(No Model.)

F. H. RICHARDS.

AUTOMATIC WEIGHING MACHINE.

No. 548,847. Patented Oct. 29, 1895.

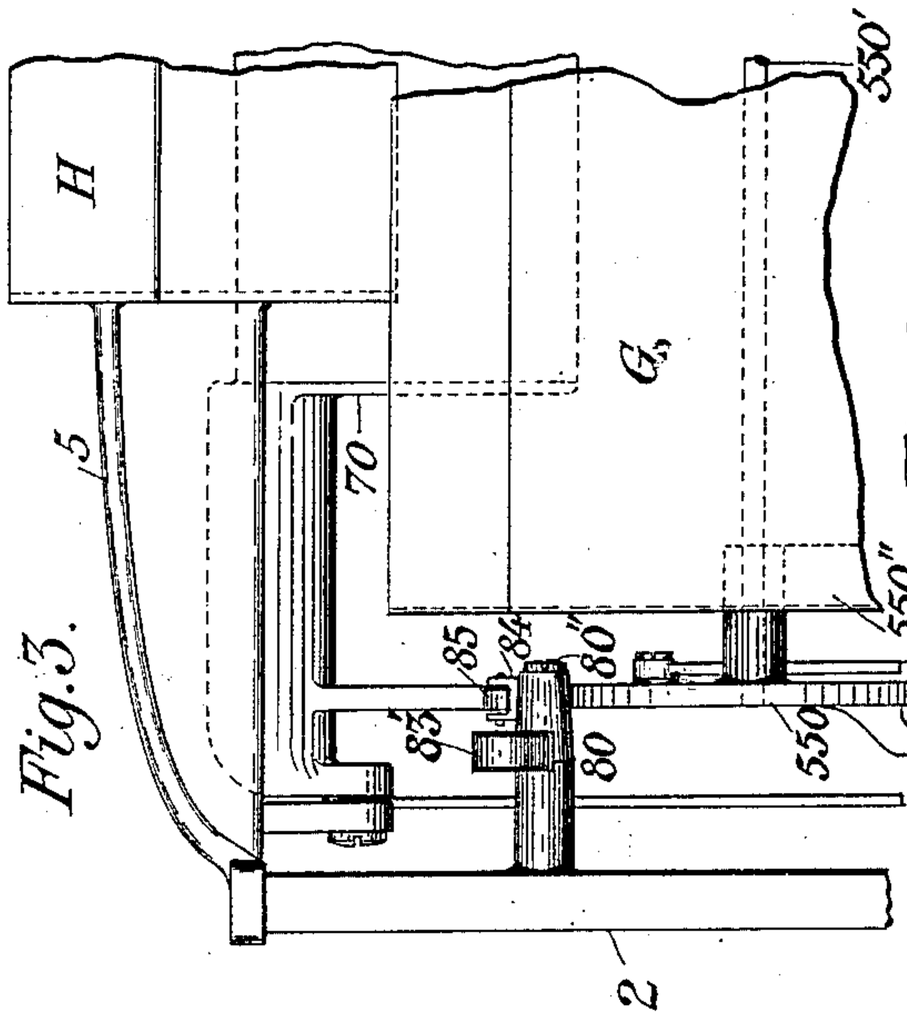

Fig. 3.

