

(No Model.)

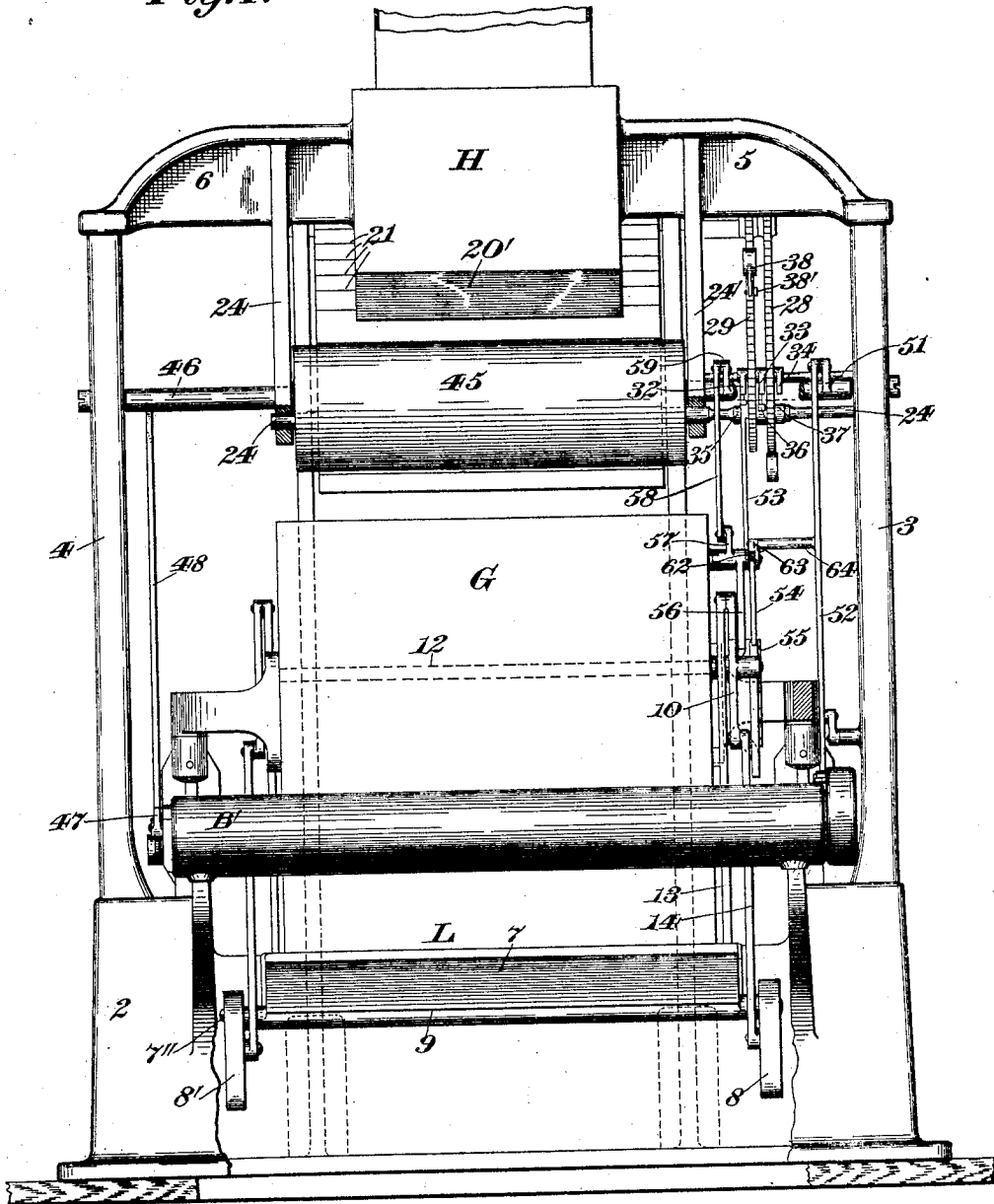
4 Sheets—Sheet 1.

F. H. RICHARDS.
WEIGHING MACHINE.

No. 578,165.

Patented Mar. 2, 1897.

Fig. 1.



Witnesses:

Chas. D. King.

Fred. J. Dole.

Inventor:

F. H. Richards.

(No Model.)

