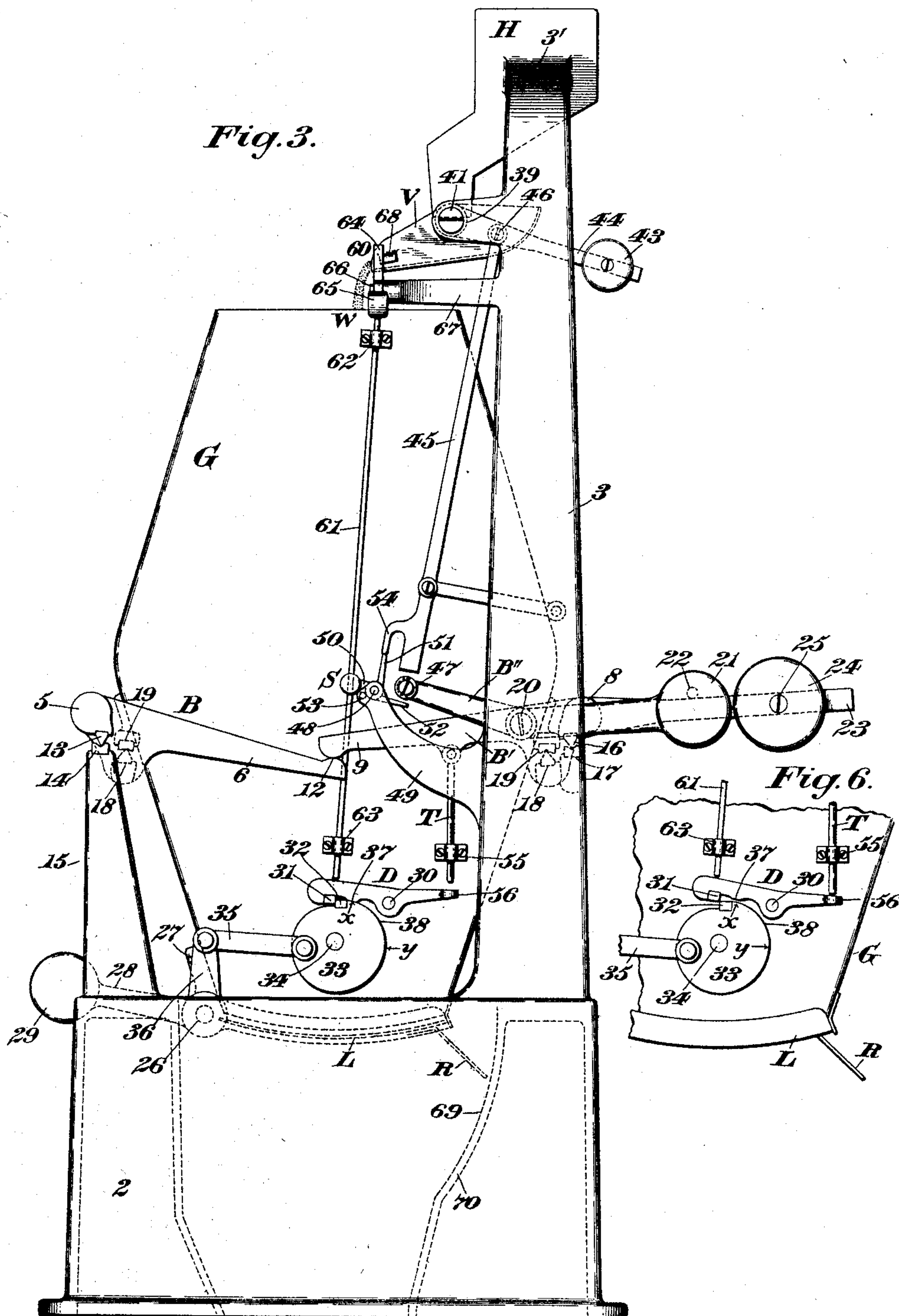
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