(No Model.) 2 Sheets—Sheet 1.

# F. H. RICHARDS.

## WEIGHING MACHINE.

No. 559,215. Patented Apr. 28, 1896.

*Fig. 1.*

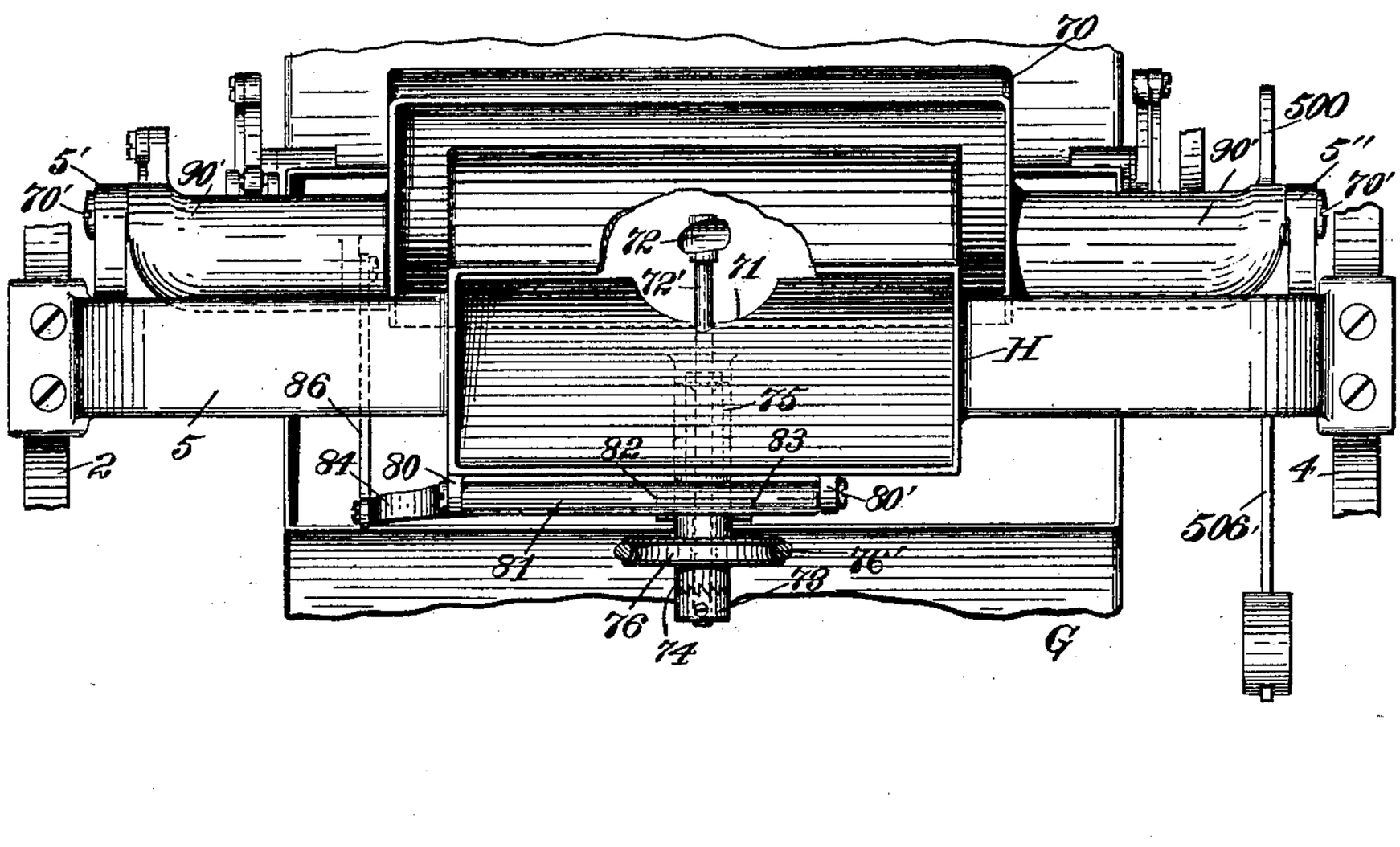
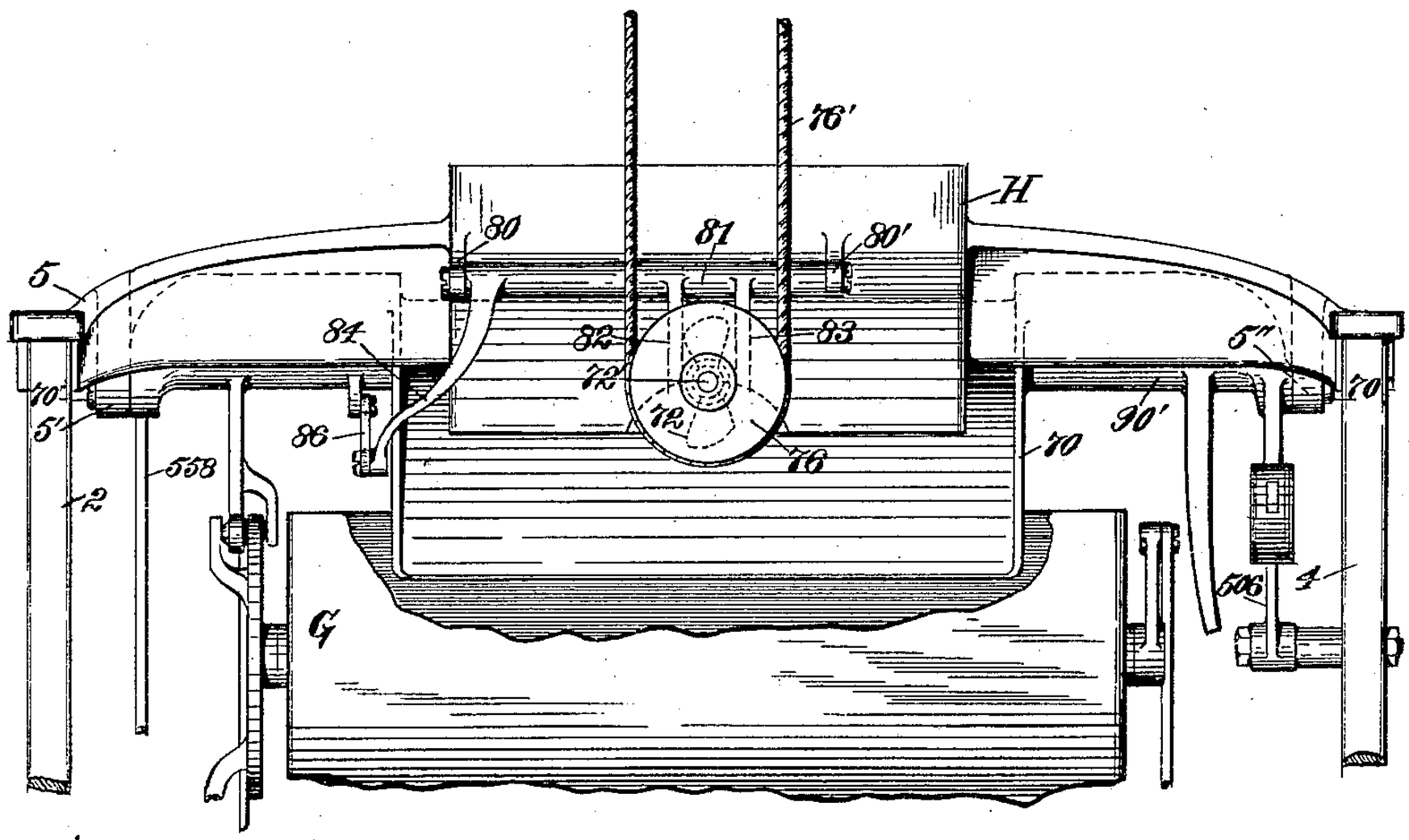



