(No Model.) 2 Sheets—Sheet 1.

F. H. RICHARDS.

WEIGHING MACHINE.

No. 548,852. Patented Oct. 29, 1895.

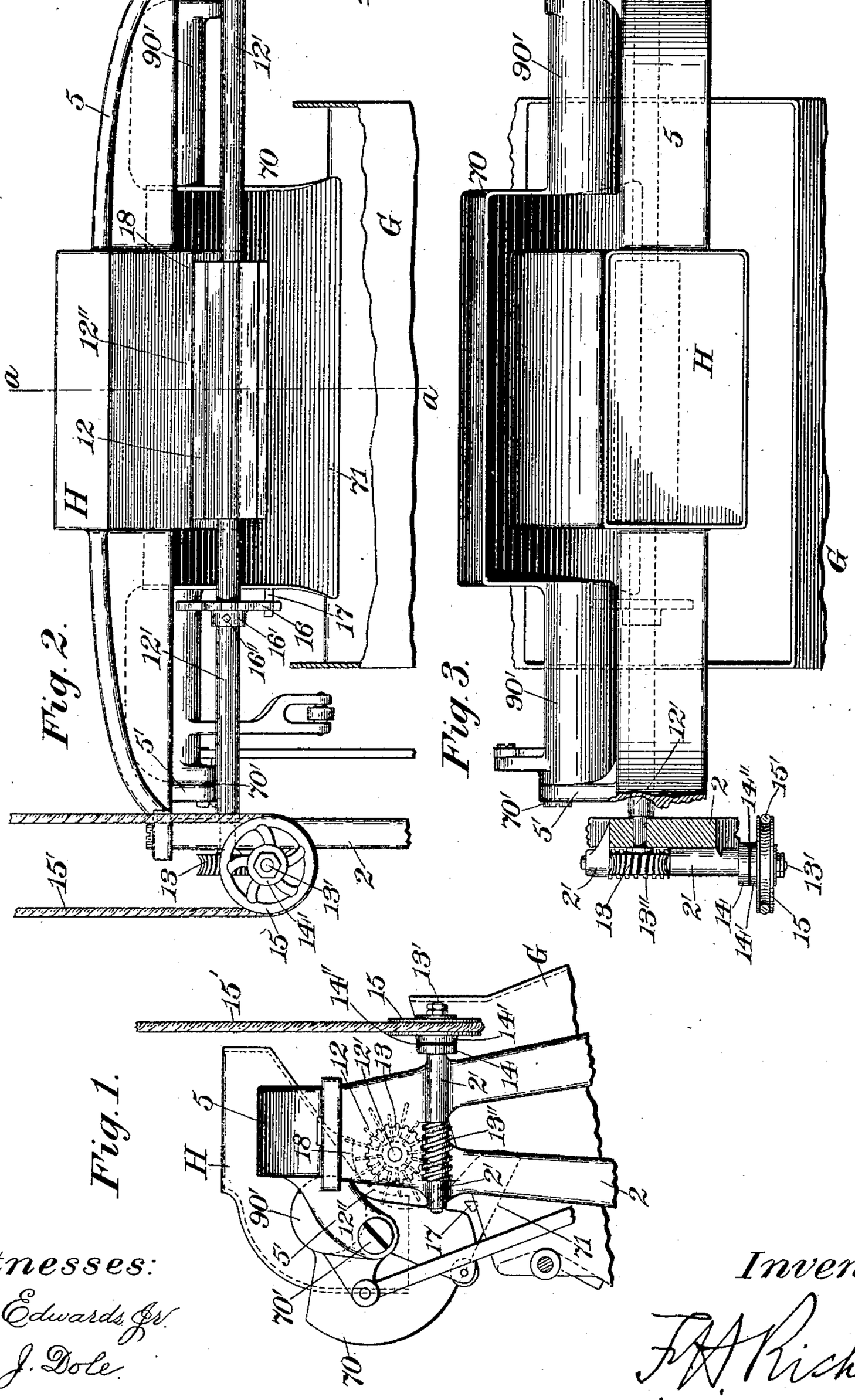

Fig. 2.

Fig. 3.

Fig. 1.

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(No Model.)

2 Sheets—Sheet 2.

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Fig. 6.