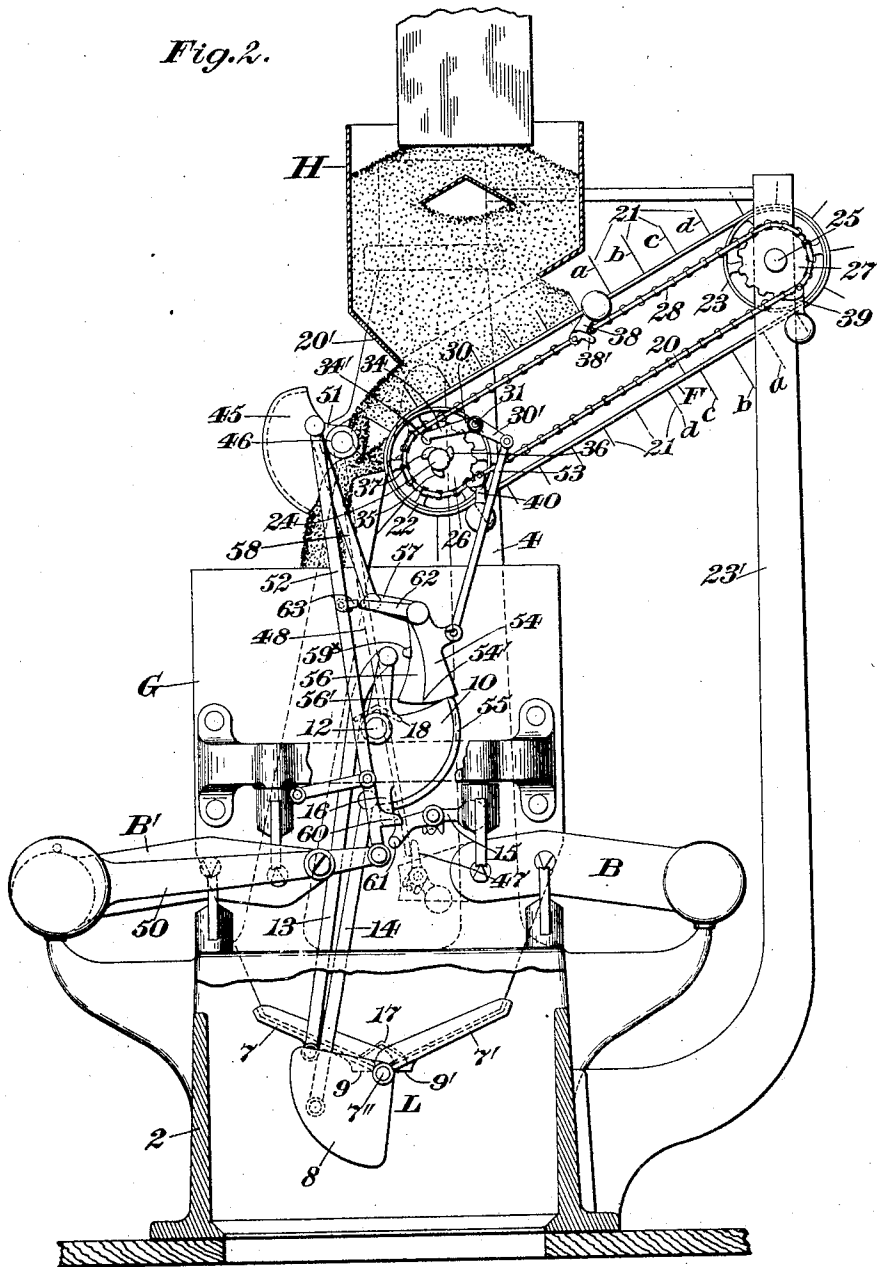
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Fig. 2.



Witnesses:

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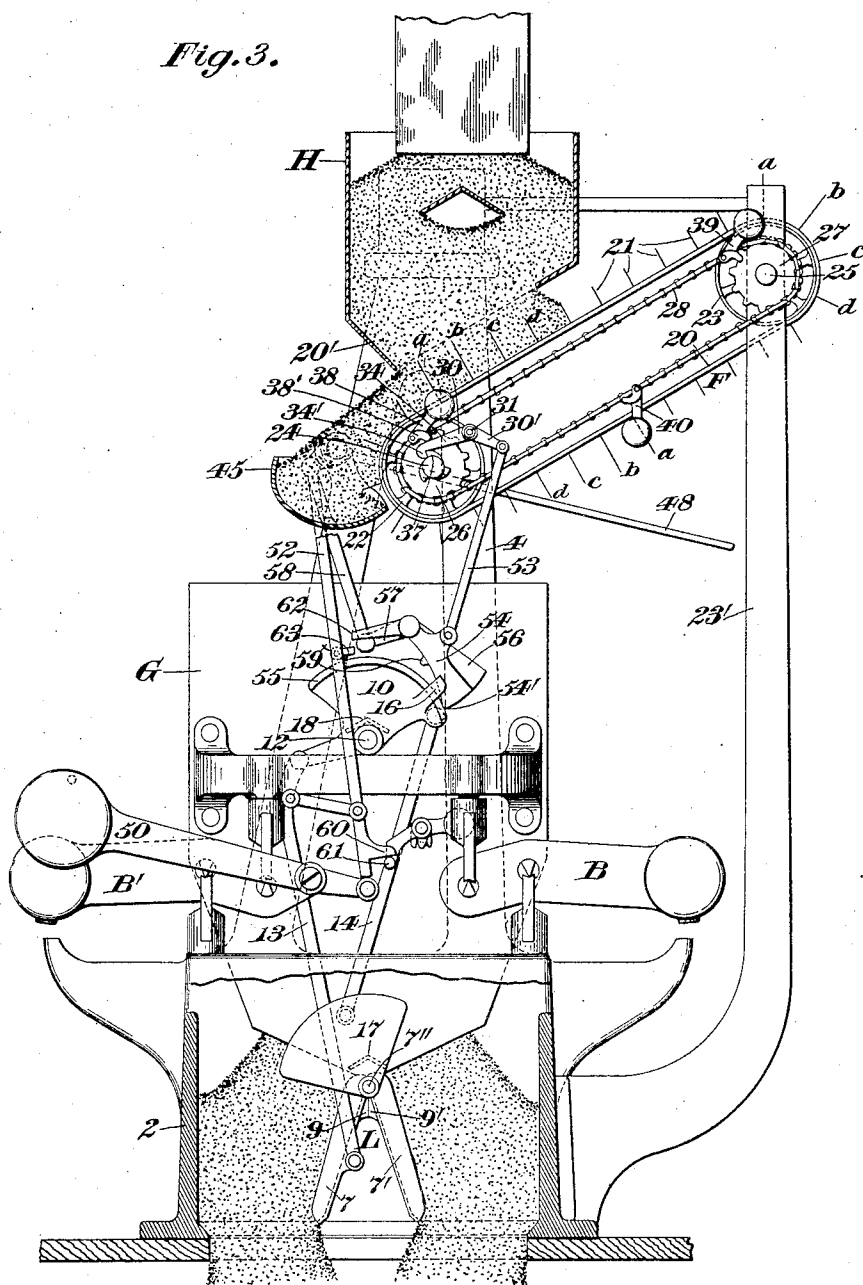
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Fig. 3.