*Fig. 2.*




Witnesses:
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Inventor
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(No Model.)

2 Sheets—Sheet 2.

# F. H. RICHARDS.

## WEIGHING MACHINE.

No. 559,215. Patented Apr. 28, 1896.

Fig. 4.

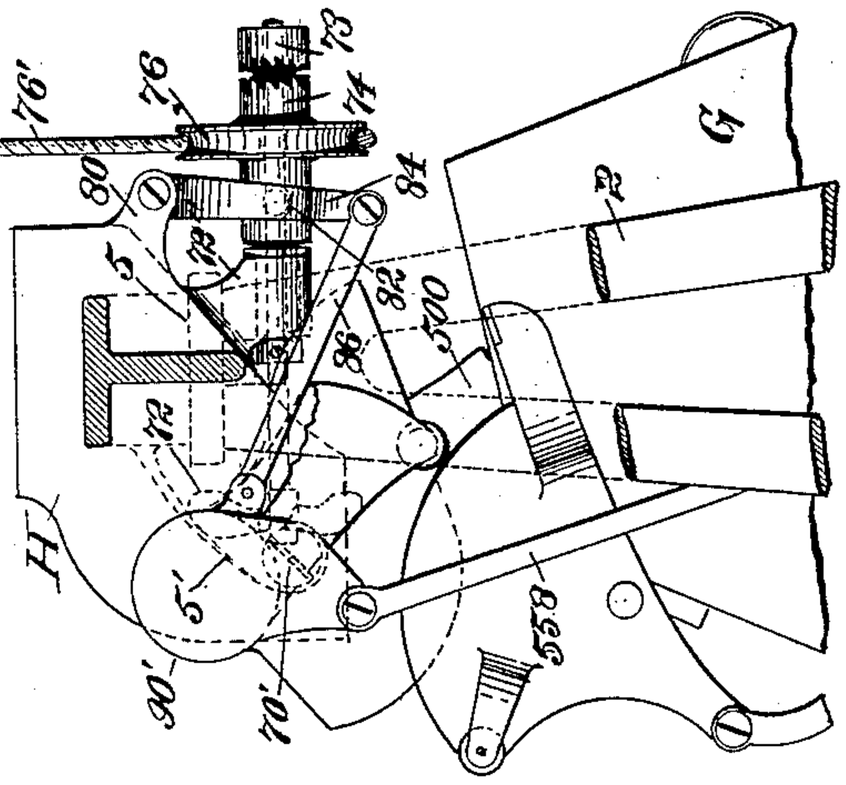



Fig. 5.

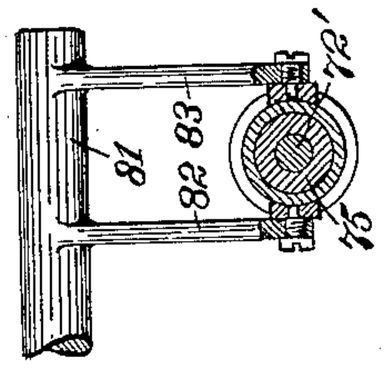



Fig. 3.

