

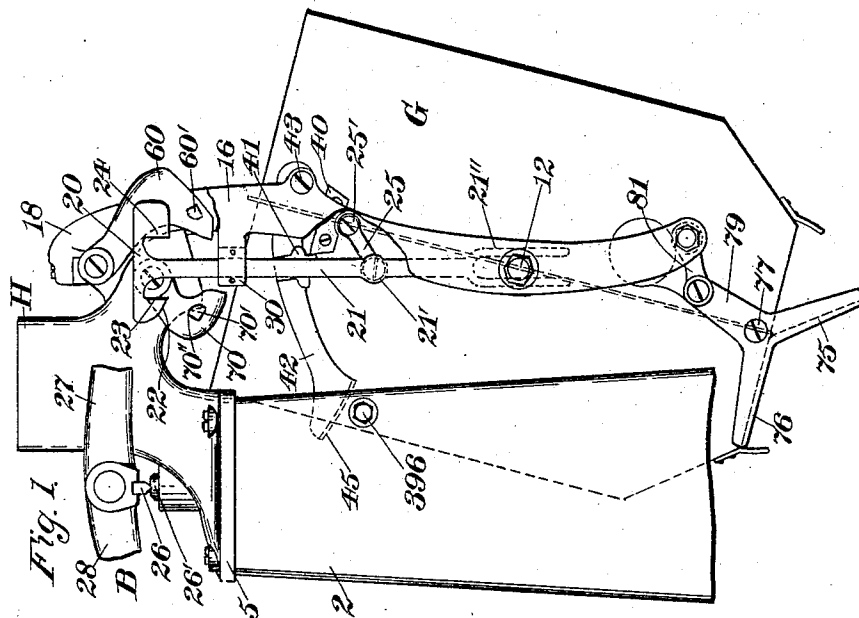
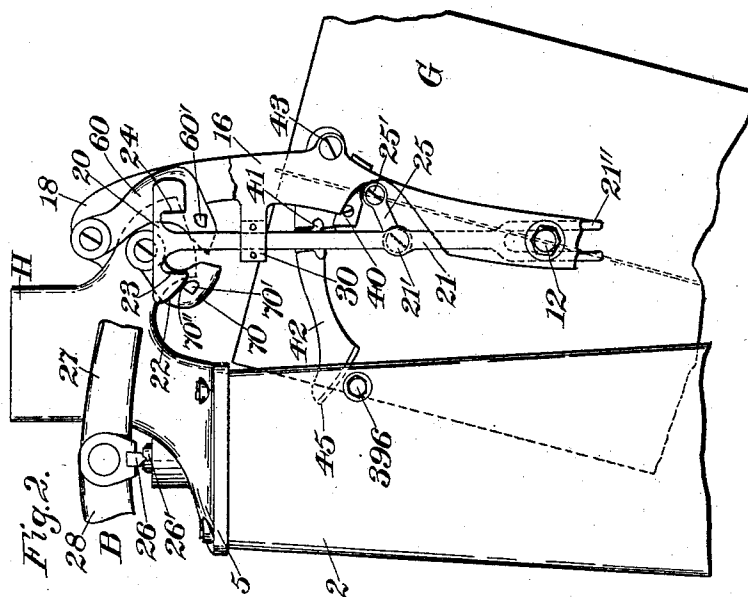
(No Model.)

3 Sheets—Sheet 1.

F. H. RICHARDS.
AUTOMATIC WEIGHING MACHINE.

No. 548,851.

Patented Oct. 29, 1895.