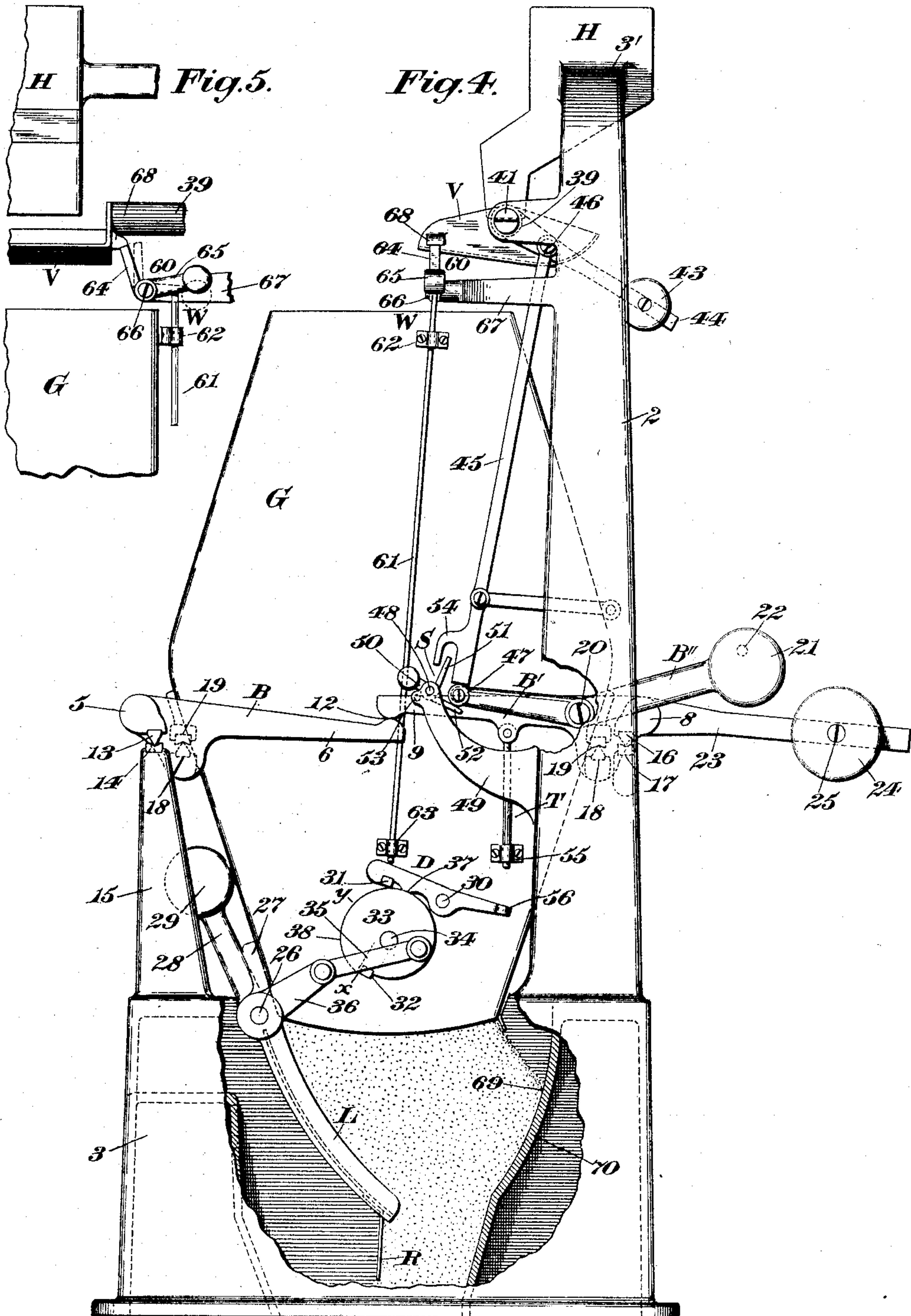