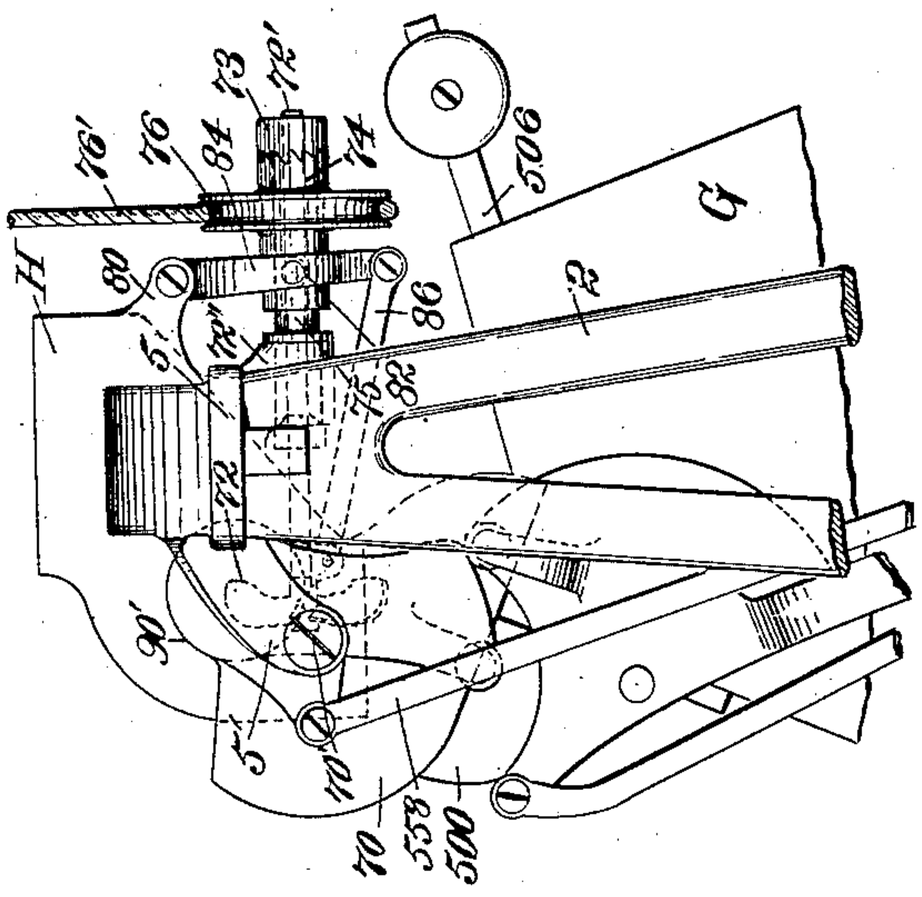



Fig. 8.

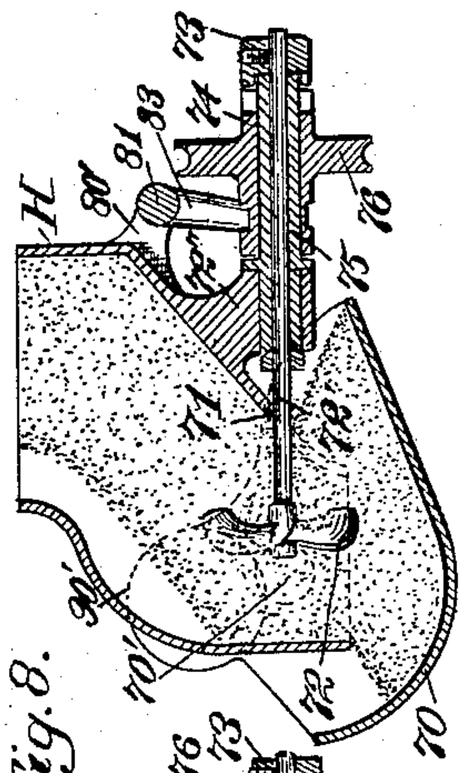



Fig. 7.

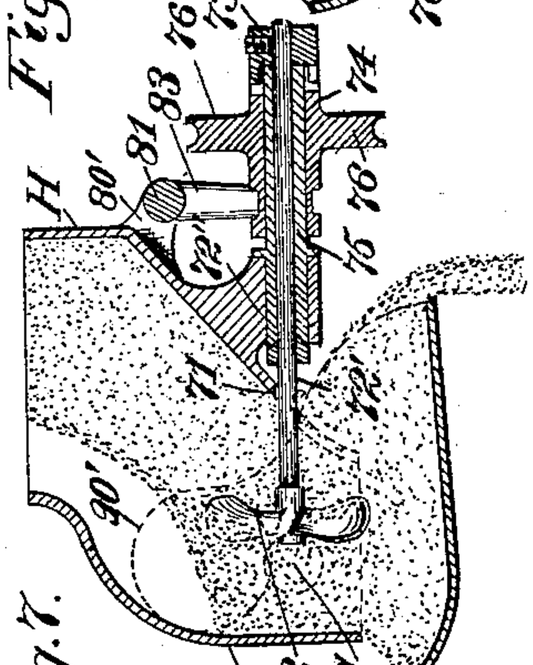
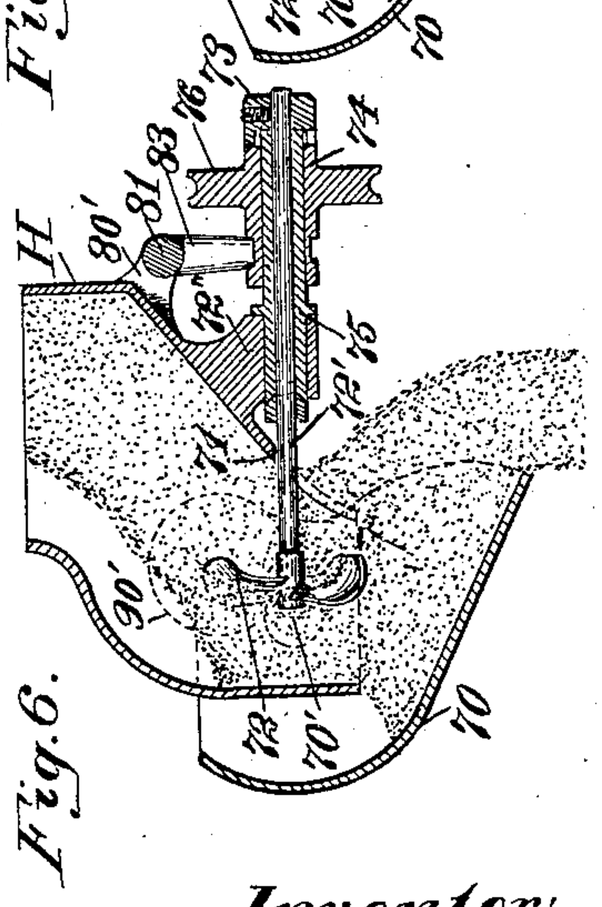



