

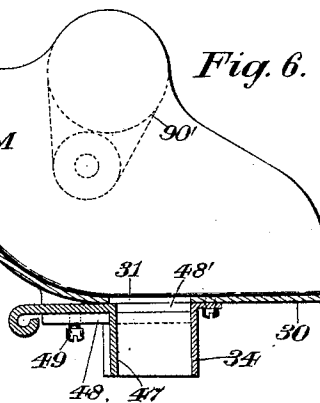
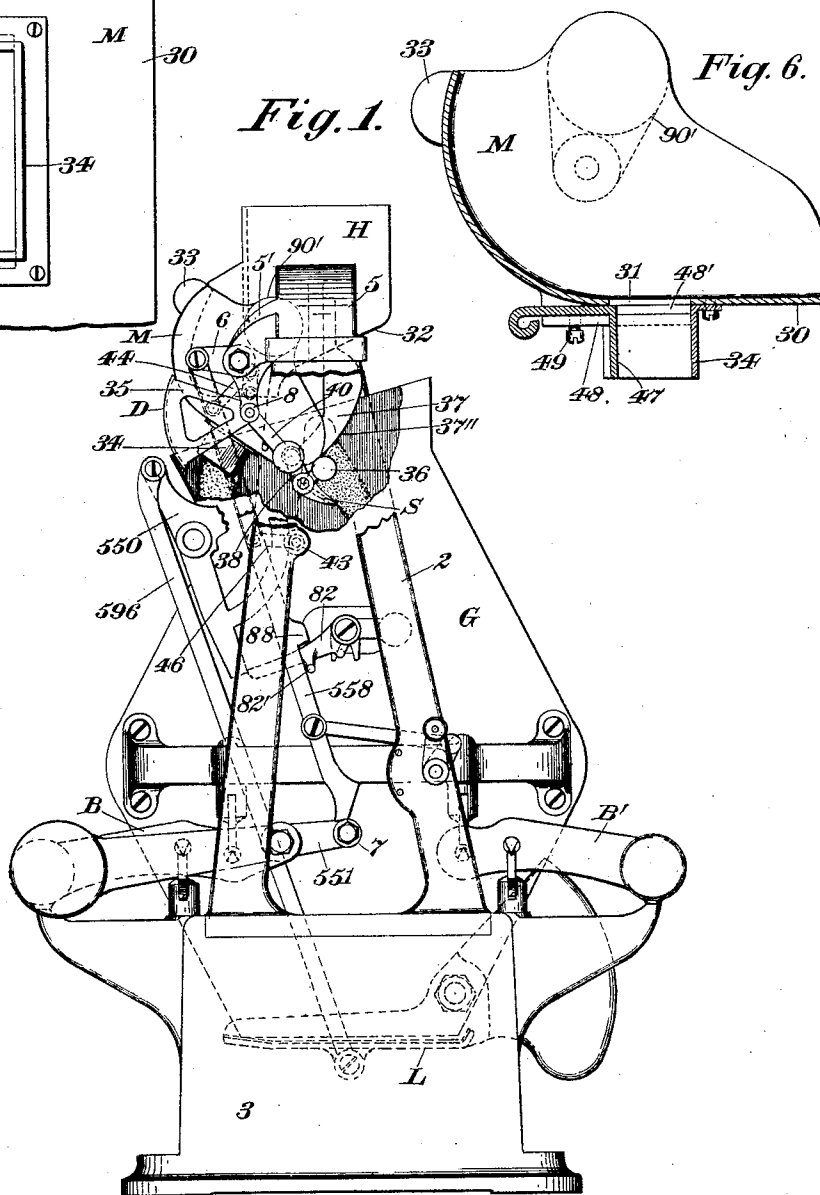
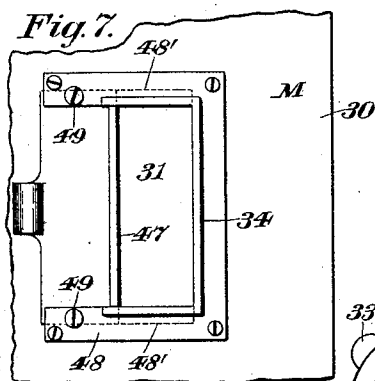
(No Model.)