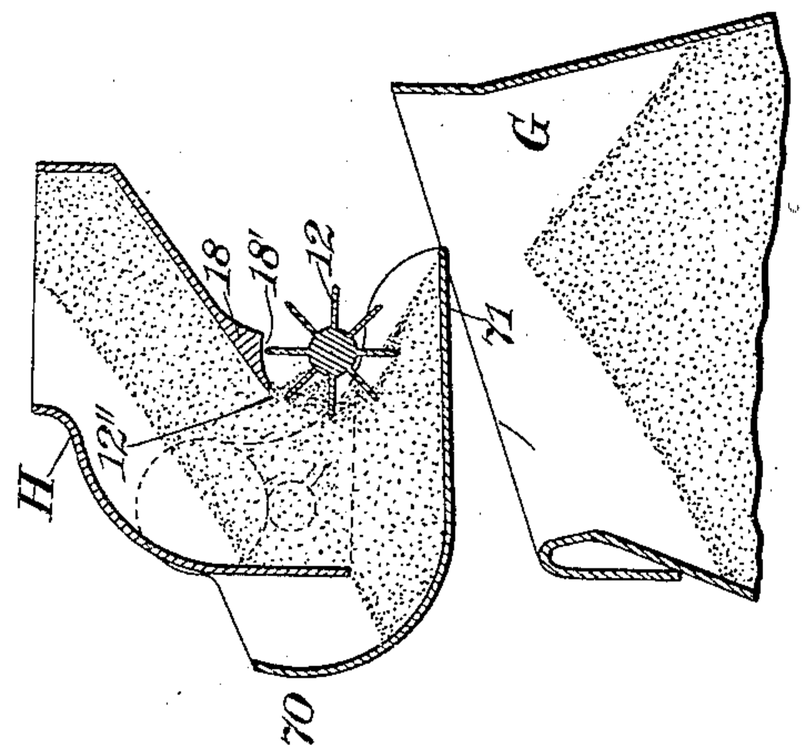


Fig. 9.

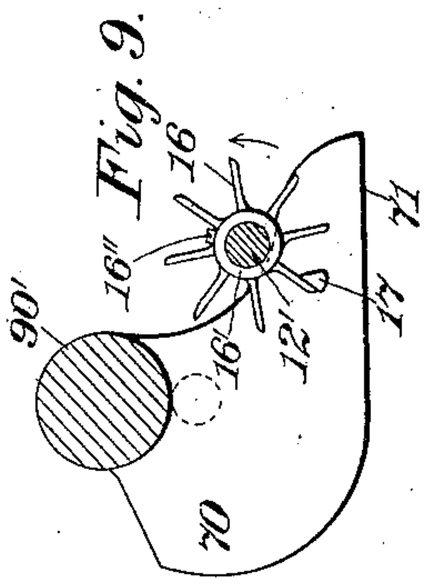


Fig. 5.

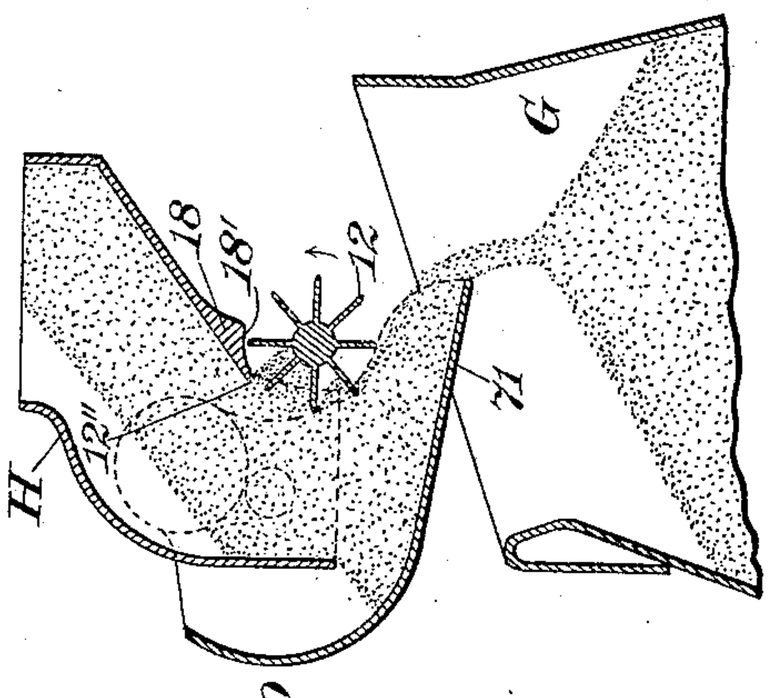


Fig. 8.