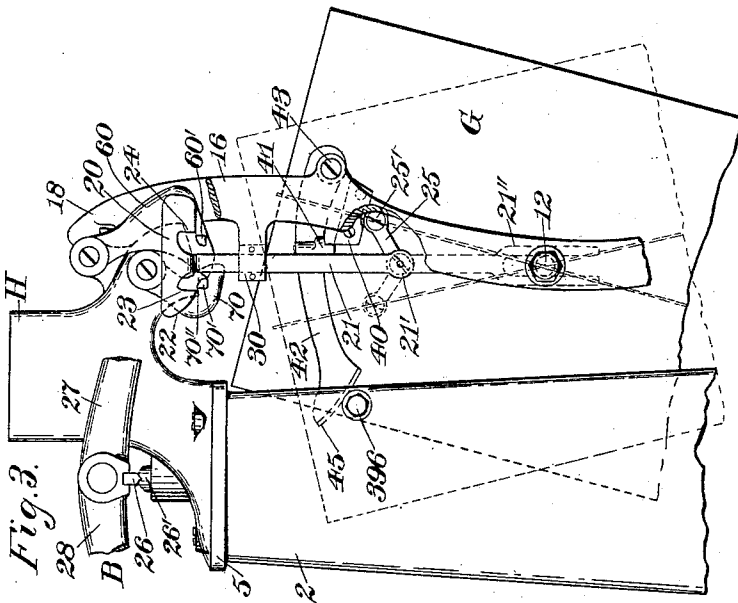
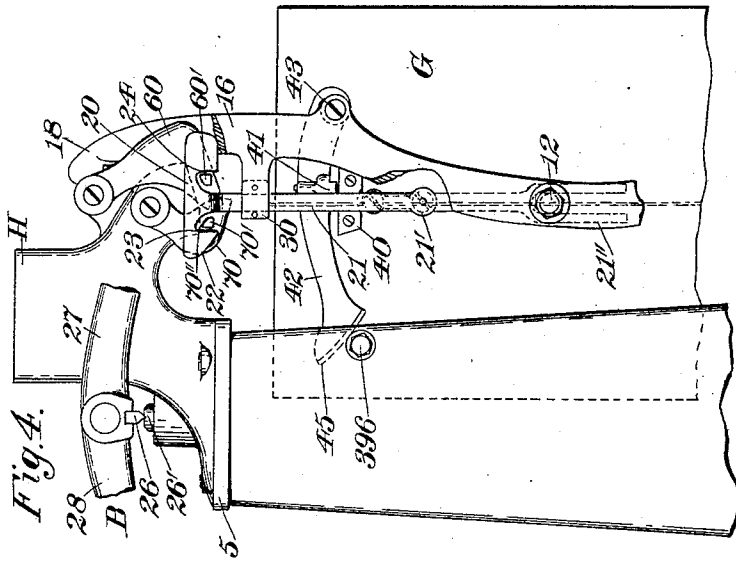
Witnesses;
J. L. Edwards &
Fred. J. Dole.

Inventor:
F. W. Richards.

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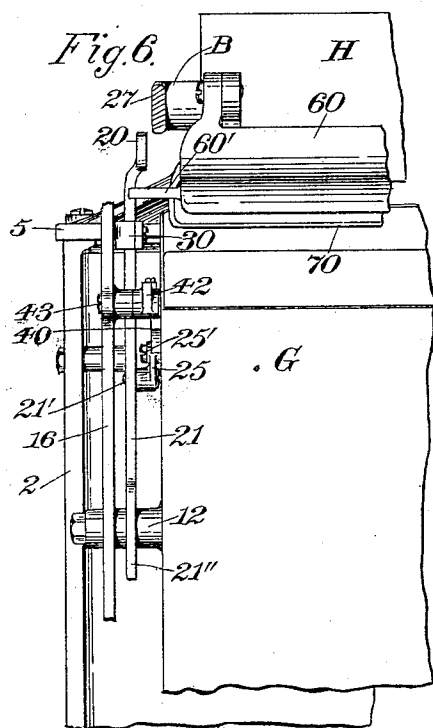
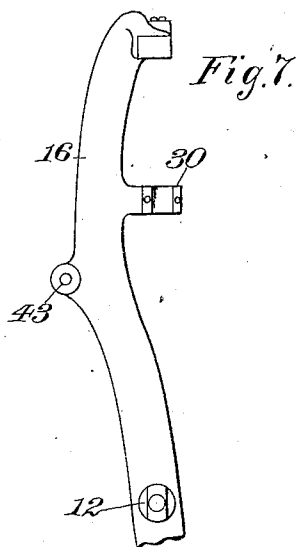
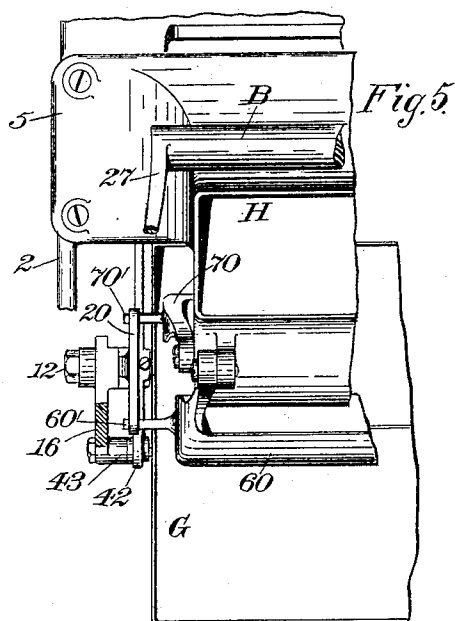