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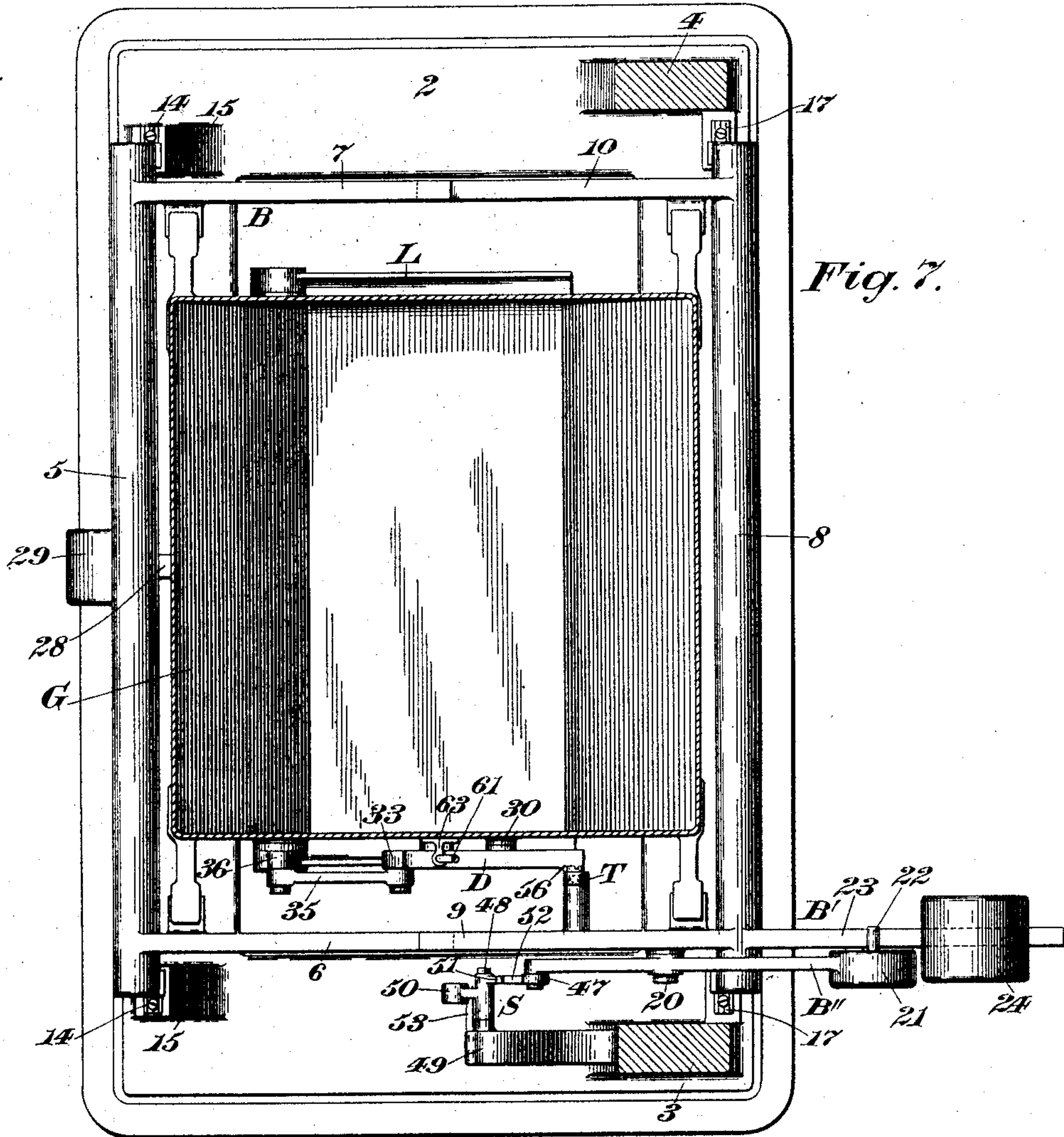