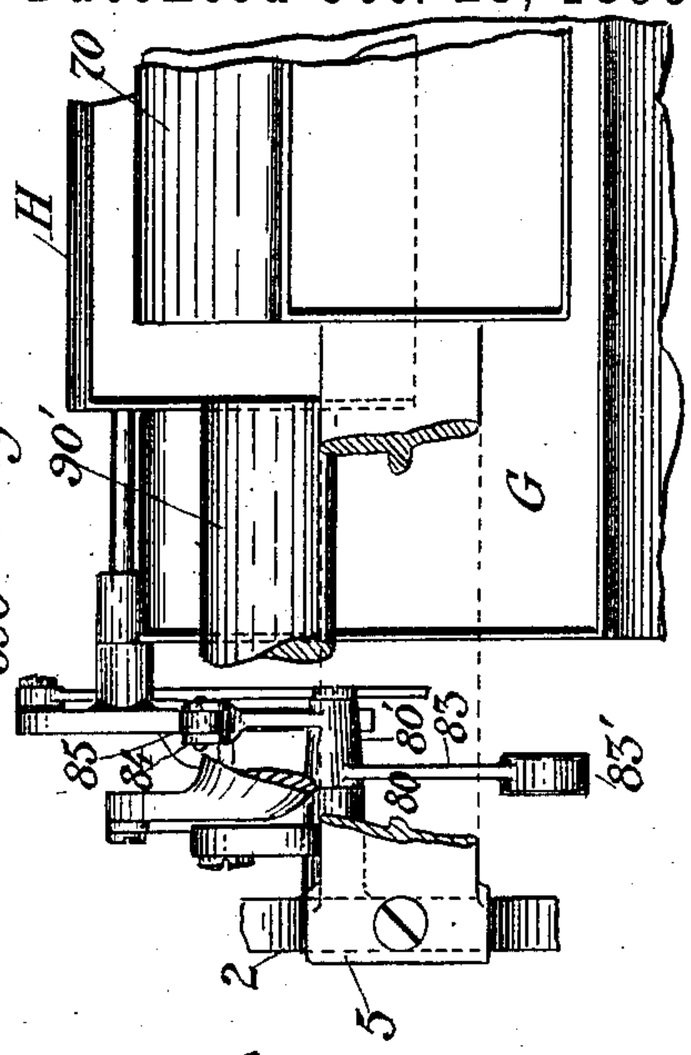

Fig. 4.

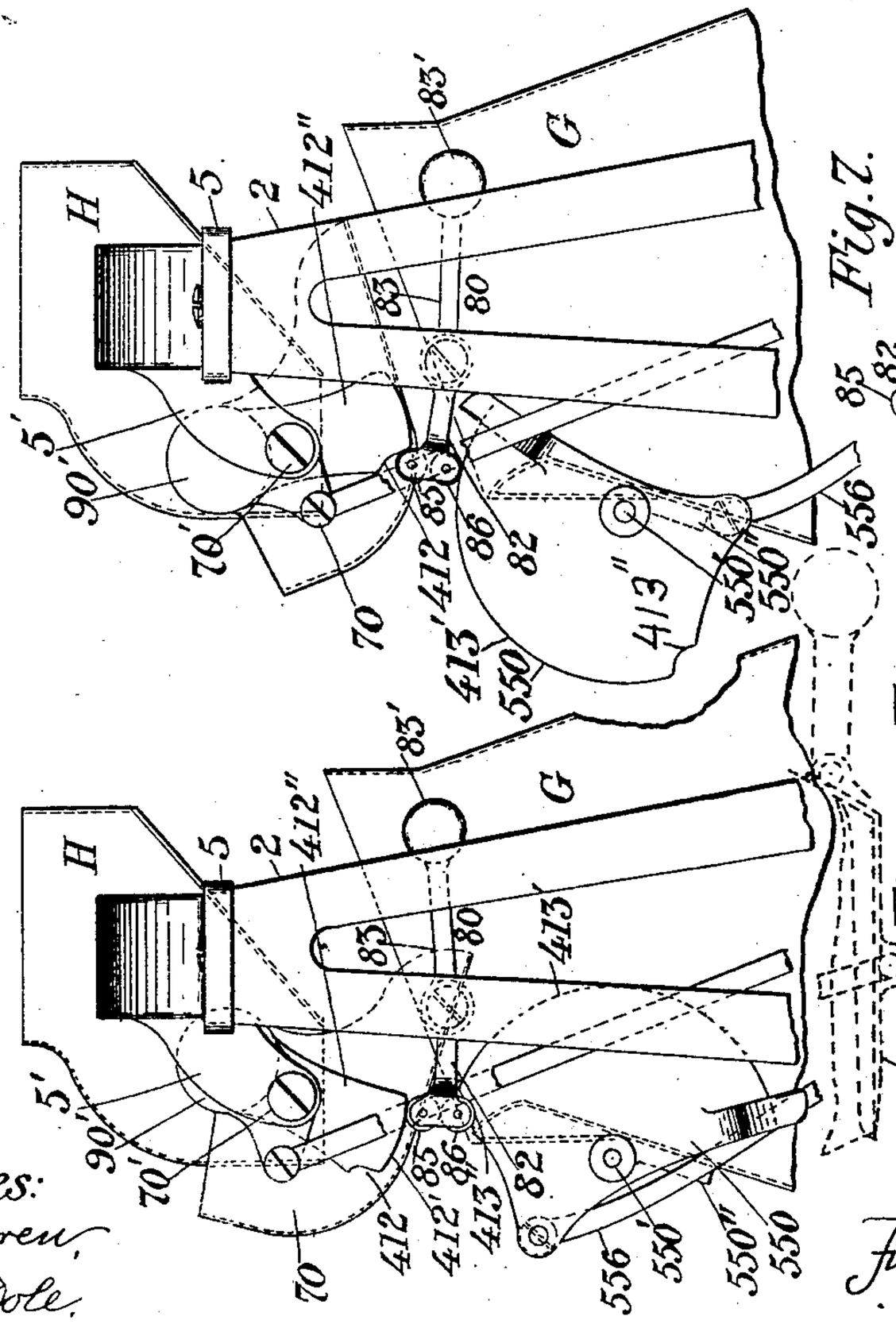

Fig. 2.