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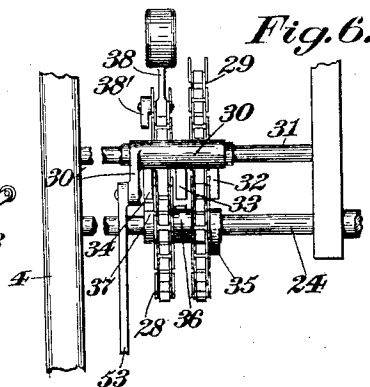
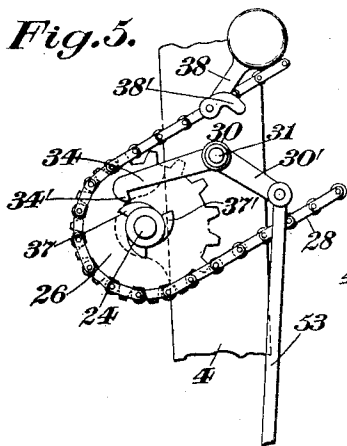
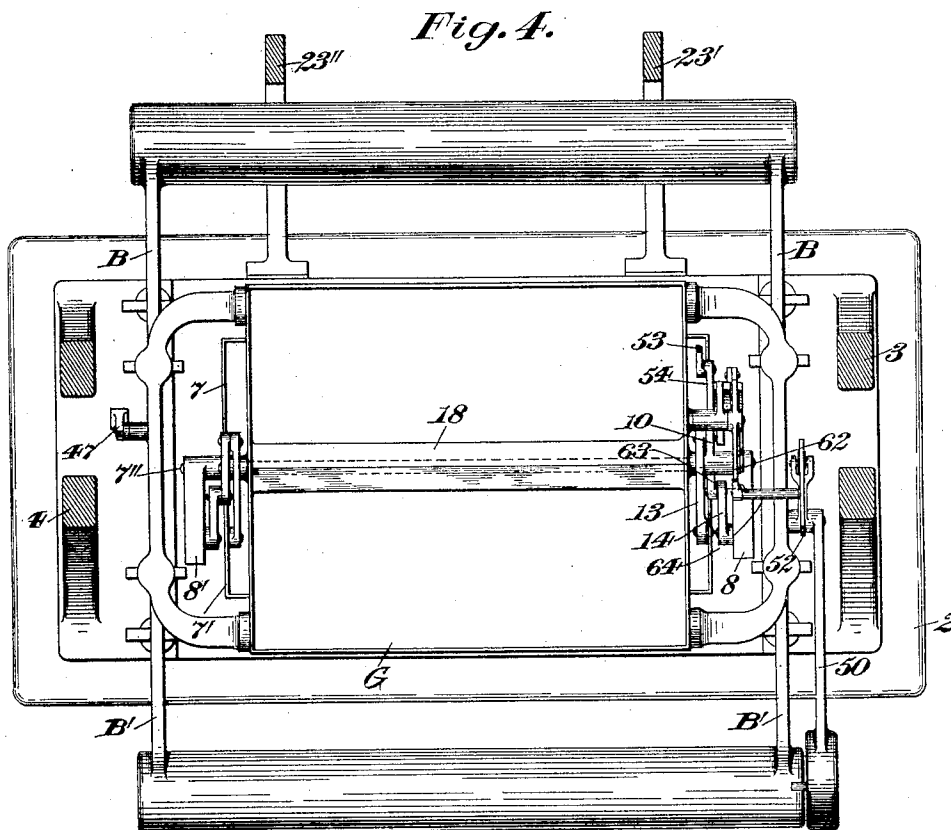
(No Model.)

4 Sheets—Sheet 4.

F. H. RICHARDS.
WEIGHING MACHINE.

No. 578,165.

Patented Mar. 2, 1897.



Witnesses:

Chas. D. King.
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. 578,165, dated March 2, 1897.

Application filed November 3, 1896. Serial No. 610,951. (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 or apparatus of this character for automatically weighing and delivering various classes of granular substances, but more especially those of a comparatively sluggish or slow-running nature.