3 Sheets—Sheet 1.

F. H. RICHARDS.  
WEIGHING MACHINE.

No. 570,296.

Patented Oct. 27, 1896.



Witnesses:

R. W. Pittman  
Fred. J. Gole.

Inventor:

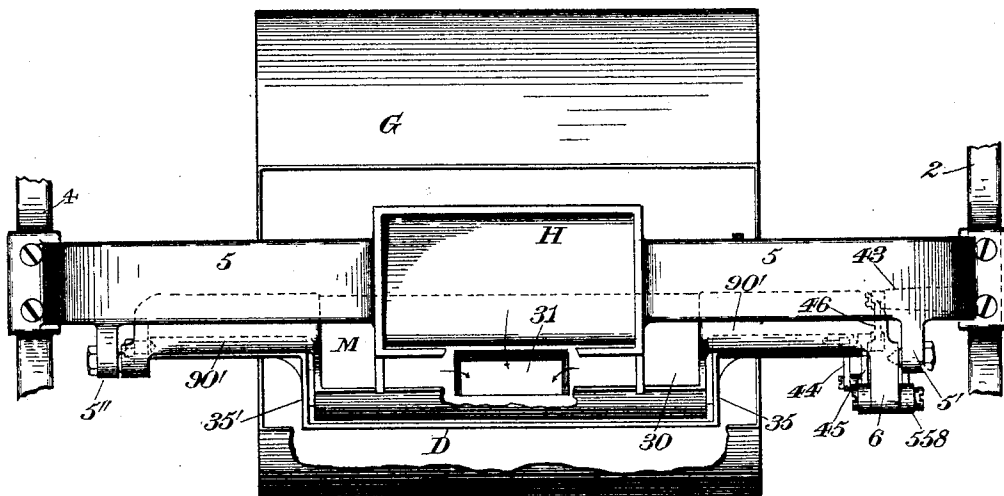
F. H. Richards.

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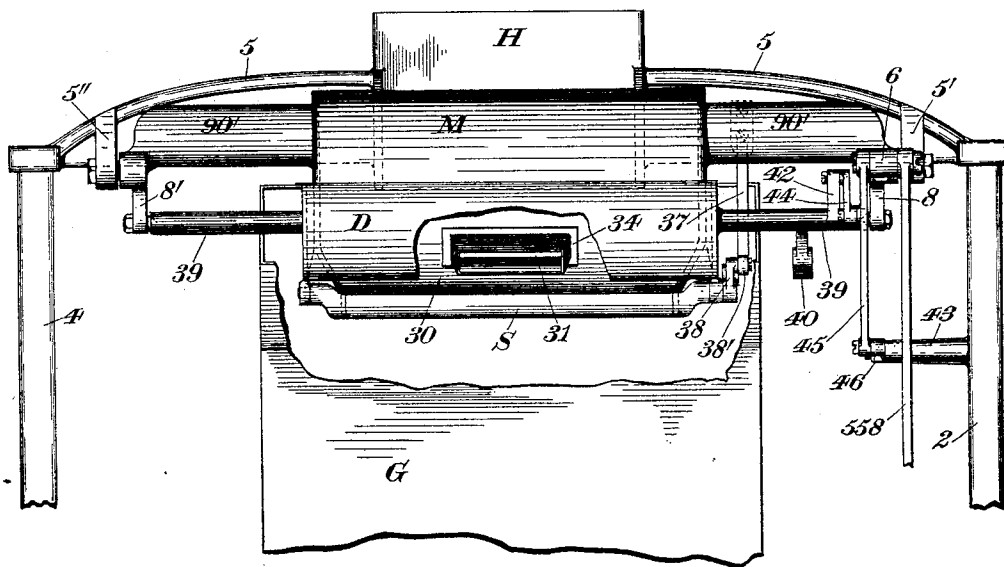
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*Fig. 2.*



*Fig. 3.*



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# UNITED STATES PATENT OFFICE.