Fig. 6.




Witnesses:
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Inventor:
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# UNITED STATES PATENT OFFICE.

FRANCIS H. RICHARDS, OF HARTFORD, CONNECTICUT.

## WEIGHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 559,215, dated April 28, 1896.

Application filed September 18, 1895. Serial No. 562,839. (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, the object being to provide an improved organization of valve and stream feed mechanisms, particularly adapted for maintaining a continuous unbroken supply-stream to the bucket of materials of more than ordinary sluggishness—such as cotton-seed meal, flaxseed-meal, and the like—with which considerable difficulty is generally experienced in weighing, owing to the marked tendency of such materials to clog and block at the valve.

In the drawings accompanying and forming part of this application, Figure 1 is a plan view illustrating the upper portion of a weighing-machine embodying my present improvements. Fig. 2 is a front elevation of the same. Figs. 3 and 4 are end elevations as seen from the left in Fig. 2, showing the valve respectively in the open and the closed or cut-off positions. Fig. 5 is a detail view illustrating part of the clutch throw-out mechanism. Figs. 6, 7, and 8 are cross-sectional detail views illustrating the supply-chute and the valve, and showing the latter respectively in the open, the drip, and the cut-off positions thereof.

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

For the purpose of illustrating the nature and mode of operation of the present improvements these are shown applied to the improved weighing-machine described and claimed in Letters Patent No. 548,839, granted to me October 29, 1895; but it will be obvious that said improvements may be used as well in connection with other types of weighing-machines.

The operative parts of the weighing-machine are generally carried by two side frames or uprights connected at their top by a top plate or beam. The upper portions of these side frames are shown at 2 and 4 and the connecting top plate or beam at 5. The top plate or beam is illustrated carrying a supply chute or hopper H, through which the material descends by gravity, which is adapted for containing a mass of material to be delivered in the form of a main stream to the bucket. It will be observed that the forward wall of the supply-chute H is shown inclined, and it will be apparent then that the main stream will be thereby directed in a rearward direction.

The bucket, a part of which is shown at G, is of the well-known "single-chambered" type or class, and, in practice, is suitably supported under the supply chute or hopper H, with its receiving end or mouth in position to receive the supply-stream from the supply chute or hopper H and the feeders.

As a means for controlling the flow of the main and the drip streams, which constitute the supply-stream into the bucket G, the stream-reducing valve 70 will preferably be employed. Said valve 70 is substantially similar to the improved valve described and claimed in Letters Patent No. 535,727, granted to me March 12, 1895, and is illustrated pivoted for oscillatory movement within the arms or brackets 5′ and 5″, depending from the top plate or beam 5, the pivot or center of movement of said valve being designated by 70′. The valve 70 will preferably be balanced, so as to have normally no tendency to either open or close, the balance-weight being shown at 90′.