In the drawings accompanying and forming part of this specification, Figure 1 is a front elevation of a weighing-machine comprehending my present improvements, and it represents the positions occupied by the various parts at the commencement of operation. Fig. 2 is a sectional end elevation as seen from the right in Fig. 1, the chute and a portion of the framing being in longitudinal vertical section. Fig. 3 is a view similar to Fig. 2, the supply to the bucket having been stopped and the bucket being shown in the act of discharging a load. Fig. 4 is a sectional plan view, the section being taken in a line slightly above the upper edge of the bucket. Fig. 5 is a detail view, in end elevation, of a part of the supply-controlling mechanism; and Fig. 6 is a rear view of the same.

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

The framework for supporting the various parts of the machine may be of any suitable character, and in the form shown it consists of the chambered supporting-base 2 and the end frames or standards 3 and 4, which rise therefrom, said end frames having connected thereto at the top the arms or brackets 5 and 6, which oppositely extend from the feed hopper or chute II.

The weighing mechanism is similar in operation to that disclosed by Letters Patent No. 518,840, granted to me October 29, 1895, to which reference may be had, and it includes the bucket G and the supporting counter-weighted scale-beams B and B', respectively.

The scale-beams B and B' are fulcrumed on the base 2, and the respective arms thereof

will be furnished at the inner ends thereof with suitable supports for the bucket.

The bucket G will have the usual discharge-outlet in its bottom, and for controlling said outlet I employ the load-discharge member or closer L. The closer L consists of two leaves or sections 7 and 7', hinged or jointed at the middle, said closer-leaves being loosely connected to the shaft 7'', which is located at the merging point of the two oppositely-inclined portions of the lower edge of the bucket, one of the closer-leaves, as the part 7, having the counterweights 8 and 8' attached thereto at its opposite ends, the purpose of said counterweights being to return the closer-leaf 7 and its companion 7' to the normal or shut position thereof on the discharge of a bucket-load, as indicated in Fig. 2.

The closer-leaves 7 and 7' are furnished with the stops or bosses 9 and 9', respectively, the meeting faces of which are plain, said faces being adapted to come into contact when the two sections have reached their wide-open position, so that the too-great movement of said sections will be properly limited or regulated.

By reason of the construction of the closer in the manner set forth the power necessary to maintain the same in its shut position is materially reduced, and it will be evident also that when the two sections are in their wide-open positions they uncover a relatively large outlet, so that the contents of the bucket may be discharged with great rapidity.

The closer-holding means includes a compound toggle and a latch, said latch being adapted to engage one of the members of the toggle, as will now appear.

A rocker is illustrated at 10, affixed to the shaft 12, which passes entirely through the bucket, said rocker having pivoted thereto the rods 13 and 14, which, with said rocker, compose the compound toggle, the first-mentioned rod being pivoted to the closer-leaf 7, while the other rod is pivoted to the counterweight 8, the several pivots or centers of the toggle members being substantially in alignment when the closer is shut, so that the rocker 10, and consequently the closer L, may be held against movement by a comparatively small amount of power applied to the rocker,

a suitable detent, as the latch 15, being employed for this purpose. The shaft 12, at the end thereof opposite to that which carries the rocker 10, will be preferably furnished with
5 crank-arms operatively connected by rods to the two closer-sections 7 and 7'.

The latch 15, which is counterweighted, is pivotally connected to the bucket and swings upward to engage the arm 16 of the rocker 10
10 on the shutting of the closer.

I dispose within the bucket G two guards 17 and 18, which are angular in cross-section and which extend from end wall to end wall of the bucket, such guards being located, respectively, over the two shafts 7" and 12 to
15 prevent particles of material from working into the joint between the two closer-sections and the bearings of the shaft 12.

The supply apparatus for furnishing the bucket with material to build up the load therein includes a feed hopper or chute—such as that illustrated at H—and a coöperative feed-conveyer F, having a stream-reducer or valve-blade thereon operable for diminishing
20 or reducing the volume of a stream of material emerging from said hopper at a predetermined point in the travel of said feed-conveyer, and at this stage in its operation I prefer to arrest or stop said feed-conveyer, whereby an attenuated or reduced stream may pass into the
25 bucket from the feed-hopper to complete the partial load delivered thereto by the conveyer when it is in motion.

The feed-conveyer in the present instance is driven or operated by the power of the descending mass or column of material which passes through the feed-hopper, and it is slightly inclined and provided with a series of blades or vanes to facilitate its effective
30 action. The feed-conveyer in the form shown consists of an endless belt or apron 20, the blades or vanes thereof being designated by 21, said belt being passed around the carrying rolls or drums 22 and 23.

The shaft for the roll 22 is designated by 24, and it is supported by the hangers 24' and 24", depending from the brackets 5 and 6, respectively, while the shaft 25 of the roll 23 is sustained by the standards 23' and 23",
35 which rise from the base 2.

I locate at regular intervals along the belt 20 one or more blades—such as *a*, *b*, *c*, and *d*—which extend outward beyond the remainder of the series, three of such sets of wide blades being employed, the first blade *a* of each set constituting a valve or stream-reducer for diminishing the volume of the supply-stream at predetermined points in the travel of said belt. The first two blades *a* and *b* of each of
40 said sets are of substantially the same width, while the two succeeding blades are somewhat narrower, though much wider than the remainder of the series.