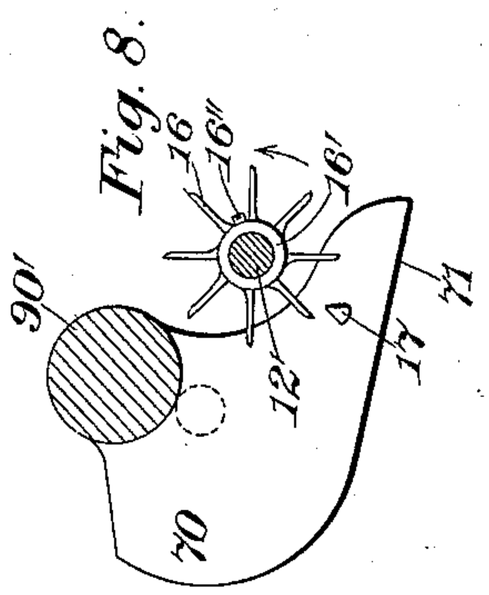


Fig. 4.

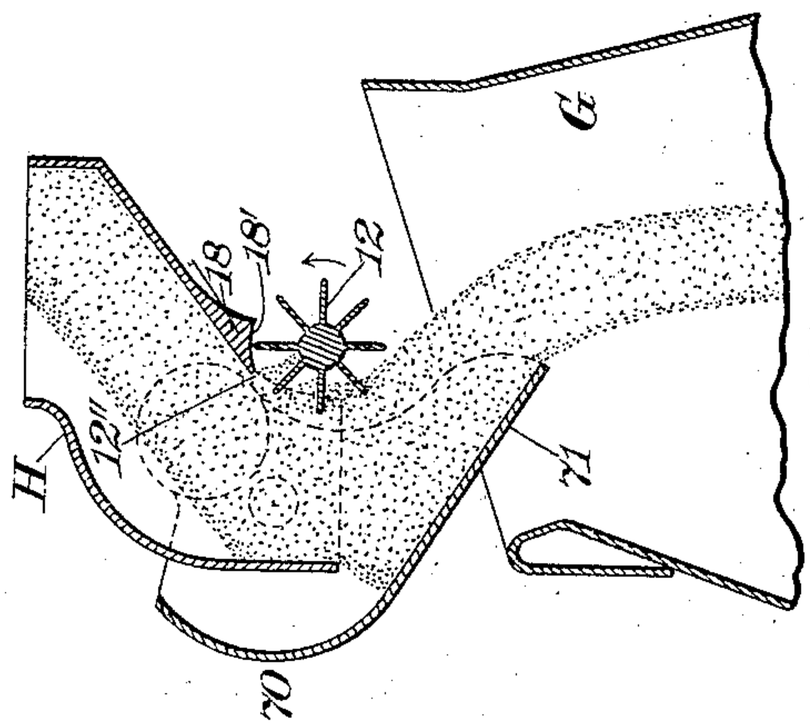
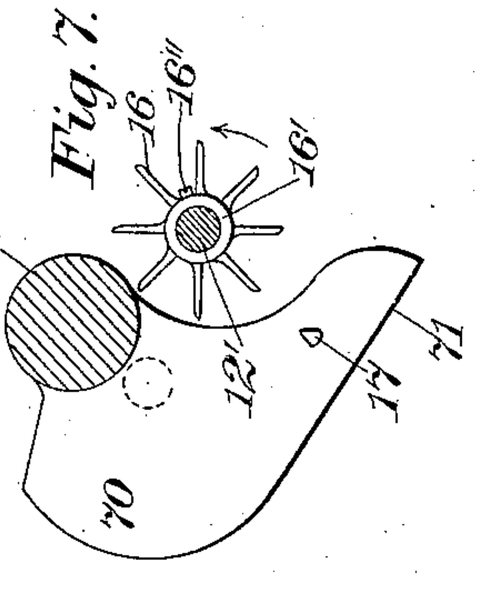


Fig. 7.



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Fred. J. Dole.

Inventor:
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UNITED STATES PATENT OFFICE.

FRANCIS H. RICHARDS, OF HARTFORD, CONNECTICUT.

WEIGHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 548,852, dated October 29, 1895.

Application filed June 12, 1895. Serial No. 552,520. (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 machine embodying an organization of devices adapted for weighing materials of more than ordinary sluggishness—such, for instance, as cotton-seed meal, flaxseed-meal, and other substances of a sticky or oily character—the present improvements rendering possible the accurate making up of predetermined quantities or measurements in the bucket or other load-carrying receptacle on successive operations of the machine and without loss of time.

In the drawings accompanying and forming part of this specification, Figure 1 is an end elevation of the upper portions of a weighing-machine embodying my present improvements as seen from the left in Fig. 2, and illustrating the valve in a position for permitting the full stream to flow into the bucket, and also illustrating by dotted and full lines a feeder for feeding forward a portion of the supply-stream and mechanism for actuating the feeder. Fig. 2 is a front elevation of the same portions of the machine, also embodying the present improvements; and Fig. 3 is a plan of the same. Figs. 4, 5, and 6 are respectively cross-sectional views taken in line *a a*, Fig. 2, these views illustrating the valve in three successive positions and also the preferred form of feeder. Figs. 7, 8, and 9 are end elevations as seen from the left in Fig. 2, showing the valve and a portion of the mechanism employed for limiting the feeder, the valve-shaft and the feeder-shaft being shown in section.

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

The present improvements may be adapted to any ordinary weighing-machine and are illustrated as applied to the improved machine described and claimed in my concurrently-pending application, Serial No. 541,087, filed March 9, 1895.

The operative parts of a weighing-machine are usually carried by some suitable framework, generally consisting of two side frames connected by a top plate or beam. There are shown in the drawings the upper portions of these side frames, which are designated by 2 and 4, respectively, and are connected by a top plate or beam, such as 5. The top plate or beam 5 is illustrated as carrying a supply chute or hopper H, which may be, except as hereinafter specified, of any suitable construction, and is connected to the top plate or beam 5 in any well-known manner.

The bucket (designated by G) is illustrated as being of the well-known "single-chambered" type and is supported under the supply chute or hopper H for the reception of a constant supply of material from the supply-chute H.

Any suitable valve for the supply chute or hopper H may be employed. That illustrated in the drawings at 70 is of the type described and claimed in Letters Patent No. 535,727, granted to me March 12, 1895. The valve 70 is illustrated as pivoted within arms or brackets 5′, depending from the top plate or beam 5, the pivot or axis of movement of the valve being designated by 70′. The valve employed is also illustrated as located substantially beneath the mouth of the supply-chute and as extending beyond the forward edge of the supply-chute sufficiently far to support the descending column or stream when the valve is closed. This valve is also preferably balanced, so as to have, normally, no tendency to either open or close, the balance-weight being shown herein as a shaft 90′ extending from opposite ends of the valve-pan.

Any suitable mechanism may be employed for actuating the valve for opening and closing the same. For example, that described and claimed in the Letters Patent first hereinbefore referred to may be employed.

In weighing-machines as generally constructed considerable difficulty has been encountered in securing a continuous flow of certain classes of materials, owing to the decided tendency of such materials to clog and block at the valve, this being particularly true in the case of materials of a sluggish or slow-moving nature—as, for example, cotton-seed meal, flaxseed-meal, and similar substances that are sticky or oily. When such

machines were weighing materials of the characters specified, it was practicable to secure only a partial load, the load varying, of course, in accordance with the peculiar characteristics of the material being weighed. It will be obvious that these errors must vitiate the accuracy of such a machine as a weighing factor. By the present improvements these errors are eliminated and a continuous unbroken supply to the bucket, of material of the most sluggish sort, is secured and maintained throughout the entire operation of the machine and true and accurate measurements of predetermined quantities are obtained, and this without interrupting the operation of the machine or causing blocking or clogging of the material at the valve. These results are accomplished by employing in connection with the supply chute or hopper and the valve therefor a feeder or feeding means, which is preferably located between the valve and supply-chute and is adapted to come in contact with the material or the mass supported on the valve as the valve oscillates for cutting off the supply-stream, the feeder feeding the material forward over the edge of the valve and into the bucket.

The present improvements have demonstrated in practice superior ability and have made it possible to successfully weigh automatically predetermined quantities of the most sluggish materials.