Fig. 7.

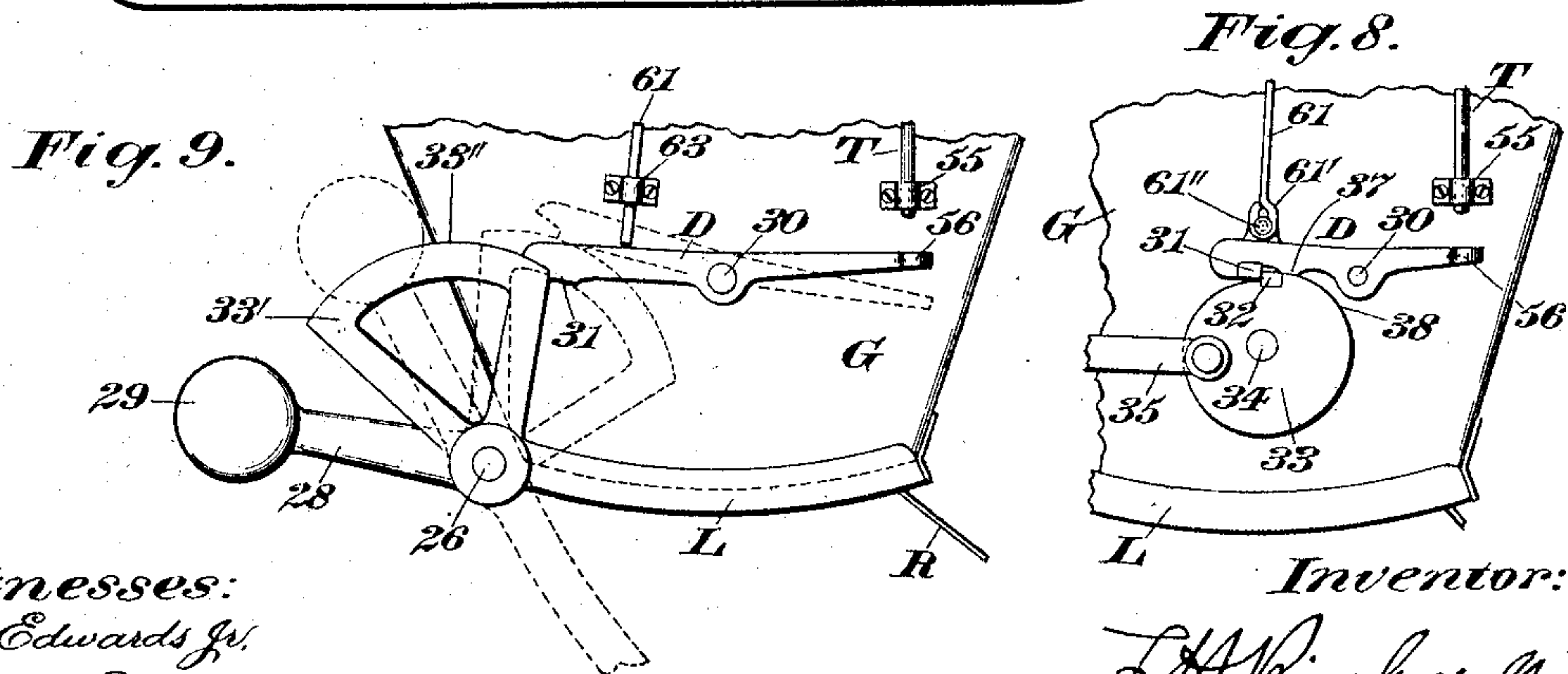


Fig. 9.

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. 632,659, dated September 5, 1899.

Application filed August 21, 1897. Serial No. 649,027. (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 kinds of granular and other free-flowing materials, the object being to provide an improved machine of the character specified and one constructed to prevent the passage of material toward the bucket when the closer-holding latch is shifted to permit the closer to open.

My improved weighing-machine embodies, preferably, valve-controlling means operable when actuated to prevent the opening of the valve and held in position by the closer-holding latch when said latch is shifted to release the closer, whereby the supply-stream or any portion thereof cannot flow into the bucket until said latch has resumed its normal position to hold the closer shut, the advantage being that the valve is not only prevented from opening while the closer is open to any extent, but is also prevented from opening until said closer is shut and is latched in its closed position.

In that form of improved machine illustrated the valve-controlling means consists of a valve-controller proper and a device which may be a thrust-rod or other intermediate contrivance located to engage the valve-controller and latch, respectively, and to be operated by said latch on the initial opening movement of the closer, so as to shift the valve-controller into a position to prevent an opening movement of the valve.

In the drawings accompanying and forming part of this specification, Figure 1 is a front elevation of my improved weighing-machine. Figs. 2, 3, and 4 are side elevations of the machine as seen from the right in Fig. 1, showing the positions occupied by the different parts during the making and discharging of a load. Fig. 5 is a detail view, in front elevation, of the valve and a portion of the controlling means therefor. Fig. 6 is a detail view, in side elevation, of the closer mechanism, including the closer-holding latch and

adjacent parts. Fig. 7 is a sectional plan view, the section being taken in the line *a a*, Fig. 2; and Figs. 8 and 9 are modifications hereinafter more particularly described.

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

The framework for supporting the several parts of the machine may be of any convenient construction, and it is represented consisting of the chambered or hollow base 2 and the side frames 3 and 4, mounted thereon, said frames having the lateral extensions 3' and 4' at the top, secured to the hopper H, of ordinary construction, which serve as a suitable means to supply the bucket of the weighing mechanism with a stream of material to build up the load therein.

The weighing mechanism consists of a load-receiver and beam mechanism therefor. The load-receiver is in the form of a hopper-shaped bucket or receptacle, as G, supported upon the main beams B and B', respectively. Each scale-beam embodies a pair of unalined arms located at opposite sides of the bucket, an arm of one of the beams being over and preferably in engagement with an arm of the other beam at one side of the bucket, and an arm of the other beam being over the complementary beam-arm at the opposite side of the bucket, whereby on the reciprocation of the latter each beam serves as a guide for the other beam. Each of the beams comprises a shaft portion and a pair of arms extending therefrom, the shaft portion of the beam B being designated by 5 and the arms thereof by 6 and 7, and the shaft portion of the beam B' by 8 and the arms by 9 and 10, said last-mentioned arms projecting in a direction opposite to that of the beam-arms 6 and 7.