Fig. 8.

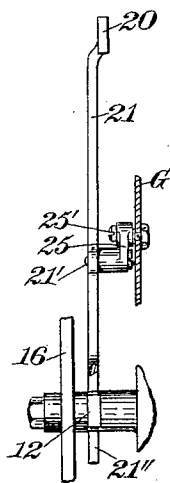
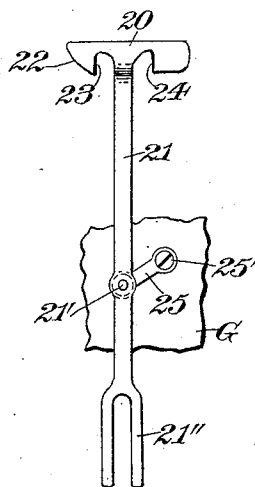


Fig. 9.



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UNITED STATES PATENT OFFICE.

FRANCIS H. RICHARDS, OF HARTFORD, CONNECTICUT.

AUTOMATIC WEIGHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 548,851, dated October 29, 1895.

Application filed June 10, 1895. Serial No. 552,197. (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 Automatic Weighing-Machines, of which the following is a specification.

This invention relates to weighing-machines, the object being to provide an improved valve and bucket mechanism embodying an organization of coacting, bucket-shifting, limiting, and valve-locking devices which are especially adapted for use in connection with weighing-machines of the "double-bucket" type or class and which are adapted for limiting the shifting movement of the bucket mechanism by the non-closing of the valve, and are also adapted for positively preventing the opening of the valve or valves by the partial oscillation of the bucket and until said bucket is in a stream-receiving position.

In the drawings accompanying and forming part of this specification, Figures 1, 2, 3, and 4 are right-hand end elevations illustrating portions of a weighing-machine of the double-bucket class and embodying my present improvements, and show the valve and the bucket mechanism in four successive positions. Fig. 5 is a plan view, and Fig. 6 is a front elevation, of the portions of the weighing-machine illustrated in Figs. 1, 2, 3, and 4. Fig. 7 is an enlarged detail view of one of the bucket-hangers. Fig. 8 is also an enlarged detail of a portion of my limiting and locking means and certain adjacent portions of the bucket of the machine, and Fig. 9 is a view of the machine as seen from the left in said Fig. 8.

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

The weighing-machine partially illustrated in the accompanying drawings is of the well-known double-bucket class or type and is illustrated as embodying my present improvements. It will be obvious, however, that these improvements may be used as well in connection with machines of other types.

A detailed description of the operation of the machine of the double-bucket class may be had on reference to my prior Letters Pat-

ent No. 442,713, granted to me December 16, 1890, or to Letters Patent No. 447,354, granted to me March 3, 1891. The drawings merely show sufficient portions of such a machine as to clearly illustrate the operation of the present improvements.