The preferred form of feeder is illustrated at 12 as composed of a series of radial blades, and the feeder is also illustrated as carried by the shaft 12′ for rotary movement The shaft 12′ is illustrated as mounted transversely of the machine, its ends being shown journaled in the side frames 2 and 4. The feeder 12 is illustrated as formed integral with the shaft 12′, but it is apparent that it may be formed as a separate member. The forward wall of the supply-chute H is shown at 12″ as cut away sufficiently to permit of the free rotation of the feeder 12. The blades of the feeder 12 are illustrated as extending a short distance into the supply-chute sufficiently far to agitate thoroughly the mass therein to cause a free flow of the supply-stream.

The cut-away portion of the supply-chute is illustrated at 18 as having a guard approximately of a width equaling the distance between the blades composing the feeder and located out of the path of said blades. This guard performs an important function, in that it prevents waste of the material when the valve has cut off the supply-stream.

It will be observed that the lower edge 18′ of the guard 18 is illustrated as a curved edge; and I prefer to have this curve defined by an arc drawn from the center of movement of the feeder and also substantially coincident with the radius of movement of said feeder.

It will be assumed that the valve has cut off the main stream and that the rotation of the feeder has been stopped and that one of the blades of the feeder has passed within the confines of the supply-chute, the following blade of the feeder being within the outer edge of the guard. It will be noticed that there will be no space left for accidental escape of the material between the guard and the blades composing the feeder, as would be the case if the forward cut-away wall of said supply-chute were a straight one.

For rotating the shaft 12′ and through it the feeder 12 any suitable mechanism may be employed. The preferred form of this mechanism is illustrated in the accompanying drawings as comprising worm-gearing operated by some suitable motive power.

Means are employed for throwing the actuating mechanism into and out of operative relation with the main shaft 12′ and thereby preventing or limiting rotation of the feeder, the means for accomplishing this result being intermittently operable.

While I prefer to intermittently prevent or limit rotation of the feeder, good results have been obtained by maintaining the feeder continuously rotative, and this is considered as within the province of my present improvements.

The shaft 12′ is illustrated as provided at one end thereof with a worm-gear 13, which may be keyed onto the said shaft or secured thereto in any other suitable manner. This worm-gear 13 is illustrated as in mesh with a co-operating worm 13″, formed on the shorter intermediate shaft 13′, which latter is illustrated as journaled in the enlargements or bearings 2′, formed on the side frame 2. The shaft 13′ constitutes the drive or power shaft and receives in turn the power from some suitable motor.

As hereinbefore stated, the present improvements contemplate means for rendering ineffective the rotary feeder. This result is attained by means of a friction-clutch. The supplemental shaft 13′ is illustrated as provided with a friction-clutch comprising two members, a driven member 14 and a driving member 14′. There is illustrated as interposed between these two clutch members 14 and 14′ a leather or frictional washer or disk 14″. The member 14′ of the friction-clutch, as stated, constitutes the driving member, and it conveys motion to the driven member 14, which latter is fixedly secured—by keying, for example—to the supplemental shaft 13′ by the interposed washer 14″, it being understood that the clutch member 14′ is carried loosely for free rotation on the shaft 13′. The frictional contact of the driving member 14′ with the washer 14″ is comparatively slight, as is usual in frictional gearing, it being, of course, sufficient to operate the shafting and gearing and through these the feeder 12.

It will be obvious that by the application of a relatively-greater power than the frictional resistance just referred to to any of the rotating parts of the mechanism described

the rotation of the shafts 12′ and 13′ will be thereby prevented, whereby the rotation of the feeder 12 is also prevented.

As hereinbefore pointed out, I prefer to employ an intermittently-operating feeder. For preventing the rotation of the rotary feeder 12 a stop is employed, acting as a brake to effectively prevent the rotation of said feeder, and this stop preferably coacts with the main shaft or a co-operating stop on said shaft 12′ for effecting this stoppage of the feeder.

The clutch member 14′, constituting the driving member, is illustrated at 15 as having formed integral therewith the pulley or band wheel 15. A rope or belt is illustrated at 15′ as passed around said wheel 15, and said rope or belt also passes around said driving or power wheel of a suitable motor positioned for conveying motion to said wheel 15 and through it to the mechanism hereinbefore described.