At regular stages in the operation of the machine the effective movement of the feed-conveyer 20 will be temporarily arrested or
45 stopped, at which time the first blade *a* of

one of the wide sets will be adjacent to the inclined portion 20' of the feed-hopper H, as indicated in Fig. 3, so that a relatively small
70 stream of material may pass through the space which exists between the discharge edge of inclined portion 20' of the feed-hopper and the valve-blade *a*, from whence it passes into the bucket.

When the feed-conveyer is released, the material from the hopper H, by acting on the wide blades *a*, *b*, *c*, and *d*, can apply a relatively great amount of force to the conveyer to immediately start the same, the feed-conveyer on each of its intermittent movements being of such capacity as to nearly supply the complete bucket-load, the remainder being furnished by the reduced stream, to which I have previously referred. In connection with the feed-conveyer I employ a brake, which is actuated by means controlled by said conveyer.
75

The shaft 24 carries two sprocket-wheels, one of which is shown at 26, (see Figs. 2 and 3,) while the companion shaft 25 carries a pair of coöperating sprocket-wheels, one of which is illustrated in said figures, it being designated by 27, while the connecting-chains for said sprocket-wheels are denoted by 28 and 29, respectively. (See Fig. 1.)
80

The feed-conveyer brake consists of an escapement-lever supported independently of the conveyer-belt and adapted to intermittently engage escapements or escapement-wheels carried by the conveyer-shaft 24, to thereby stop the effective movement of the feed-conveyer F.
85

The feed-conveyer brake or escapement-lever is designated by 30, it being fixed to the rock-shaft 31, which is supported by the framing of the machine, said escapement-lever having a series of three forwardly-extending arms 32, 33, and 34, which are adapted to successively engage the escapement-wheels 35, 36, and 37 on the feed-conveyer shaft 24, so that when any one of the arms of said lever engages the coöperating escapement-wheel the movement of the feed-conveyer F will be stopped.
90

For effecting the engagement of the lever-arms with the respective escapement-wheels at proper stages in the operation of the machine I locate actuators on the sprocket-chains, such actuators being designated by 38, 39, and 40 and consisting of counterweighted dogs pivotally carried by the two chains 28 and 29. The sprocket-chain 28 carries the actuator or dog 38, while the sprocket-chain 29 carries the other two.
95

Attention is called to Figs. 5 and 6, which show, on an enlarged scale, the feed-conveyer controlling or brake mechanism and coöperating devices, the sprocket-chain 28, which travels with the conveyer-belt 20, having nearly carried the actuator or dog into contact with the arm 34 of the escapement-lever 30. When the feed-conveyer has advanced slightly beyond this point, the toe 38' of the
100

dog 38 will engage and ride along the upper face of the arm 34, forcing it downward, with the hook 34' thereof across the plane of rotation of the tooth 37', so that when said tooth 5 abuts against the hook 34 the movement of the feed-conveyer F will be instantly stopped. (See Fig. 3.) When the hook 34' is disengaged from the tooth 37', the feed-conveyer may resume its motion and will be stopped 10 at a further point in the operation of the apparatus by the actuator 39, and subsequently by the actuator 40, these last two actuators, however, cooperating with the escapement-wheels 36 and 37. For thus releasing or freeing 15 the feed-conveyer, whereby it may be stopped, I prefer to employ means operative with or controlled by the weighing mechanism, as will hereinafter appear.

For stopping the flow or passage of the reduced or drip stream to the bucket G at the conclusion of the weighing operation I may employ a cut-off or valve which is to be normally held in its wide-open position to permit the unobstructed passage of the main supply 25 into the bucket, said valve being freed at a point subsequent to the stoppage of the feed-conveyer, whereby it may readily close to cut off the drip or reduced stream. The cut-off or valve is designated by 45 and is of the "pan" 30 type, it being self-closing and rigidly joined to the two-part shaft 46, which is journaled in bearings formed in the end frames 3 and 4, respectively.

For holding the valve in its wide-open position to permit the main supply to enter the bucket I mount a stop on the weighing mechanism, which is adapted to engage a member or part cooperative with the valve and to release the same subsequent to the stoppage of 40 the feed-conveyer. The stop for this purpose is designated by 47 and is of the well-known "by-pass" type, it being counterweighted and pivotally connected to an arm of the scale-beam B', the cooperating member, which is engaged by said by-pass stop, being the rod 48, which depends from the two-part shaft 46. When the beam B' with its mate B passes below the so-called "poising-line," indicating the completion of a bucket-load, the by-pass 50 47 will descend clear of the rod 48, thereby releasing the valve 45, whereby it will instantly shut by its own weight, as illustrated in Fig. 3, to cut off the drip-stream.

On the opening of the cut-off or valve 45, 55 during which movement the feed-conveyer will be started, the depending rod 48, when the valve has nearly reached its wide-open position, will strike the upper arm of the by-pass stop 47 and swing the latter about its 60 pivot, so that the valve will be thereby permitted to resume its normal or wide-open position, following which the by-pass stop 47 will again engage the depending rod 48 to hold the valve against closure.