As a means for opening the valve any suitable mechanism may be employed—for example, that disclosed in Letters Patent first hereinbefore referred to. A part of the valve-opening mechanism described and claimed in said patent is shown. A connecting-rod 558 is shown pivoted to the upper rearward side of the valve. This rod will have a descending movement with a valve-opening actuator (not shown) carried by the beam mechanism, and said valve-opening actuator, when the load has been discharged and the bucket has returned to the normal position thereof, is effective for imparting a valve-opening thrust to the valve 70 through the medium of the connecting-rod 558.

As a means for closing the valve the mechanism shown will preferably be employed, and this mechanism is substantially similar to that described and claimed in Letters Patent No. 535,729, granted to me March 12, 1895.

A cam 500 is shown depending from and oscillatory with the valve 70. The valve-closing cam 500 will preferably be provided with two faces, (not shown,) a reducing cam-face and a cut-off cam-face. A counterweighted valve-closing actuator is shown at 506, pivoted to the side frame 4. At the extremity of the actuator, opposite to that provided with the counterweight, a friction-roller (not shown) will be provided. At the commencement of the flow of the supply-stream the friction-roller of the actuator 506 will be on the reducing cam-face of the cam 500 and will be effective for imparting a valve-closing but slow thrust to the valve. When the load is nearly completed, the friction-roller referred to leaves the reducing cam-face and rides over the cut-off cam-face, so that the valve will be immediately closed for cutting off the supply-stream.

In weighing granular and other materials it is customary to provide for a drip or reduced stream which continues to flow into the partially-loaded bucket on the cut off of the main stream. This drip-stream is secured in several different ways. In Letters Patent No. 548,844, granted to me October 29, 1895, is disclosed a method of securing the drip-stream. The supply-chute in that patent is shown provided with a relatively small opening in the forward wall thereof, which constitutes a drip-opening, and when the valve has reached a predetermined point in its closing movement and the main stream is cut off a valve-supported bank is formed on the forward part of the valve. The drip-stream flows from out this drip-opening and over the banked-up mass on the valve and into the bucket. The valve, when the bucket-load has been completed, is immediately actuated for cutting off the drip-stream.

It will be obvious that in weighing materials of a sticky or oily nature considerable difficulty must be experienced, as such materials do not flow freely over the banked-up mass on the valve. This causes a consequent error in each bucket-load, due to underloading.

The present improvements contemplate the provision of two steam-controlling factors—the valve itself, which constitutes one, and which reduces the volume of the supply-stream and successively cuts off the main and the drip streams, and the other a mechanically-operated feeder or feeding mechanism, which is adapted during the closing movement of the valve for feeding the drip-stream into the bucket, so that by the present improvement it is possible to secure accurate bucket-loads on each operation of the machine of materials of the most sluggish sort, as well as removing all tendency of the material to clog and block at the valve. When the valve has cut off the main stream, the feeder will be effective for feeding the drip-stream into the bucket, and connections will be provided for instantaneously rendering the feeder ineffective on the completion of the bucket-load, followed by an immediate cutting off of the drip-stream.

The preferred form of feeder is shown at 72, consisting of a rotary two-bladed screw-propeller, embodying a pair of oppositely-disposed radial blades, and which is shown located within the supply-chute and in the line of flow of the main stream, and this will be intermittently driven or actuated by suitable driving or actuating mechanism for feeding forward over the discharge edge of the valve and into the bucket the drip-stream, which is intended to complete the partial load therein. The front wall of the supply-chute H is shown provided with an opening of suitable size, through which the drip-stream will be fed. This drip-stream opening is illustrated at 71, and will be preferably of segmental shape, as best adapted to offer the least resistance to the feed-stream, and is shown located approximately midway between the end walls of the supply-chute. The feeder will preferably be operative within the supply-chute H, and will rotate about an axis transverse to the axis of the valve, to thereby feed the drip-stream through this opening over the valve and into the bucket.

The supply-chute H is shown having formed at a point above, and substantially in alinement with, the drip-opening 71, a bearing 72″, which is shown provided with a longitudinal bushing 75, preferably seated tightly therein, and in said bushing is shown mounted for rotation a feeder-carrying shaft 72′, the inner end of which is shown carrying the feeder 72. The feeder 72 will be secured to its shaft 72′ in some well-known manner, as by keying.