On inspection of Fig. 7 it will be observed that the arm 6 of the beam B is under the arm 9 of the beam B' and that the arm 7 of said beam B is over the arm 10 of the beam B', the several arms being in engagement to accomplish the result hereinbefore set forth, and the engaging portions of the several arms being curved, as at 12, to decrease the area of contact. The shaft 5 of the beam B is provided at its opposite ends with the knife-edges 13, working against corresponding V-shaped bearings 14, secured to the upper ends of posts 15 on the base or bed 2. The shaft 8 of

the beam B' has a similar pair of knife-edges 16, resting on the bearings 17 of the side frames 3 and 4, respectively. The several beam-arms are furnished between and adjacent to their points of support with a series of knife-edges 18, which sustain V-shaped bearings 19, attached at opposite sides of the load-receiver.

The beam B' carries an auxiliary beam B'', pivoted, as at 20, to the arm 9 of the main beam B' and consisting of a lever having at its rear end the counterweight 21, serving as a part of the counterpoising means, said weight being furnished with a laterally-extending pin 22, normally or during the descent of the beam mechanism resting upon the rearwardly-disposed arm 23 of the beam B', (see Fig. 7,) said arm having the weight 24 adjustable thereon and held in a fixed position by the set-screw 25. The two weights 21 and 25 are adapted to counterpoise the loaded bucket G.

The load-receiver or bucket G has in its lower portion the usual discharge outlet or opening, which is covered by a closer L, pivoted to the lower forward side of the bucket, as at 26. The pivot 26 for the closer consists of a transverse rock-shaft on the front of the bucket, carried by the brackets 27, secured to the opposite sides of said bucket. The shaft 26 is provided with the forwardly-extending arm 28, carrying the closer-shutting weight 29 at its outer end.

Means will be provided for holding the closer shut during the load-supplying period, and said means includes, preferably, in its organization a member cooperative with the closer and a latch adapted to engage said member, one of the closer-holding parts having a curved face, or face defined by an arc, adapted to run in contact with the other part on the opening movement of the closer.

The closer-holding latch is designated by D, it being preferably a gravity-latch, so that the working end thereof may fall into engagement with a cooperating catch operative with the closer. The closer-holding latch is preferably pivoted, as at 30, to the load-receiver and has at its working end a hook or shoulder 31, adapted to engage a catch or offset 32 on a plate or disk 33 when the closer is shut, as indicated in Fig. 2, although I do not limit myself to such construction. The plate or disk 33 is pivoted, as at 34, to the bucket, and it has a link 35, eccentrically pivoted thereto and also to the crank-arm 36 on the closer-shaft or pivot 26.

To release the closer L, the right-hand arm of the latch D is preferably engaged by a suitable tripping device, so as to lift the opposite arm of said latch above the catch 32 on the disk 33. This operation takes place automatically on the completion of a load, so that the closer L will be forced open, thereby through the crank-arm 36 and link 35 turning the plate or disk about its axis in the direction of the arrow in Fig. 2, the peripheral

face of the disk as it rotates running in contact with the latch D or the lug 37 on said latch, as shown in Fig. 4, so as to elevate the same to throw the valve-controlling means into operation, as will hereinafter appear. The face 38 of the disk 33 between the points x and y is eccentric to the axis of oscillation of said disk or in the form of a cam, so that on the initial opening movement of the closer the latch will be positively elevated to throw the valve-controlling means into operation.

The chute H, hereinbefore mentioned, constitutes a convenient source of supply for delivering to the bucket G a stream of material to build up the load therein, the passage of the supply-stream being regulated or governed by a valve, as V, oscillatory below the chute to cut off the stream flowing therefrom. The valve is provided with side bars 39 and 40, having journal-openings in their opposite ends to receive the pivot-screws 41 and 42 on the side frames 3 and 4, respectively, as shown in Fig. 1.

The device represented for closing or for swinging the valve V under the mouth of the hopper H to cut off the supply consists of a valve-closing weight 43, secured near the outer end of the arm 44, which projects rearward from the bar 39 and which causes a normal valve-closing tendency, governed, however, by the beam mechanism or the auxiliary beam B'', which serves as a valve-opening actuator, and in contact with which is a rod 45, connected with the valve V. The upper end of this rod is pivoted, as at 46, to the valve-closing arm 44, the lower end of the rod bearing against the projection or roll 47 on the inner end of the beam B'', so that when said parts are in engagement the valve cannot be closed too quickly on the downstroke of the weighing mechanism by the weight 43. On the return of the auxiliary beam B'' to its normal position it imparts an upward thrust to the rod 45, which in turn is transmitted to the valve V to swing the same open, as shown in Fig. 2, thereby again to permit the supply to enter the load-receiver G.