65 For opening the cut-off or valve and for also releasing the feed-conveyer I provide the counterweighted lever 50, which is shiftably

connected to the scale-beam B', said lever forming a part of the beam mechanism, and its weight being normally added to the beam 70 B, but being subtracted therefrom at a predetermined point. On the return of said lever it is operable through the intervention of properly-located instrumentalities for forcing the valve open. 75

The two-part valve-shaft 46 is furnished with the crank-arm 51, to which is pivoted the reciprocatory rod 52, the free end of said rod being adapted to bear against the inner end of the counterweighted lever 50. 80

It will be remembered that the valve is held in its wide-open position during the loading period and is released at the close of the weighing operation, when it instantly shuts, and while the beam mechanism and the counterweighted lever descend the latter will 85 move away from the free end of said rod, which is held with the valve. On the release of the valve said rod will be thrust downward and into contact with the inner end of the 90 counterweighted lever 50. The beam mechanism will return to its normal position as soon as a part of the bucket contents have been discharged, the lever, however, being locked against return movement therewith. 95 When said lever is unlocked, it of course returns to its normal position, and in so doing it will transmit an upward thrust to the rod 52, which is communicated to the valve 45 to force the same open. 100

In connection with the feed-conveyer and its brake and with the closer L, I provided reciprocally-effective stops.

The rearwardly-extending arm 30' of the brake or escapement-lever 30 has connected 105 thereto the rod or link 53, which is attached to an ear or lug on the stop or blade 54, said stop or blade being pivotally supported by the bucket and having its working face concentric with its axis of movement. The co- 110 acting stop is the rocker 10, which is provided with a relatively long supplemental stop or segmental flange 55.

The office of the two interlocking stops 54 and 10 is to prevent the opening of the closer 115 L while the feed-conveyer F is in motion should the closer-holding latch 15 be tripped too quickly, and for also holding the feed-conveyer out of action or at rest while the closer L is open and any part of the load is being 120 discharged.

The operation of the two coacting stops is illustrated in Figs. 2 and 3, the feed-conveyer F in the first-mentioned view being in motion, while the closer L is shut, and the flange 55 125 of the stop 10 being in contact with the curved face of the stop 54, so that should the latch 15 be prematurely tripped the oscillation of the stop 10 will be positively arrested by its mate 54, and the latter will continue its effective action until the motion of the feed-conveyer F is arrested. When the brake or escapement-lever 30 is actuated, as hereinbefore set forth, by having its arm 34 forced 130

downward, the arm 30' thereof will be elevated, so that the rod or link 53 will be raised to swing the stop 54 bodily across the plane of oscillation of the stop member 10, but the latter is prevented from movement by a second interlocking stop, which is connected to the valve. When, however, the stop 10 does oscillate, due to the opening of the closer L, the flange 55 thereof will ride in contact with the point 54' of the stop 54, so that retractive movement of the latter will be checked and the brake 30 will be thereby maintained in its effective position.

On the shutting of the closer L the stop or rocker 10 will be caused to resume its normal position, and when it has nearly reached the end of its return stroke it will release the stop 54.

The stop which coöperates with the stop 10 and which is directly connected to the valve is designated by 56, it being mounted on the bucket and carried by the pivot which supports the stop 54. The stop 56 has an angular arm or extension 57, which is connected by the rod 58 to the crank-arm 59 on the two-part valve-shaft 46. The stop 56 is substantially similar in construction and mode of operation to the stop 54, except that its working face is much longer. As the bucket descends during the course of the weighing operation the flange 55 will remain in contact with the stop 56, so that the rocker 10, and necessarily the closer L, can have no movement at all if the latch 15 should have been tripped prematurely.

On the completion of the bucket-load and the rapid closure of the valve 45 the rod 58 and angular arm 57 will be thrust downward from the position shown in Fig. 2, thereby swinging the stop member 56 bodily to the right, as illustrated in Fig. 3, and across the plane of the curved face of the flange 55, so that the latch being tripped the stop 10 will be free to swing about its pivot as the closer L opens, and in doing so the relatively wide flange 55 will be contiguous to the point 54' of the stop 56 to thereby lock the return movement thereof, whereby the valve 45 will be held in its closed position during the discharge of the bucket-load.

The stop 56 is furnished with a laterally-projecting stud or boss 59^x, which abuts against the stop or blade 54, as indicated in Fig. 3, to thereby limit the too great closing movement of the valve 45.

For tripping the latch 15 I prefer to employ a tripper operative with the cut-off valve 45, such a tripper being shown at 60 as a fixed projection on the reciprocatory rod 52, which, on the closure of the valve 45 in the manner hereinbefore set forth, is caused to impinge against the laterally-extending pin 61 on the latch 15, thereby depressing said latch and disengaging it from the rocker or stop 10, whereby the closer L is released. When so released, the two closer-leaves 7 and 7' will be simultaneously forced open by the weight

of the contents within the bucket G, such contents being discharged into the chamber of the supporting-base 2.

The stop 54 is provided with an angular arm 62, the free end of which is normally adjacent to the by-pass actuator 63, which is mounted on the inwardly-extending pin 64 of the rod 52, and said arm 62 on the closer-releasing movement of the stop 54 will be caused to cross the line of movement of said by-pass actuator.