FRANCIS H. RICHARDS, OF HARTFORD, CONNECTICUT.

## WEIGHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 570,296, dated October 27, 1896.

Application filed June 4, 1896. Serial No. 594,249. (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, one of the objects being to provide an improved organization of valve mechanism operable to insure a perfect control of the supply-stream at all points in the operation of the machine.

An additional object is the provision of means operative in conjunction with the valve mechanism for adapting the machine to the weighing of materials of different classes with exactness and precision.

In the drawings accompanying and forming part of this specification, Figure 1 is a right-hand end elevation of a weighing-machine comprising my present improvements in their preferred embodiment, the main and the drip valves being in open positions to permit the flow of the full volume of the supply stream into the bucket. Fig. 2 is a plan view on an enlarged scale of the upper part of the machine, with parts broken away to illustrate more clearly certain peculiarities of my present invention. Fig. 3 is a rear elevation of the same, parts being broken away. Figs. 4 and 5 are end elevations as seen from the right in Fig. 2, and show the positions occupied by the main and the drip valves at the commencement and close of the poising period, respectively. Fig. 6 is a central vertical section of one of the valves equipped with means for varying the volume of the drip-stream; and Fig. 7 is a bottom view of a fragment of said valve and also illustrates the drip-stream-regulating means.

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

My present improvements are adapted for use in connection with various types of weighing-machines, but for convenience in illustrating the peculiar nature thereof they are herein illustrated applied to a weighing-machine of the kind disclosed in Letters Patent No. 548,840, granted to me October 29, 1895, to which reference may be had.

The framework for supporting the operative parts of the machine may be of any suitable or preferred construction, and it is herein illustrated comprising the side frames or columns 2 and 4, mounted upon the chambered supporting-base 3 and connected at the top by the plate or beam 5. Said plate or beam is herein shown having formed therewith the chute or hopper H, which contains the mass of material to be weighed, and the peculiar coaction of said chute with the valve mechanism will be hereinafter clearly set forth.

The beam mechanism comprises the oppositely-disposed counterweighted scale-beams B and B', respectively, mounted upon the chambered supporting-base 3 in the usual manner, and provided with bucket-supports at suitable points thereon for supporting the bucket mechanism, which consists of the bucket G and the operative parts.

The bucket G is provided with the closer L, pivotally supported at one side of the discharge-outlet of said bucket, and furnished with suitable means for returning it to its closed or normal position. As a means for supporting said closer an inverted toggle is herein shown, consisting of the rocker 550, (part thereof being broken away,) pivotally supported adjacent to the upper rearward side of the bucket, and the connecting-rod 596, pivoted to said rocker and also to the closer in such a manner that when the latter is in its normal position, as indicated, the three pivots will be virtually in line.

For engaging the rocker whereby the bucket-closer L may be held against opening movement, a counterweighted latch 82 is herein illustrated, said latch being pivotally supported on the bucket G and having a detent for engaging a cooperating detent on the rocker 550 when the closer is shut. In the embodiment illustrated the closer-latch 82 swings upward to engage the rocker 550, and it is evident that it will be released therefrom by a downward pressure, suitable means, to be hereinafter described, being employed for effecting such action.

As a means for controlling the supply-stream which emerges from the chute or hopper H, a valve in the nature of a multiplex valve is illustrated, the same consisting of a

main valve M, a supplemental valve S, and a drip-valve D. The first-mentioned valve constitutes a stream-controller, the supplemental valve serving as a means for cutting off the main stream coincident with the commencement of the poising period, and the drip-valve controlling the flow of the drip or reduced stream issuing from a drip-opening suitably formed in said main valve.

The main valve M, except as hereinafter specified, is similar in construction and mode of operation to the improved valve shown and described in Letters Patent No. 535,727, granted to me March 12, 1895, to which reference may be had.