The operative parts of a weighing-machine are carried by some suitable framework, usually comprising two side frames connected by a top plate or beam. There is shown in the drawings a portion of one of these side frames (designated by 2) and a portion of the connecting top plate, (designated by 5.) The top plate 5 is illustrated as carrying a supply-chute H, which may be of any well-known form and connected to the top plate in some suitable manner.

There is shown in the drawings but a portion of the beam mechanism. The scale-beam B is provided with a pair of forwardly-extending bucket-supporting arms, a portion of one of these bucket-supporting arms being shown at 27. The scale-beam B is also pivotally supported on the top plate, the support shown comprising a knife-edge 26, carried by said scale-beam B, which rests on or is supported by the V-shaped bearing 26, the latter being carried by the framework. The beam-supported knife-edge and its supporting V-shaped bearing, it will be understood, are duplicated at the opposite side of the framework. The scale-beam B also comprises a rearwardly-extending weight or counterpoise-supporting arm, a portion of which is shown at 28, the purpose of this arm being adapted to support the counterpoise. (Not shown.)

The bucket mechanism embodies two members, one of which is shiftable relatively to the other for discharging a load. The bucket (designated by G) is of the well-known double-bucket type or class and is pivotally supported for oscillatory movement. Said bucket G is so suspended relatively to the supply-chute H that its chambers or compartments are adapted for alternate positioning under said chute for the purpose of receiving the supply-stream. The bucket is illustrated as carrying a pair of hangers 16 and 18, by which it is supported from the beam-arms 27. The hanger 16 is shown as having a journal-opening, which is adapted to receive the pivot 12 of the bucket. A similar pivot is provided

at the opposite side of the bucket, which bears in a similar journal-opening in the hanger 18, the bucket oscillating or shifting on these pivots.

5 For maintaining the bucket in a fixed relation, so that either one of the two compartments thereof may receive the supply-stream, I prefer to employ the form of detent apparatus shown in the drawings. This detent
10 apparatus is illustrated as embodying a latch or lever 42, pivoted at 43 to the hanger 16. For securing uniformity of operation this detent apparatus may be duplicated at the opposite side of the machine. The bucket latch
15 or lever 42 is illustrated as terminating in an enlarged portion 45, which engages a bucket-latch stop 396, (shown as fixedly secured to the side frame 2.)

A detent-catch is shown at 41 secured to the
20 bucket latch or lever 42, and this is adapted for co-operating with a substantially similar detent catch or stop 40, which latter is shown as carried by the bucket G. Each of these detent-catches is provided with a pair of stop
25 or locking faces for alternately locking the bucket in its two positions, in one position permitting the flow of the supply-stream into one of the bucket-compartments, and in the other position permitting the flow of the
30 stream into the other compartment. During the time when the bucket is in its stream-receiving position these detents should be in locked engagement, (see Fig. 1,) and as the bucket descends the latch or lever 42 is
35 brought into engagement with the stop 396 on the side frame 2, which action disengages the detents 40 and 41, (see Fig. 4,) which permits a shifting or oscillation of the bucket.

Any suitable valve mechanism may be employed. That illustrated embodies a pair of
40 coacting valves constituting, respectively, a main reducing-valve and a supplemental cut-off valve. The reducing-valve is illustrated at 60, pivotally supported from the supply-
45 chute H. Said valve 60 closes under the supply-chute and is somewhat more than half the width of the supply-opening in said chute and is intended for reducing the volume of the supply-stream until this is brought to a
50 reduced size or to what is usually termed the "drip-stream." The cut-off valve is illustrated at 70 and is shown as pivotally supported from the supply-chute, this valve being
55 intended for controlling the drip-stream by cutting off said stream on the completion of a load in either one of the two compartments. It will be obvious, then, that the main
60 reducing-valve and supplemental cut-off valve are operable toward each other for cutting off the supply-stream. For opening and closing the two valves any suitable actuating mechanism may be employed. For example, it may be operated from and by the beam mechanism.