The means employed for preventing the rotation of the feeder comprises a suitable stop, herein illustrated as a ratchet-wheel, carried by the shaft and rotative therewith, and a co-operating stop carried by the valve, the latter being operable by the power of the valve mechanism for interposition or engagement between the teeth or arms of the ratchet-wheel.

It will be apparent that by reason of the relatively-greater power of the valve mechanism, as compared with the power of the friction-clutch, when the lock or stop is thrust or interposed between the teeth or spokes of the ratchet and engages said teeth or arms, the friction-clutch is thereby rendered ineffective as such, and the rotation of the main and the supplemental shafts and the feeder is thereby prevented.

The shaft 12′ is illustrated as provided with a ratchet-wheel having a series of relatively-long teeth or arms. This ratchet-wheel is illustrated at 16 as fixedly secured to said main shaft by means of a pin 16″ passing through the hub 16′ of said ratchet 16 and seated in the main shaft 12′.

The valve 70 is illustrated at 17 as carrying a stop. It will be apparent that as the valve 70 oscillates on its pivots for cutting off the main stream said stop will be brought into engagement with the teeth of the ratchet 16 and will serve as a brake, thereby preventing rotation of the shaft 12′, and, of course, of the feeder 12. This engagement of the ratchet-wheel 16 by the stop 17 on the valve also renders ineffective the clutch mechanism. This stop is preferably of the form illustrated, having a pair of faces angularly disposed relatively to each other, and these faces come into contact with the teeth of the ratchet on lines substantially coincident with the lines of repose of the metals of which these members are composed, so that no undue friction will be exerted by the one on the other during the operation of the machine. It will be understood that as the valve is opened the stop 17 will be carried out by the valve past the radius of movement of the teeth or spokes of the ratchet 16, and when this is done the friction-clutch will be thereby rendered effective for again driving said shaft 12 through the described connections.

It will be observed that the feeder 12 is located adjacent to the supply-chute H and above and at such point relatively to the valve 70 that when the latter has cut off the main stream which it controls the feeder itself coacts with the valve and serves as an additional stream-controller, and is adapted, when at rest, for cutting off, approximately, that portion of the supply-stream, which is designated as the "drip-stream," that it had theretofore fed to the bucket.

The operation of the improved machine, briefly stated, is as follows: It will, of course, be understood that while the valve is open for permitting the full stream to flow into the bucket the rotary feeder is serving as a means for assisting the flow or feed of the supply-stream, its blades extending into the supply-chute H for a portion of their length, this feeding action continuing until the supply-stream is entirely cut off by the valve.

Fig. 4 illustrates the full supply-stream as entering or flowing into the bucket. It will be assumed that the valve-closing actuator is operating to close the valve, this being done slowly to gradually reduce in volume the size of the supply-stream, as shown in Fig. 5. While the valve is closing the feeder is, as hereinbefore stated, rotating, causing a forward feed of the upper portion of the supply-stream. As the valve-plate 71 approaches a horizontal position, it will, of course, be understood that the material flows with more or less difficulty, according to the particular inclination which said plate may occupy or the peculiar characteristics of the flowing mass or stream supported on the valve. As the valve approaches a horizontal position, the stream cannot, if it be of the character specified, flow freely, so that the feeder will now by its rotation feed or carry forward over the edge of the valve sufficient portions of the material to complete the partial load already in the bucket. When the load has been completed, the valve is actuated to cut off the supply-stream. After the feeder is locked against rotation by the stop device and the stream is cut off the radial blades serve as a means for preventing an overflow of the material into the loaded bucket.

Having thus described my invention, I claim—

1. In a weighing-machine, the combination with a supply-spout; of a valve in position for controlling a stream of material flowing from the supply-spout; a feeder located adjacent to the supply-spout and above the valve, and adapted to have an intermittent feeding movement for feeding forward over the edge of the valve a portion of the supply-stream, and adapted also, when at rest, to coact with

the valve, for cutting off the supply-stream; and means for intermittently operating the feeder, substantially as specified.

2. In a weighing-machine, the combination with a supply-spout; of an oscillatory valve in position for controlling a stream of material flowing from the supply-spout; a feeder located adjacent to the supply-spout and above the valve, and adapted to have an intermittent feeding movement for feeding forward over the edge of the valve a portion of the supply-stream, and adapted also, when at rest, to coact with the valve for cutting of the supply-stream; and means for intermittently operating the feeder, substantially as specified.