The by-pass actuator on the downstroke of the reciprocatory rod, concurrent with the closure of the valve 45, will abut against the arm 62, which at this time is a resistance member or fixture, so that the by-pass actuator will be rocked about its pivot, thereby permitting the rod 52 to freely descend to the end of its downstroke, and during the interim the by-pass actuator will be forced to its effective position, a counterweight being employed for this purpose.

On the upstroke of the rod 52 to open the valve the by-pass actuator 63, which is then held against movement, will engage the arm 62 of the stop 54, raising said arm and thereby swinging the stop 54 to the left. As the stop 54 is thus swung it will draw the rod 53 and the escapement lever-arm 30' down, thereby disengaging the arm 34 of said lever from the escapement-wheel 37, so that the feed-conveyer F will be released, and the closer L being shut and latched the said conveyer will be driven by the force of the material which descends from the feed-hopper II, such material being conducted into the empty bucket by said conveyer.

The operation of the hereinbefore-described weighing-machine, briefly, is as follows: Fig. 2 represents the positions occupied by the various parts at the commencement of operation, the closer L being shut and held in such position by the latch 15, which is in engagement with the arm 16 of the rocker 10, the bucket G, of course, being empty. The valve 45 is held in its wide-open position by the stop 47 of the scale-beam B, which engages the rod 48 of the valve. The feed-conveyer F, which has been released, will be started in motion by the downflowing mass of material which emerges from the hopper II and which acts against the plates 21 thereof. On the movement of the conveyer it will conduct the material into the empty bucket G, sufficient of the mass being delivered thereto to nearly complete the bucket-load, said bucket when the mass has been received thereby descending for a limited distance. As the feed-conveyer moves, the sprocket-chain 28, which travels therewith, will carry the toe 38' of the actuator 38 into engagement with the upper face of the lever-arm 34, thereby forcing said arm downward, so that the tooth 37' of the escapement-wheel 37 may abut against the hook 34' of said lever-arm, to thereby intercept the effective movement of the conveyer F, the blade *a* at this time having reached a point adjacent to the discharge edge of the inclined

portion 20' of the feed-hopper, so that a comparatively small stream may pass between said discharge edge and the blade *a* to complete the partial load delivered to the bucket by the feed-conveyer F. This reduced or drip stream will then flow into the bucket for a comparatively brief space of time, and when it completes the bucket-load the beam mechanism will pass below the so-called "poising-line," the by-pass stop 47 on the beam B' thereby releasing the rod 48 and consequently the valve 45, so that the latter will shut, and in so doing the rod 52 will be forced downward, with its projection 60 thereof, into engagement with the pin 61 of the latch 15, thereby tripping said latch and disengaging it from the rocker 10, which action releases the closer L. On the release of the closer the two plates 7 and 7' will be forced open by the weight of the contents within the bucket, and when the said contents have been discharged the closer L and other parts will return to their normal positions. On the succeeding operation of the machine the actuator or dog 39 will engage the lever-arm 33 to force it into engagement with the escapement-wheel 36, to thereby stop the feed-conveyer, and on the next succeeding operation of the machine the same action will take place with respect to the actuator or dog 40, the lever-arm 34, and the escapement-wheel 37".

Having described my invention, I claim—

1. The combination, with a hopper, of a conveyer having a series of blades thereon, one or more of which extend outward beyond the other of the series.

2. The combination, with a hopper, of a conveyer having a series of blades and mounted to be driven by a supply of material passing through said hopper, one or more of said blades extending outward beyond the others of the series.

3. The combination, with weighing mechanism including a load-receiver, of a hopper having an inclined portion; an inclined conveyer disposed between the hopper and the load-receiver, said conveyer having a series of blades thereon and being driven by a supply of material passing through the hopper, certain of said blades being wider than the remainder of the series and being also located at regular intervals along the feed-conveyer; and means for intermittently arresting the action of said conveyer when the wide blades are opposite the discharge edge of the inclined portion of the hopper, to thereby permit a diminished stream to pass into the load-receiver.

4. The combination with weighing mechanism including a bucket, of a hopper; an intermediate feed-conveyer; a brake for said feed-conveyer; and means controlled by the feed-conveyer, for actuating said brake.

5. The combination with weighing mechanism including a bucket, of a hopper; an intermediate feed-conveyer; a brake for said feed-conveyer; means carried by the feed-conveyer, for actuating said brake; and instru-

mentalities operated by the weighing mechanism for releasing said feed-conveyer.

6. The combination with a bucket and its supported beam mechanism, of a hopper; a feed-conveyer located between the hopper and the bucket; a brake for said feed-conveyer; means carried by said feed-conveyer, for actuating the brake; and instrumentalities operated by the beam mechanism, for releasing said feed-conveyer.

7. The combination with weighing mechanism including a bucket, of a hopper; a feed-conveyer intermediate the hopper and the weighing mechanism, said feed-conveyer having a series of blades thereon, one or more of which extend outward beyond the others of the series.

8. The combination with a hopper, of a cooperative feed-conveyer having a series of blades certain of which are wider than the others, said wide blades being located at intervals and in sets along the feed-conveyer.