65 One form of closer for the bucket is shown in Fig. 1 as comprising two oppositely-disposed and suitably-shaped plates or closers

proper 75 and 76, formed integrally and having arms 79, which are pivoted at 77 to the bucket G. These arms are connected by a
70 pair of links to the hangers 16 and 18. There is shown in the drawings but one of the arms 79 and links 81. The links 81 and the arms 79 of the closers constitute toggles for alternately actuating each of the closers 75 and
75 76 for alternately opening and closing the bucket-compartments on the complete shifting of the bucket.

The present improvements embody means in the nature of a safety device or safety-stop
80 for limiting the shifting of the bucket by the non-closing of the valve. By means of this safety-stop the shifting of the bucket is deferred until the compartment that is receiving the supply-stream has completed its load,
85 and during this period the discharging-bucket has ample time in which to wholly discharge its load. It will therefore be understood that by means of the safety-stop premature shifting of the bucket is prevented. The safety-
90 stop is preferably carried by and is shiftable into operative relation with a stop carried by one of the valves, preferably the cut-off valve, and while in such operative relation the shifting of the bucket is prevented. The safety-
95 stop, also, immediately when the bucket shifts or oscillates for assuming a vertical position, is intended to act as a lock for locking and holding closed the valve or valves until
100 the bucket is in a stream-receiving condition. Occasionally during the operation of weighing-machines of the double-bucket class as heretofore constructed the bucket on assuming
105 a true vertical position stops, (see Fig. 4,) and should the bucket be in its uppermost position, as often occurs, the valve or valves, as well as the closers, will simultaneously open, permitting a flow of the stream through
110 the bucket, thereby wasting, but not weighing, the material, which stream would so flow until the bucket were shifted by hand to one or the other of its positions. As hereinbefore
115 stated, the safety-stop comprises, also, means for locking and holding the valves closed as soon as the bucket commences its shifting movement. It will of course be understood, then, that should such a contingency as that
120 just pointed out occur the stream could not flow into the bucket, the valves being locked and maintained in this position until the bucket is shifted into its proper position. The locking function of the safety device is
125 also of further practical value, as when it is desired to not use the machine it will be only necessary to shift the bucket by hand, bringing it to the intermediate position (shown by
130 Fig. 4) when the valve will be locked and remain so until released by hand, or until a complete shift of the bucket.

From the foregoing it will be understood
130 that the safety-stop serves alternately as a bucket-shifting limiter by the non-closing of a valve and also as a valve-lock by the shifting of the bucket.

The safety-stop is shown operable independently of the movements of the valve mechanism and is so disposed relatively to the valve and bucket mechanism that while performing effectively its intended functions it can in no wise affect or interfere with a proper working of the valve, valves, or bucket.

Each of the valves is illustrated as provided with a locking-stop. The locking-stop for the reducing-valve is designated by 60', and that for the cut-off valve by 70'. The locking-stop 70' of the cut-off valve is illustrated as provided with an upper working face 70'', which is adapted for co-operation with the safety-stop for limiting the bucket-shifting movement, as will be hereinafter described.

The safety-stop is shown as comprising two integral members or arms—a horizontal arm and a vertical arm. The horizontal arm of the safety-stop is designated by 20, and the vertical arm by 21. The horizontal arm is adapted, by means of the vertical arm, the latter constituting one member of a toggle, actuated by the bucket on the descent of the latter, to be first brought into frictional engagement with the working face 70'' of the locking-stop 70' to prevent the premature shifting of the bucket, and subsequently to be carried downwardly into locked engagement with the locking-stops 60' and 70' of the valves by the force of the shifting bucket.