Means are provided for intercepting and temporarily holding the valve during its advancing or closing movement and at a time when the load is nearly completed; so that a drip or reduced stream can flow from the hopper H over the valve V and from thence into the bucket for the purpose of "topping off" the load.

The valve-intercepting means embodies as a part thereof a stop, such as S, pivoted, as at 48, upon the forwardly-extending arm 49 on the side frame 2, said stop being in the form of a three-armed lever whose arms are designated, respectively, by 50, 51, and 52. The weighted arm 50 of the stop rests on the pin 53 on the frame-arm 49, thereby to hold the rod-contacting arm 51 in place to be engaged by the rod 45 or lateral projection 54 near the lower end of said rod. At the commencement of the poising period, or when the load

in the bucket G is nearly completed, the projection 54, forming a part of the rod 45, will strike the arm 51 of the stop S, as shown in Fig. 3, so that the valve is held against the closing action of its weight, whereby a reduced or drip stream may flow into the bucket to complete the load. As the drip-stream flows into the bucket it, with the poising side of the beam mechanism, will continue to descend, the working end of the auxiliary beam B'' moving away from the lower end of the rod, as shown in Fig. 3. The stop S will preferably be tripped on the completion of a load by the beam mechanism, whereby the valve V will be released, so that it can be instantly shut by the dropping of the counterweight 43. The arm 52 is disposed in the path of movement of the projection 47 on the auxiliary beam B'', so that near the close of the poising period said projection will impinge against said arm, and on the continuation of the bucket and beam movement and when the load is completed the arm 51 of the stop will be swung from under the projection 54 of rod 45, as indicated in Fig. 4, thereby releasing the valve V, following which said valve is promptly shut by the weight 43.

The closer-holding latch D, which I have hereinbefore described, is preferably tripped by the beam mechanism, the beam B' carrying a latch-tripper for this purpose. The latch-tripper is represented as a vertical reciprocatory rod or bar T, pivoted at its upper end to the poising side of the beam B' and guided at its lower end by the bracket 55, attached to the bucket. On the completion of the load the tripper will be forced rapidly downward into contact with the lug 56 on the right-hand arm of the latch, thereby raising the opposite arm of said latch above the disk or plate 33, so as to release the closer. When the latch is disengaged from the disk 33, the closer will be forced open by the weight of material in the bucket, as shown in Fig. 4, and as it opens the plate 33 will be rotated in the direction of the arrow in Fig. 2, thereby carrying the cam-face 38 of the plate into contact with the latch to elevate the same, as above stated.

In connection with a closer-holding latch such as that just described my present invention comprehends the provision of valve-controlling means operative with said latch and preferably shifted or actuated thereby into position to prevent the opening of the valve and in the present case prior to the beginning of the opening movement of the closer, so that when the latch is tripped to release the closer the valve-controlling means is immediately rendered active to perform its function, the safety period being prolonged by the latch which holds or maintains said valve-controlling means in proper position so long as said latch is in its closer-releasing position.

The valve-controlling means is designated in a general way by W, and it consists in the

present case of a valve-controller, which may be a gravity-stop 60, as shown, and a thrust device or rod 61, adapted to engage the stop 60 and latch D, respectively, (although other devices may be substituted,) so that when the latch is disengaged from the adjacent catch the disk 33 will be rotated to elevate the latch, and consequently the rod 61, to throw the stop into a position to render the valve mechanism inoperative, this advantageous result continuing so long as the latch is in its elevated position. The rod 61 rests upon the latch D and is maintained in position for reciprocation by the guides or brackets 62 and 63, secured to the load-receiver at distant points. The valve-controller (see Figs. 1 and 5) in the form represented consists of an angle-lever, the stop or detent arm 64 of which is adapted to cooperate with the valve or a catch-face thereof, the weighted stop-arm 65 returning the controller 60 to its primary position, when the latch D resumes its initial position. The controller 60 is pivoted, as at 66, to the forward arm 67 on the side frame 2, the upper end of the rod 61 being in engagement with the weighted stop-arm 65.

The right-hand end wall of the valve V (see Fig. 1) is provided with a catch-face or projection 68, adapted to be engaged by the controller 60 when the latter is operated by the latch D.