The valve M is shown pivotally supported for oscillatory movement beneath the supply opening or outlet of the chute or hopper H, and by and between the arms or brackets 5' and 5'', depending from the top plate 5. The bottom plate 30 of the main valve M is illustrated having formed therein the drip-opening 31, (see Fig. 2,) which may be of any suitable shape and size, it being herein shown rectangular. This opening 31 will be preferably situated at a point forward of the plane of inclination of the front or stream-directing wall 32 of the chute H, so that on the descent of separated particles of material from a point above the chute, and when these strike said front wall they will be directed toward the rear of the valve M, following the course of the dotted line *a*, (see Fig. 4,) and away from the drip-opening 31, as, if they pass through said opening and strike the empty valve D, they will rebound with such force as to be wasted. Again, by virtue of such a location of the drip-opening 31, the substance which composes the drip-stream will be taken from a mass of material which is practically in repose thereon, the force of which has been spent in striking the rear of the valve in the manner just stated. By reason also of such a location of the drip-opening the capacity of the machine will be materially increased, attended by a minimum expenditure of power to effect the closure of said valve M.

The valve M is herein illustrated as being a "self-closing" valve, the counterweight 33, (see Fig. 1,) suitably attached to said valve at a point to the rear of its axis of oscillation, being illustrated for this purpose, though it is to be understood that the invention is not to be so limited, as other means may be employed, among which may be mentioned, for example, the improved valve-closing mechanism set forth in Letters Patent No. 548,843, granted to me October 29, 1895.

As a means for actuating the valve M to open the same, the mechanism disclosed in the Letters Patent first hereinbefore referred to may be employed, and, being illustrated, will now be briefly described.

The valve M will be preferably balanced, so that when in its closed position (indicated in Fig. 5) it has no tendency in itself to either

open or close the balance-weight 90', forming a part of said valve, and consisting of two arms laterally extending from the end walls thereof serving for this purpose.

A relatively long rod is shown at 558, it being operatively connected with the valve and illustrated herein pivoted to the ear or lug 6, projecting rearward from the balance-weight 90', said rod being also in position to receive an upward thrust from a suitable actuator, which in turn is transmitted to the valve for effecting the opening movement thereof.

The scale-beam B is illustrated shiftably supporting the counterweighted lever 551, which is pivoted thereto at a point adjacent the inner end thereof, the counterweight of said lever normally exerting its force on the counterpoise side of the scale-beam B, said lever being preferably furnished at its inner end with a projection or antifriction-roll 7, with which the free end of the rod 558 is normally in contact.

The valve M being in its open position, as shown in Fig. 1, the full volume of the supply-stream may flow into the empty bucket, and when a certain proportion of the load has been received by the latter said bucket, and hence the beam mechanism, will descend, the shiftable lever 551 descending in unison therewith and falling from under the connecting-rod 558, thereby permitting the closing movement of the valve M by the counterweight 33.

At a predetermined point in the operation of the machine, and subsequently to the final closing movement of the valve M, the lever 551 is shifted about its axis, and on the return thereof to its normal position an upward thrust will be imparted to said rod and communicated to the valve M at a point to the rear of its center of movement for opening said valve in the manner specified in Letters Patent first hereinbefore mentioned.

A drip-conduit is shown at 34, it being illustrated in Figs. 1 to 5, inclusive, as tubular and having a flange at its upper edge by which it may be attached to the under surface of the bottom plate 30 of the main valve M, the bore of said conduit registering with the drip opening or aperture 31, to which allusion has been hereinbefore made, and being preferably of a cross-sectional shape corresponding with said drip-opening. The drip-conduit serves as a convenient means for guiding the drip-stream as it flows from the opening 31, evenly distributing it in the bucket on the oscillation of the valve M, as will be readily obvious.