The shaft 72′ will have secured thereto one member of some suitable clutch mechanism, and I prefer to employ the clutch shown. The outer end of the shaft 72′ is shown provided with the fixed member of a clutch, (designated by 73,) which will be fixed to the shaft in some well-known manner. The fixed clutch member 73 will receive its motion from the slidable clutch member 74, operatively connected with suitable actuating means, thereby imparting the feeding or rotary movement to the feeder 72 for feeding the drip-stream into the bucket. The slidable clutch member 74 will have a sliding movement on the bushing 75, and will rotate on said bushing. The inner or engaging faces of these clutch members 73 and 74 are shown provided with the usual teeth or circular rack, which are adapted to mesh or engage each other, and when in mesh to actuate the feeder. Suitable throw-out mechanism will also be employed for unclutching the clutch by slowly moving the slidable or movable clutch member 74 away from the fixed clutch member 73, and it will be obvious that when the teeth of the latter are carried past or out of engagement with those on the fixed clutch member 73 these members will be disengaged, and the rotation of the shaft 72′, and thereby the

feeder, will be immediately stopped and the valve will instantaneously cut off the drip-stream.

The mechanism for unclutching the clutch or the two clutch members 73 and 74 is preferably operated by and from the power of the valve at a predetermined point in the closing movement thereof.

The supply-chute H is shown provided with two brackets or bearings 80 and 80′, projecting forwardly therefrom, in which a rock-shaft 81 is shown mounted. The rock-shaft 81 is shown provided with a pair of downwardly-extending throw-out arms or levers 82 and 83, the function of which will now be described.

The slidable clutch member 74 is shown provided with a peripheral groove or way in which are shown loosely operative a pair of friction blocks or shoes pivoted, respectively, to the throw-out arms or levers 82 and 83. It will be obvious that when the rock-shaft 81 is rocked in one direction (to the left in Figs. 3 and 4) the throw-out arms or levers 82 and 83 will also be moved therewith, and the slidable clutch member 74 will be thereby carried past or out of operative engagement with the fixed clutch member 73, thereby stopping the feeder. Hence it will be evident that means are provided for stopping the feeder at a predetermined point in the descent of the bucket. It will also be understood that when this rock-shaft 81 is oppositely rotated the slidable clutch member 74 will be carried into engagement with the fixed clutch member 73, to thereby actuate the feeder.

The slidable clutch member 74 is shown provided with a pulley or band wheel 76, preferably formed integral therewith, about which will be passed a suitable belt or rope, as 76′, connected also with some suitable motor for rotating the slidable clutch member, and thereby the feeder-shaft 72′, and hence the feeder 72 itself, when said movable clutch is in mesh with the feed clutch member.

The rock-shaft 81, at a point adjacent to the bracket 80, is shown provided with a curved or cranked rock-arm 84, preferably formed integral therewith, to the lower end of which is shown pivoted the connecting-link 86. The connecting-link 86 is also shown operatively connected with the valve 70 and as pivoted thereon at a point adjacent to the center of movement or axis thereof.

It will be remembered that the valve has been described as constituting the means for rendering the feeder ineffective for feeding forward the drip-stream, and it will be apparent that by the described connections the valve will be effective for immediately stopping the movement of the feeder at a predetermined point in the closing movement of the valve by unclutching the clutch or clutch mechanism. By reason of the location of the pivot of the connecting-link 86 adjacent to and forward of the valve-axis the shifting movement of the slidable member 74 through these connections will be quite slow, the engaging teeth of the slidable clutch member 74 will be very slowly carried out of contact with those of the fixed member by the slow closing-thrust imparted by the valve-closing actuator to the valve during the first stage of the closing movement of the valve, the movement of said movable member being hardly appreciable during this first stage of the valve-closing movement. When the main stream has been cut off, which is at the commencement of the poising period, the valve will have nearly closed, the clutch members 73 and 74 still being in engagement, the valve being held momentarily against closing movement to permit the flow of the fed or forced drip-stream into the nearly-loaded bucket. At this time the valve-closing actuator 506 will have nearly closed the valve, the roll thereon being very near the end of the reducing-face of the valve-closing cam 500. When this roll leaves the reducing-face of the valve-closing cam 500, it passes therebeyond and rides over the cut-off cam-face of the valve-closing cam, the effect being an immediate closure of the valve, and consequently a cut off of the drip-stream. The valve itself during the final cut-off movement operates immediately to stop the feeding movements of the feeder by unclutching the clutch through the medium of the described connection.