On the completion of a load the controller or stop 60 will be in the position occupied by the dotted lines in Fig. 5, it being understood, of course, that the weighted arm 65 of said stop drops with the rod 61 during the descent of the weighing mechanism. When the latch is tripped in the manner hereinbefore specified and is elevated, the rod 61, and consequently the stop 60, will be lifted a corresponding distance, and as soon as the closer is released the plate or disk 33 will be turned by said closer, so that the cam-face 38 by running in contact with the shoulder 37 on the under side of the latch will further elevate the latch, and hence the rod 61, and also the weighted arm 65 of the stop 60, thereby throwing the stop or working arm 64 under the catch-face or projection 68 on the valve V, as indicated by the full lines in Fig. 5 and also in Fig. 4, to prevent or interrupt the return or opening movement of the valve until the latch resumes its primary or closer-holding position. (Shown in Fig. 2.) When all of the material passes from the closer or a regulator connected therewith, such a regulator being usually provided, the closer will be shut by the counterweight 29, so that the disk or plate 33 is rotated in a direction opposite to that in which it turns on opening, whereby when the inner face of the catch 32 on the disk is opposite the adjacent cooperating face of the latch-hook 31 the latch D will drop to again hold the closer shut. When the latch falls into place, the rod 61 and stop 60 will resume their initial positions, they being in the form of gravity devices to insure this result.

For the purpose of retarding the return movement of the closer on the discharge of a load said closer is furnished with a regulator, such as R. The regulator R consists of an angular plate the shorter portion of which is attached to the under side of the closer L near its discharge edge or lip, the regulator as the closer shuts being preferably contiguous to but not in engagement with the curved face 69 of the wall or plate 70 in the base, the curvature of the face 69 being concentric with the axis of oscillation of the closer, so that as the latter returns to its shut position the regulator forms, in connection with said curved plate, as represented in Fig. 3, a pocket adapted to contain a quantity of material sufficient to check the shutting of the closer.

The operation of the hereinbefore-described machine is as follows: Fig. 2 represents the positions occupied by the different parts at the commencement of operation, the closer L being shut and held in such position by the latch D, which is in engagement with the disk 33, and the valve V being wide open and maintained in its wide-open position by the auxiliary beam B'', which is in contact with the free end of the rod 45, connected with said valve. The valve being wide open, a stream of large volume will enter the empty bucket G, and when a certain proportion of the load has been received the bucket and the beam mechanism will descend, so that the inner end of the auxiliary beam B'' will fall away from the rod 45, thereby permitting the valve to be closed by the dropping of the counterweight 43. At the commencement of the poising period and when the load is nearly completed the projection 54 on the rod 45 will strike the arm 51 of the valve-intercepting stop S, thereby momentarily retarding the closure of the valve. When the load is completed, the auxiliary beam B'' or the projection 47 thereof will impinge against the stop-arm 52, thereby tripping said stop and releasing the rod 45, and consequently the valve. When the valve is thus released, the weight 43 will further drop completely to shut the valve. On the completion of the load the tripper T will strike and elevate the latch D, thereby releasing the closer L, the latch D, the thrust device 61, and the stop 60 being simultaneously operated by said tripper. When the closer opens, the latch D, the device 61, and the stop 60 will be further shifted to throw said stop 60 into position in the manner and for the purpose hereinbefore set forth, this relation being continued so long as the latch is shifted. When the closer L shuts, as hereinbefore specified, the various parts, including the latch, will be free to return to their primary positions to repeat the operation.

In Fig. 8 I have illustrated a modification of the latch D and rod 61, the rod having an eye or loop 61' at its lower end which is carried on the headed pin 61'' on the upper side

of the latch D. With this exception the construction is the same as illustrated in the preceding figures.

In Fig. 9 I have shown a modification of the closer and latch mechanism, the latch D engaging the segmental or skeleton plate 33', which is fixed to the closer-shaft 26, the latch being elevated by the cam or arc face 33'' of the plate or segment 33', when said latch is tripped and the closer is opened, as represented by the dotted lines in said figure. With this exception the closer and latch mechanism is similar to that illustrated in the principal views.

Having described my invention, I claim—

1. The combination, with weighing mechanism involving a load-receiver, of a closer; closer-holding means including a latch and an independent catch device coöperative with the closer and constructed to raise said latch on the opening of the closer; a valve; and valve-controlling means supported and shiftable by the latch to prevent the operation of the valve.