The horizontal arm 20 of the safety-stop is illustrated as provided with a working face 22, slightly curved, which is adapted when said horizontal arm has been pulled downwardly to be brought into frictional contact with the working face 70'' of the cut-off-valve-locking stop 70' as said cut-off valve closes. The contact of these faces is merely momentary, it being just of sufficient duration to prevent shifting of the bucket during the completion of a load in one or the other of the bucket-compartments and while the companion compartment is discharging its load. On the further closing movement of the cut-off valve the face 70'' is carried past the working face 22 of the safety-stop, at which period the stream will be cut off by said valve and the bucket will be in a condition for shifting or oscillating to discharge the load in the loaded compartment. The horizontal arm of the safety-stop is also shown as provided with a pair of locking-stops 23 and 24, which are adapted when the bucket oscillates or shifts to be brought into locked engagement with the valve-locking stops 70' and 60', thereby preventing opening movement of said valves as the bucket shifts or when said bucket is in a vertical position, as shown by Fig. 4, and while the bucket is in said position this locked engagement will be maintained.

As hereinbefore stated, the safety-stop is actuated by means of a toggle operatively connected with the bucket. The vertical arm 21 of said safety-stop constitutes one member of this toggle. The other member of this toggle is shown as a link 25, pivoted to the bucket

at 25' and to the vertical arm 21 of the safety-stop at 21'.

The bucket G, it will be understood, constitutes the power on its descent for first pulling downwardly the safety device into operative relation with the working-face 70'' of the cut-off-valve-locking stop, to thereby prevent oscillation of the bucket, and when the face 70'' has passed beyond the face 22 then constituting the power, when the bucket is shifted, for carrying the safety-stop into locked engagement with the locking-stops of the valves by means of the toggle connection with said bucket and maintaining said locked engagement until a further shifting of the bucket or until the latter is in a stream-receiving condition.

Means are provided for guiding the vertical arm of the safety-stop, whereby said safety-stop is maintained in an operative position. An arm is shown at 30 projecting from the hanger 16, and it has formed therein a suitable guideway to receive and permit of the free sliding movement of the vertical arm 21 of the safety-stop, while preventing lateral motion thereof. Said vertical arm 21 terminates in a bifurcation or fork 21'', which is adapted to straddle or engage the pivot 12 of the bucket, and also serves as an additional means for guarding the said arm and preventing lateral motion thereof. It will be apparent that as the bucket descends the safety-stop will be carried with it at substantially the same rate of speed as the bucket so long as these travel in parallel planes. Immediately on the shifting or oscillation of the bucket the safety-stop is given an accelerated powerful pull, the working face 70'' of the cut-off valve having in the meantime passed beyond the working face 22 of the safety-stop, and the stops 23 and 24 are drawn into locked engagement with the locking-stops 60' and 70' on the valves, and these stops will remain in locked engagement so long as the bucket remains in a vertical position, as might sometimes be the case. On the complete shifting of the bucket to discharge the load in the loaded compartment the safety-stop is carried out of locked engagement with the valve-locking stops 70' and 60' with an accelerated thrust by means of the toggle, so that the valves are opened quickly for the purpose of permitting the flow of the stream into the empty bucket-compartment.

The operation of a weighing-machine embodying my present improvements, briefly stated, is as follows: On reference to Fig. 1 it will be assumed that the compartment to the right is discharging a load and that the companion compartment is receiving the supply-stream. As the bucket descends it carries with it, as hereinbefore stated, the safety-stop, which has the working face 22. During the descent of the bucket the reducing-valve is being actuated to reduce in volume the supply-stream. As the bucket descends the latch 42 is brought into engagement with the

stop 396 on the side frame 2, which raises said latch and its detent 41 from out of engagement with the bucket-detent 40, until at the proper period these detents are wholly disengaged.