9. The combination, with weighing mechanism including a load-receiver, of a hopper; a conveyer located below said hopper and having a shaft; an escapement-wheel and chain carried by said shaft; a brake for engaging said escapement-wheel; and means carried by said chain, for actuating said brake.

10. The combination, with weighing mechanism including a load-receiver, of a hopper; a conveyer located below said hopper and having a shaft; an escapement-wheel and chain carried by said shaft; a brake for engaging said escapement-wheel; and a counterweighted dog on said chain, for actuating said brake.

11. The combination, with weighing mechanism including a load-receiver, of a hopper; a conveyer located below said hopper and having a shaft; a series of escapement-wheels on said shaft; and means for intermittently engaging said wheels, to thereby stop the conveyer.

12. The combination, with weighing mechanism including a load-receiver, of a hopper; a conveyer located below said hopper and having a shaft; a series of escapement-wheels carried by said shaft; a lever having a series of arms adapted to intermittently engage said escapement-wheels; and means for actuating said lever.

13. The combination, with weighing mechanism including a load-receiver, of a hopper; a conveyer consisting of an endless belt and its supporting-shafts; sprocket-wheels carried by said shafts; sprocket-chains connecting said sprocket-wheels; a plurality of escapement-wheels carried by one of the shafts; a lever having a series of arms located to intermittently engage the escapement-wheels; and pivotally-supported counterweighted dogs carried by said chains and adapted to intermittently engage and operate said lever-arms.

14. The combination, with weighing mechanism including a load-discharge member, of a hopper; a conveyer having a stream-reduc-

ing blade operable for diminishing the volume of a stream of material issuing from said hopper at a predetermined point; means for stopping the motion of the conveyer when the stream is thus diminished; and reciprocatory stops operative, respectively, with said conveyer and load-discharge member, one of them being adapted to hold the latter against premature movement during the load-supply period and the other being adapted to hold the conveyer against motion on the discharge of a load.

15. The combination with weighing mechanism including a load-discharge member, of a hopper; a feed-conveyer coöperative with said hopper and having a stream-reducer; a brake for said feed-conveyer; and reciprocally-effective stops, one of which is operative with the load-discharge member and the other of which is directly connected to the feed-conveyer brake.

16. The combination, with weighing mechanism including a shiftable load-discharge member, of a hopper; a conveyer having a series of blades, one or more of which extend outward beyond the others of the series; and a stop member operative with said conveyer and adapted to limit the movement of said load-discharge member.

17. The combination, with a bucket having a discharge-outlet; of a closer for said outlet, consisting of two leaves hinged together at the middle and joined to the bucket at their point of connection, one of said closer-leaves being counterweighted; a compound toggle, two of the members of which are connected, respectively, to one of the closer-leaves and the counterweight of the other closer-leaf, the third toggle member being mounted upon the bucket; and a detent for engaging said last-mentioned toggle member.

18. The combination with weighing mechanism including a bucket, of a hopper; a feed-conveyer; a brake for said feed-conveyer; means for actuating said brake, to throw it into its effective position to stop the feed-conveyer; a blade operatively connected to said brake; and instrumentalities operative with the weighing mechanism, for imparting a movement to said blade to return the brake to its ineffective position.

19. The combination with weighing mechanism including a bucket, of a hopper; a feed-conveyer; a brake for said feed-conveyer;

means for actuating said brake, to throw it into its effective position to stop the feed-conveyer; a blade operatively connected to said brake and having an extension; and a reciprocatory rod operative with the weighing mechanism and having a projection adapted to engage said extension to thereby return the brake to its ineffective position.

20. The combination with weighing mechanism including a bucket, of a hopper; a feed-conveyer; a brake for said feed-conveyer, consisting of a lever; means for actuating said brake, to throw it into its effective position to stop the feed-conveyer; a blade; a rod connected to said blade and to the brake; a reciprocatory rod having a by-pass actuator thereon adapted to engage an extension of said blade to thereby return the brake to its ineffective position.

21. The combination with weighing mechanism including a bucket, of a hopper; a feed-conveyer; a brake for said feed-conveyer; a pair of blades mounted on the bucket, one of which is connected to said brake and has an extension; a valve connected to the other blade, said blades constituting stops; a reciprocatory rod having a projection adapted to engage said extension on one of the strokes of said rod; and a stop connected to the closer and coöperative with said first-mentioned stop.

22. The combination with weighing mechanism including a bucket having a closer; of means including a latch, for normally holding said closer against movement; a hopper; a feed-conveyer having a stream-reducing blade thereon; means for stopping said feed-conveyer at a predetermined point in its travel; a valve; means for holding said valve in its wide-open position during the movement of the feed-conveyer and for releasing the same subsequent to the stoppage thereof; and a latch-tripper connected to said valve.

23. The combination with a bucket having a discharge-outlet; of a closer for said outlet, consisting of two leaves hinged at the middle and joined to the bucket at their point of connection; a compound toggle operatively connected to the closer; and a detent for engaging one of the toggle members.

FRANCIS H. RICHARDS.

Witnesses:

FRED. J. DOLE,
HEATH SUTHERLAND.