2. The combination, with a bucket having a closer, of closer-holding means embodying a member mounted independently of the closer and connected thereto and having a catch and coöperative with said closer and a latch adapted to engage said member, one of said closer-holding parts having a cam-face adapted to be engaged by the other closer-holding part on the opening of said closer; a valve; and valve-controlling means shiftable into position by the latch to prevent an opening movement of the valve.

3. The combination, with a bucket having a closer, of closer-holding means embodying a member mounted independently of the closer and coöperative with said closer and a latch adapted to engage said member, one of said closer-holding parts having a cam-face adapted to be engaged by the other closer-holding part on the opening movement of said closer; a valve; and means shiftable into position by the latch to prevent an opening movement of the valve.

4. The combination, with a bucket having a closer, of a member having a catch and mounted on the bucket and connected with the closer; a latch adapted to engage said member and to be lifted thereby on the opening of the closer; a valve; and valve-controlling means shiftable by the latch into position to prevent an opening movement of the valve.

5. The combination, with a bucket having a closer, of a member mounted independently of and connected with the closer and having a cam-face and also provided with a catch; a latch adapted to engage said catch; means for raising the latch, thereby to release the closer, the cam-face of said member upholding the latch; a valve; and valve-controlling means shiftable by the latch into position to prevent an opening movement of the valve.

6. The combination, with a bucket having a closer, of a disk pivoted to said bucket; a connection between the closer and the disk; a latch in position to engage a catch on the disk; a valve; and valve-controlling means shiftable by the latch into position to prevent an opening movement of the valve.

7. The combination, with a bucket having a closer provided with a crank-arm, of a member on the bucket connected with the crank-arm by a link, said member having a cam-face and also having a catch; a latch on the bucket, located to engage said catch; means for raising the latch on the completion of a load; a valve; and valve-controlling means shiftable by the latch into position to prevent the valve from opening.

8. The combination, with a load-receiver and with a valve mechanism therefor, said valve mechanism being located above said load-receiver, of a closer for the load-receiver; beam mechanism; a latch for the closer, said latch being located adjacent to a catch for the closer; a valve-controller operative with the latch and adapted for preventing the opening movement of the valve while the latch is raised above its normal closer-holding position; means operated by the beam mechanism for moving the latch out of its closer-holding position independently of the movement of the closer; means operative with the closer for holding the latch in its valve-controlling position while the closer is in its open position; and a rod intermediate the latch and the valve-controller for transferring the effect of the latter to the former.

9. The combination, with weighing mechanism embodying a bucket having a closer, of closer-holding means including a latch; a valve; means for raising said latch, thereby to release the closer; a rod in position to be lifted by the latch when the latter is raised; and a gravity valve-controller shiftable by said rod when the latter is lifted by the latch.

10. The combination, with weighing mechanism embodying a bucket having a closer and beam mechanism, of closer-holding means including a latch; a valve; means actuated by the beam mechanism for raising said latch, thereby to release the closer; a rod in position to be lifted by the latch when the latter is raised; and a valve-controlling lever shift-

able by said rod when the latter is lifted by the latch.

11. The combination of a load-receiver; a supply-valve; a rod cooperative with the valve; means for engaging said rod to actuate the valve; and a stop on the framework, disposed in the path of movement of said rod and acting directly to engage said rod for arresting the advancing movement of the same and also of the valve.

12. The combination, with a load-receiver, of beam mechanism therefor; a supply-valve; a rod cooperative with the valve and located to be engaged by the beam mechanism to open said valve on the upstroke of the beam mechanism; and a stop disposed in the path of movement of the rod and acting to arrest the movement of the same and also of the valve, said stop being located to be tripped by the beam mechanism on the completion of a load.

13. The combination, with a load-receiver, of beam mechanism therefor; a rod cooperative with the valve and located to be engaged by the beam mechanism on the upstroke thereof to open the valve; and a stop having two arms, one of which is disposed in the path of movement of, and is engaged by, said rod, and the other of which is engaged by the beam mechanism to trip said stop.

14. The combination, with a load-receiver, of beam mechanism therefor; a rod cooperative with the valve and located to be engaged by the beam mechanism on the upstroke thereof to open the valve; and a stop having three arms, one of which is weighted, another of which is disposed in the path of movement of, and is engaged by, said rod, and the other of which is engaged by the beam mechanism to shift said stop.

15. The combination, with weighing mechanism embodying a bucket having a closer, of closer-holding means including a catch and a latch; means controlled by the beam mechanism for tripping said latch; a valve; a valve-controller; and a rod connected to the latch and in position to operate the valve-controller when the latch is actuated.

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