5 When this is reduced to a drip-stream, the working face 22 of the safety-stop is brought into contact with the working face 70'' of the cut-off-valve-locking stop 70', which engagement prevents the bucket from shifting, and
10 should there be a portion of a load in the opposite compartment giving the latter compartment, while these working faces are in engagement, ample time in which to discharge its load. As the said working faces are brought
15 into contact, which is quite slight, the cut-off valve is closing for cutting off the supply-stream, and in so closing the working face 70'' of the cut-off valve 70 is riding over the working face 22 of the safety-stop 20. When these
20 have passed out of engagement, the cut-off valve will then be permitted to close, thereby wholly cutting off the drip-stream and at the same time the bucket. The discharging-compartment, having in the meantime been emptied of its load, will be permitted to oscillate or shift, carrying the safety-stop into locked engagement with the valve-locking stops, thereby preventing an opening of said valves while the bucket is so oscillating or shifting
25 and maintaining them in this condition until the bucket is in a position for its opposite compartment to receive the supply-stream. If from any cause the bucket in shifting should be brought to an intermediate position, (see Fig. 4,) as might sometimes be the case under certain conditions, the valves will be locked and cannot open, as shown at Fig. 4, and the bucket will so remain until shifted by hand.

30 In Fig. 3 the dotted lines show the position assumed by the bucket when a complete oscillation thereof has been made.

Having thus described my invention, I claim—

45 1. In a weighing-machine, the combination with a bucket mechanism embodying a bucket, and having said bucket oscillatory for discharging a load; of means for supplying a stream of material to said bucket; a valve adapted for cutting off said supply-stream; and a safety-stop co-operatively disposed relatively to the valve and to the bucket mechanism and in position and adapted for limiting the oscillation of the bucket by the non-closing of the valve, substantially as specified.

2. In a weighing-machine, the combination with a bucket mechanism embodying a bucket, and having said bucket oscillatory
60 for discharging a load; of means for supplying a stream of material to said bucket; a valve adapted for cutting off said supply-stream; and a safety-stop operable independently of the movements of said valve in position and adapted for preventing the opening
65 of said valve by a partial oscillation of said bucket, and having said stop also adapted for

maintaining said valve in a closed position until the bucket is in a stream-receiving position, substantially as specified.

3. In a weighing-machine, the combination with a bucket mechanism embodying a bucket, and having said bucket oscillatory for discharging a load; of means for supplying a stream of material to said bucket; a valve adapted for cutting off the supply-stream; and a safety-stop carried by the bucket, and adapted to be brought into operative relation with said valve, to thereby limit the oscillation of said bucket by the non-closing of said valve, substantially as specified.

4. In a weighing-machine, the combination with a bucket mechanism embodying a bucket, and having said bucket oscillatory for discharging a load; of means for supplying a stream of material to said bucket; a valve adapted for cutting off said supply-stream; and a safety-stop having two movements, and having one of said movements for limiting the oscillation of the bucket by the non-closing of the valve, and having the other of said movements for preventing the opening of said valve on the partial oscillation of said bucket, and maintaining said valve in a closed position until the bucket is in a stream-receiving position, substantially as specified.

5. In a weighing-machine, the combination with a bucket mechanism embodying a bucket, and having said bucket oscillatory for discharging a load; of means for supplying a stream of material to said bucket; of a valve adapted for cutting off the supply-stream; and a safety-stop operatively connected with said bucket, and operable by the power of the oscillating-bucket for limiting the oscillation of said bucket, and for locking and holding closed said valve by the partial oscillation of the bucket, and until said bucket is in a stream-receiving position, substantially as specified.

6. In a weighing-machine, the combination with a bucket mechanism embodying a bucket having two compartments, and having said bucket oscillatory for alternately discharging said compartments; of means for supplying a stream of material to said compartments; a valve for cutting off said stream on the completion of a load; and a safety-stop operable independently of the movements of the valve for limiting the oscillation of the bucket during the period that one of said compartments is discharging a load, and while the other of said compartments is receiving the supply-stream, substantially as specified.

7. In a weighing-machine, the combination with a bucket mechanism embodying a bucket having two compartments, and having said bucket oscillatory for discharging its load; means for supplying a stream of material to said compartments; a valve for cutting off the supply-stream on the completion of a load; and a safety-stop operable independently of the movements of the valve and for

locking said valve closed by the partial oscillation of the bucket, and for holding said valve closed until the bucket is in a stream-receiving position, substantially as specified.