The drip-valve D is supported for oscillatory movement beneath the outlet of the conduit 34, and on such movement under said opening it will be evident that the drip-stream will be at first reduced in volume and subsequently cut off by said valve D. The valve D is shown consisting of a curved or segmental plate having end pieces 35 and 35'—the upper ends of the latter being suitably

pivoted between the lugs or ears 8 and 8'—extending from the balance-weight 90' at the opposite ends thereof. The means herein illustrated for actuating the drip-valve will be hereinafter described.

On the upward oscillation or closing movement of the valve M it will be evident that the main stream which flows from the chute II over plate 30 of said valve and over the discharge edge thereof will be gradually reduced, and when said valve has reached a predetermined point in its operation, or at the commencement of the poising period of the machine, said valve occupying substantially the position indicated by Fig. 4, the result will be the flow of a very fine stream of material, the latter being practically in the form of a drizzle, which it is desirable to check or stop. For this purpose the supplemental valve S is provided, it consisting of an approximately flat plate or blade pivotally supported at the discharge edge of the main valve M and being disposed during the major part of the operation of the machine substantially in alinement with the valve-plate 30, so as to permit the flow of the main stream into the bucket without material obstruction, as shown in Fig. 1. Said valve S will be furnished with suitable journals working in brackets suitably connected to the end walls of the valve M, and will also be equipped with means for normally maintaining it in its open position, the counterweighted arm 36, connected to one of said valve-journals, being shown for the purpose.

As a means for effecting an upward shifting or closing movement of the valve S, which acts as a main-stream cut-off, a cam 37, preferably supported by the framing, is herein illustrated, said cam having two faces 37' and 37'', the first mentioned of which is adapted for effecting the closing movement of said valve and the other face serving practically as a stop-face for preventing retractive movement of said valve on the final closure thereof.

The right-hand journal of the valve S is illustrated having rigidly fixed thereon the crank-arm 38, preferably formed integral with the counterweighted arm 36. The arm 38 is shown carrying the antifriction-roll 38' contiguous to the cam-face 37'. The normal position of the valve mechanism is indicated in Fig. 1, the supplemental valve S being approximately in alinement with the valve-plate 30, so that a stream of material emerging from the chute II may flow over said valves and be discharged into the bucket. On the closing movement of the valve M by the counterweight 33 in the manner previously described the antifriction-roll 38' by riding in contact with the cam-face 37' will cause an upward shifting of the valve S through the force of said valve M in closing, and when the roll has reached the end of said cam-face 37' the complete closure of the supplemental valve S will be the result. When the roll 38' leaves the cam-face 37', it

will enter or engage the cam-face 37'', and the supplemental valve will be thereby maintained positively in its closed position. On the opening movement of the main valve M the operation just described will be reversed, whereby said cam 37 is operable for opening the supplemental valve S, as will be readily understood.

It will be remembered that a drip-valve D has been hereinbefore described for controlling the drip-stream which issues from the drip-opening 31 in the bottom plate of the valve M, said valve having a movement beneath said opening for causing or preventing a flow of the drip-stream. Said valve D is shown supported for rocking movement by the two-part shaft 39, the outer ends of said shaft having formed therein suitable bearings for the reception of pivot-screws or other journals connected to the ears or lugs 8 and 8', respectively, of the balance-weight 90'. For opening the drip-valve D and maintaining it normally in an open position a counterweighted arm 40 is illustrated, said arm extending forward from, and being preferably formed integral with, the supporting-shaft 39.

As a means for swinging the valve D beneath the outlet of the drip-conduit 34, the following-described instrumentalities may be employed: The shaft 39 is illustrated having formed thereon the arm 42, to which is operatively connected one member of a toggle, the other member of said toggle being connected to the projection 43, extending inward from the side frame 2. The toggle herein illustrated consists of the links 44 and 45, the first mentioned being pivoted to the arm 42 and the other to the link 46, which latter in turn is likewise connected to the projection 43. The link 45 is also pivoted to the ear or lug 6, to which reference has been hereinbefore made, extending rearward from the balance-weight 90', said balance-weight on the closing movement of the valve M tending to throw the three toggle-pivots into line, whereby the closure of the drip-valve D may be obtained.