3. In a weighing-machine, the combination with a supply-spout; of a valve in position for controlling a stream of material from the supply-spout; a rotary feeder located adjacent to the supply-spout and above the valve, and adapted to have an intermittent feeding movement for feeding forward over the edge of the valve a portion of the supply-stream, and adapted also, when at rest, to coact with the valve for cutting off the supply-stream; and means for intermittently rotating the feeder, substantially as specified.

4. In a weighing-machine, the combination with a supply-spout; of a stream-supporting valve for said spout; a feeder located between the valve and spout, and in position and operable for feeding forward a portion of the supply-stream supported on the valve; and means operable by the closing-valve for limiting the operation of said feeder on the cutoff of the supply-stream, substantially as specified.

5. In a weighing-machine, the combination with a supply-spout; of a stream-supporting valve for said spout; a feeder located between the valve and spout, and operable for feeding forward a portion of the supply-stream supported on the valve; and a stop carried by the valve, and operated by the power of the valve, and operable for intercepting the movement of the feeder on the cutoff of the supply-stream.

6. The combination with a supply-spout having a cutaway portion; of a valve in position for controlling a stream of material flowing from the supply-spout; a feeder located above the valve and operative in said cutaway portion, and adapted to have an intermittent feeding movement for feeding forward over the edge of the valve a portion of the supply-stream, and adapted also, when at rest, to coact with the valve for cutting off the supply-stream; and means for intermittently operating said feeder, substantially as specified.

7. In a weighing-machine, the combination with a framework and a supply-spout carried thereby; of a stream-supporting valve for said spout; a rotative shaft also carried by the framework, and having thereon a series of radial blades constituting a feeder for feeding forward a portion of the supply-stream supported on said valve; a stop carried by said rotative shaft; and a stop carried by the valve, and adapted for engaging the other stop to prevent rotation of said shaft, substantially as specified.

8. In a weighing-machine, the combination with a supply-spout; of a valve in position for controlling a stream of material flowing from said supply-spout; a feeder located adjacent to the supply-spout and above the valve; a driven-shaft for carrying said feeder; driving mechanism for said shaft; clutch mechanism co-operative with the driven-shaft and with said driving mechanism; and feeder-stopping means operable by the closing-valve for unclutching the driven-shaft to thereby stop the feeder at a predetermined point in the closing movement of said valve, whereby said valve and feeder will coact to cut off the supply-stream, substantially as described.

9. In a weighing-machine, the combination with a supply-chute; of a stream-supporting valve for said chute; a feeder for feeding forward a portion of the supply-stream; a driven-shaft carrying said feeder; a stop carried by said driven-shaft driving mechanism for said shaft; clutch mechanism normally operatively connecting said driven-shaft and driving mechanism; and a stop carried by the valve, and coacting with the stop on the driven-shaft, and operable for unclutching the driven-shaft on the cutoff of the stream, substantially as specified.

10. In a weighing-machine, the combination with a supply-chute; of a stream-supporting valve for said chute; a feeder for feeding forward a portion of the supply-stream; a driven-shaft carrying said feeder and having a ratchet and also having a worm-gear; an intermediate shaft having a worm meshing with the gear of the driven-shaft; driving mechanism for said intermediate shaft; clutch mechanism normally operatively connecting said driving mechanism and intermediate shaft; and a stop carried by the valve, and operable for engaging the ratchet carried by the driven-shaft to thereby unclutch the driven-shaft, substantially as specified.

11. In a weighing-machine, the combination with a supply-spout having a cutaway portion; of a stream-supporting valve for said supply-spout; a rotary-feeder adapted for feeding forward a portion of the supply-stream, and having said feeder extending partially into the supply-spout and through the cutaway portion thereof; means for operating the feeder during the closing movement of the valve; and a guard extending over the blades of the feeder and co-operating with said blades for preventing escape of the material when the valve is closed, substantially as specified.

12. In a weighing-machine, the combination with a supply-spout; of a stream-supporting valve for said supply-spout; a series of radial blades constituting a feeder, and having said feeder extending partially into the supply-

spout; means for operating the feeder during the closing movement of the valve; and a guard carried by said spout, and located over the feeder, and having a curved edge approximately equal to the distance between a pair of the series of radial blades of the feeder, and co-operating with said blades for preventing escape of the material when the valve is closed, substantially as specified.

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