8. In a weighing-machine, the combination with a bucket mechanism embodying a bucket oscillatory for discharging a load; of means for supplying a stream of material to said bucket; a pair of valves adapted for controlling the supply-stream, and each having a stop; and a safety device operatively connected with the bucket, and having a pair of locking members, and having said locking members adapted to be brought into locked engagement with the valve-stops on the partial oscillation of the bucket, to thereby lock the valves closed until the bucket is in a stream-receiving position, substantially as specified.

9. In a weighing-machine, the combination with a bucket mechanism embodying a bucket oscillatory for discharging a load; of means for supplying a stream of material to said bucket; a pair of coacting-valves adapted for controlling the supply-stream and constituting, respectively, a main reducing-valve and a supplemental cut-off valve, and having said valves operable toward each other for cutting off the supply-stream, and having said main-valve provided with a stop; and a safety device operatively connected with the bucket, and provided with a locking member adapted to be brought into locked engagement with the main reducing-valve on the partial oscillation of the bucket, for holding said main-valve against opening movement, until the bucket is in a stream-receiving position, substantially as specified.

10. In a weighing-machine, the combination with a bucket mechanism embodying a bucket, and having said bucket oscillatory for discharging a load; of means for supplying a stream of material to said bucket; a valve for cutting off the supply-stream on the completion of a load, and having a stop; and a safety-stop having two movements, and adapted on one of said movements to co-operate with said valve-stop, to thereby limit the oscillation of the bucket, and on the oscillation of said bucket to be brought into locked engagement with said valve-stop, and to remain in locked engagement with said valve-stop, until the bucket is in a stream-receiving position, substantially as specified.

11. In a weighing-machine, the combination with a bucket mechanism embodying a bucket oscillatory for discharging a load; of means for supplying a stream of material to said bucket; a valve for cutting off the supply-stream on the completion of a load, and having a stop; and a safety-stop comprising two arms, and having one of said arms provided

with a locking-stop, and the other of said arms constituting one member of a toggle; a link pivoted to the bucket, and constituting the other member of said toggle, and having said safety-stop adapted, on the oscillation of said bucket, to be carried into locked engagement with the valve-stop, and to remain in locked engagement until the bucket is in a stream-receiving position, substantially as specified.

12. In a weighing-machine, the combination with a bucket mechanism embodying a bucket oscillatory for discharging a load; of means for supplying a stream of material to the bucket; of a valve for cutting off the supply-stream on the completion of a load, and having a stop; and a safety-stop comprising two arms and having one of said arms provided with a locking-stop, and the other of said arms constituting one member of a toggle; a link pivoted to the bucket and constituting the other member of said toggle, and having said safety-stop adapted, on the oscillation of said bucket, to be carried into locked engagement with the said stop, and to maintain said locked engagement until the bucket is in a stream-receiving condition; and means for guiding and preventing lateral movement of said toggle-arm of the safety-stop, substantially as specified.

13. In a weighing-machine, the combination with a bucket mechanism embodying a bucket, and having said bucket oscillatory for discharging a load; of means for supplying a stream of material to said bucket; a pair of valves for controlling said supply-stream, and each of said valves having a stop; a safety device having two members, and having one member of said safety-stop provided with a pair of locking-stops, and said member also having a working-face, and having the other member of said safety device constituting one member of a toggle, and having the other member of said toggle constituting a link pivotally carried by the bucket, and having the working-face of said safety-stop to be carried into operative relation with one of said valve-stops, and by the power of the bucket to thereby limit the oscillation of said bucket; and having also said safety device adapted, on the oscillation of the bucket, to be carried into locked engagement with the locking-stops on the valves, and to hold said valves closed until the bucket is in a stream-receiving condition; and means for preventing lateral movements of the toggle member of the safety device during the descent and oscillation of the bucket, substantially as specified.

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Witnesses:

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F. N. CHASE.