Fig. 1 represents the normal positions of the various valves, these being in the full open positions thereof and the toggle-pivots being relatively out of line. On the closure of the main valve M a force will be transmitted thereby to the toggle through the power of the closing main valve M, as will be obvious, such action tending to move the three toggle-pivots into alinement, and concurrently therewith closing the drip-valve D under the discharge-outlet of the drip-conduit 34 for gradually reducing in volume the drip-stream, and subsequently, and on the completion of a bucket load, completely cutting off said stream, as indicated in Figs. 4 and 5.

In Figs. 6 and 7 means are illustrated for regulating the volume of the drip-stream which flows from the drip-opening 31, whereby the machine is adapted to the successful

weighing of materials possessing different characteristics. The drip-conduit 34 is shown having three walls and a regulable rear wall 47, consisting in the present instance of a right-angled plate. The flange 48 of said drip-conduit, and by which it is attached to the under surface of the valve M, is shown having formed therein the groove or channel 48', the upper portion of the plate 48 having a suitable tongue or rib seated in said groove or channel 48'. By moving the plate 47 inward or outward the volume of the drip-stream may be correspondingly varied, as will be clearly understood. A set-screw 49, passing through the flange 48, is illustrated, it being adapted to bear against the upper portion of the plate 47 to hold the same in an adjusted position.

It will be remembered that a latch 82 has been hereinbefore described as operative for maintaining the closer L in its normal position by engaging the rocker 550, said latch being also depressible. For tripping the latch, the thrust-rod 558 is equipped with a projection 88, which has a descending movement on the closure of the valve M, and at a point succeeding the cut-off of the supply stream said projection will be moved into contact with a pin 82' on said latch, thereby depressing the same and releasing the rocker 550 and also the closer L, whereby the latter may be forced open by the bucket contents to cause a discharge thereof, all in the manner disclosed in the prior patent first hereinbefore mentioned.

Having described my invention, I claim—

1. The combination with a chute having an inclined stream-directing wall, of a valve therefor having a bottom plate provided with a drip-opening situated at a point forward of the plane of inclination of said stream-directing wall, and a valve operable for controlling a stream of material issuing from said drip-opening.

2. The combination with a chute, of a main valve therefor, said valve having a bottom plate provided with a drip-opening; and a supplemental valve supported adjacent to the discharge edge of said main valve.

3. The combination with a chute, of a main valve, said valve having a bottom plate provided with an opening; a supplemental valve

supported adjacent to the discharge edge of said main valve; and a drip-valve operable for controlling a stream of material issuing from said opening.

4. The combination with a chute having an inclined stream-directing wall, of a valve for said chute, said valve having a drip-opening located forward of the plane of inclination of said wall.

5. The combination with the framework, of a chute; a valve therefor, said valve having a drip-opening; a drip-valve operative for controlling a drip-stream issuing from said opening; and a toggle operatively connected to said drip-valve and to said framework.

6. The combination with a framework having a chute supported thereby and also having a projection, of a valve for said chute having a drip-opening; a drip-valve; and a toggle operatively connected to said drip-valve and projection.

7. The combination with a chute, of a main valve therefor, said valve having a drip-opening; a drip-valve; and a toggle operatively connected to said drip-valve and having one of the toggle members also connected with said main valve.

8. The combination with a chute, of a main valve therefor having a drip-opening in the bottom plate thereof; a supplemental valve supported adjacent to the discharge edge of said main valve; a drip-valve operable for controlling a stream of material issuing from said opening; and a toggle operatively connected to said drip-valve.

9. The combination with a chute, of a valve therefor having a drip-conduit provided with a regulable wall.

10. The combination with a chute, of a valve therefor having a drip-conduit provided with a regulable wall; and means for maintaining said wall in an adjusted position.

11. The combination with a chute, of a valve therefor; a drip-conduit provided with a regulable wall; a slide to which said wall is attached; and means for securing said slide in its adjusted position.

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Witnesses:

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