From the preceding description it will be evident that in connection with a supply-chute, a valve therefor, and a feeder, valve-operated connections are provided between the valve and the feeder for controlling the movements of the feeder.

Having thus described my invention, I claim—

1. The combination with a bucket, of a supply-chute through which the material descends by gravity, said chute having a drip-opening in its side above its lower edge; a feeder in said chute; means for actuating the feeder; a stream-reducing valve; and valve-actuating mechanism.

2. The combination with a bucket, of a supply-chute through which the material descends by gravity, said chute having a drip-opening in its side above its lower edge; a feeder in said chute comprising a pair of oppositely-disposed radial blades; means for actuating the feeder; a stream-reducing valve; and valve-actuating mechanism.

3. In a weighing-machine, the combination with a supply-chute, of a valve therefor; a feeder; and valve-operated connections between the valve and the feeder for controlling the movements of the latter.

4. In a weighing-machine, the combination with a supply-chute, of a valve therefor; a feeder and its supporting-shaft; a clutch embodying fixed and movable members carried by said shaft and coöperative, respectively, with the feeder and with the driving mech-

anism; and valve-operated connections between the valve and the movable clutch member for moving the latter along said shaft.

5. In a weighing-machine, the combination with a supply-chute, of a feeder; driving mechanism for actuating said feeder; a clutch operatively connected with said driving mechanism and embodying fixed and movable clutch members; an oscillatory stream-reducing valve; a connecting-link operatively connected with the movable clutch member and with the valve at a point adjacent the center of movement thereof, whereby during the major period of the closing movement of the valve, said clutch members will be maintained in operative engagement, and whereby on the further closing movement of said valve, said clutch member will be disengaged to thereby stop the feeder.

6. In a weighing-machine, the combination with a supply-chute, of a feeder; driving mechanism for actuating said feeder; a clutch operatively connected with the driving mechanism and embodying fixed and movable clutch members; a rock-shaft having a pair of depending arms operatively connected with said movable clutch member; and a link connected with the valve and operatively connected with said rock-shaft, whereby when the valve moves in one direction the clutch members will be disengaged, and whereby when said valve moves in the opposite direction the clutch members will reëngage.

7. In a weighing-machine, the combination with a supply-chute, of a feeder; driving mechanism for actuating said feeder; a clutch operatively connected with the driving mechanism and embodying fixed and movable members; a rock-shaft having a depending arm or arms operatively connected with said movable clutch member, and also having a rock-arm; a valve and its actuating mechanism; and a connecting-link operatively connected with the valve and with said rock-arm, whereby on one movement of the valve the clutch members will be disengaged, and whereby on the other movement said clutch members will be reëngaged.

8. In a weighing-machine, the combination with a supply-chute having its forward wall inclined to thereby direct said stream at an inclination, said wall having an opening therein; of a stream-reducing valve for said chute; valve-actuating mechanism; a feeder located within the chute and in the line of flow of said stream of material, and operative for feeding a stream of material through said opening and over the discharge edge of the valve at a predetermined point in the closing movement thereof.

9. In a weighing-machine, the combination with a supply-chute; of a stream-feeder and its supporting-shaft; a clutch member carried by said shaft and fixed thereto; a second clutch member movable relatively to the first-mentioned clutch member and adapted to engage the same, said movable clutch member having a peripheral channel; a rock-shaft having a pair of depending arms adapted to engage said peripheral channel; a rock-arm carried by said shaft; a link connected with a valve and with said rock-arm; and a valve in position for controlling the supply-stream, and adapted also to rock said shaft, and thereby disengage said clutch members whereby the feeder will be stopped, substantially as described.

FRANCIS H. RICHARDS.

Witnesses:
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