Fig. 1.

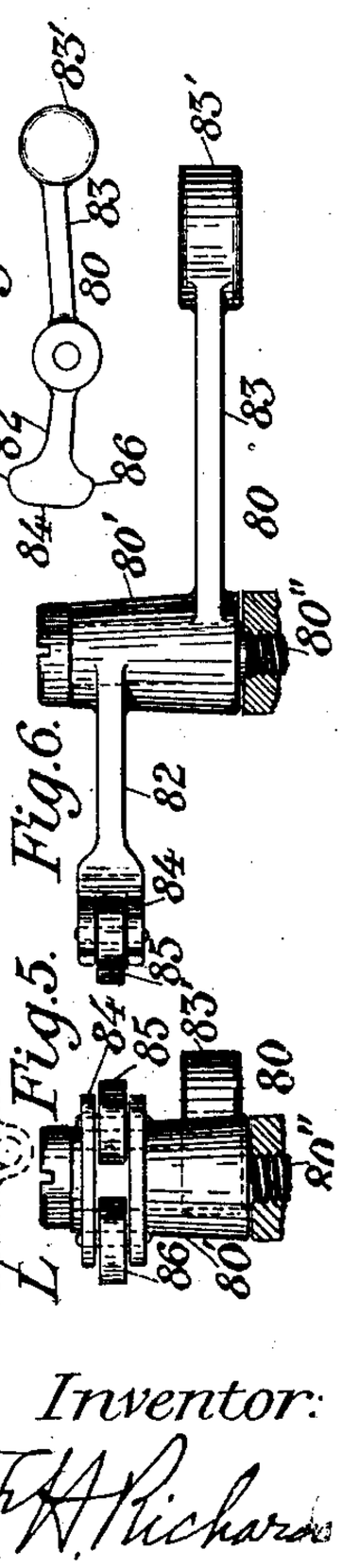

Fig. 7.

Fig. 6.

Fig. 5.

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UNITED STATES PATENT OFFICE.

FRANCIS H. RICHARDS, OF HARTFORD, CONNECTICUT.

AUTOMATIC WEIGHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 548,847, dated October 29, 1895.

Application filed April 22, 1895. Serial No. 546,612. (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 is in the nature of an improvement on the improved weighing-machine described and claimed in my prior application, Serial No. 541,087, filed March 9, 1895, the object being to provide an intermediate stop adapted for effectively coacting with the valve and bucket stops for synchronously and reciprocally regulating and limiting the movements of the valve and closer and for compensating for lost motion between and for securing quick and close action of the stops.

In the drawings accompanying and forming part of this specification, Figure 1 is a left-hand end elevation of a portion of a weighing-machine embodying my present improvement, the valve being shown open for permitting the supply-stream to flow into the bucket, it being assumed that the closer (shown by dotted lines) is closed. Fig. 2 is a similar view, the valve being shown closed and the closer (not shown) being closed. Fig. 3 is a front elevation and Fig. 4 a plan of the parts shown in Figs. 1 and 2. Fig. 5 is a rear elevation, on an enlarged scale, showing the peculiar intermediate stop for co-operating with the valve and closer stops for regulating and controlling the valve and closer movements. Fig. 6 is a plan of the same, and Fig. 7 is a side elevation of one modification of the interlocking stop.

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

The framework for carrying the operative parts of the machine may be of any suitable construction. It is shown comprising side frames connected by a top plate or beam. There is shown in the drawings but one of the side frames, and it is designated therein by 2. The top plate or beam is shown at 5 as having suitably secured thereto a hopper H.

The bucket (designated by G) is of the "single-chambered" type and is supported under the hopper H to receive material therefrom.

I have deemed it necessary for convenience to show only those portions of a weighing-machine which clearly demonstrate the operation of my present improvement.

As a means for controlling the stream from the supply-chute I prefer to employ a valve substantially similar to that shown in my Patent No. 535,727, granted March 12, 1895. Such a valve is shown at 70, pivoted within the arms or brackets 5′, depending from the top plate or beam 5 of the machine. The pivot or axis of movement of the valve 70 is designated by 70′. The valve 70 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 mass or column when the valve is closed. The 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.

A portion of the means employed for supporting the bucket-closer is illustrated in the drawings as comprising an inversely-disposed toggle connection. This toggle connection consists of some suitable rocker—such, for instance, as 550—which is shown secured to a rock-shaft 550′, journaled in bearings 550″, one on each side of the rear upper portion of the bucket G. The rocker is shown connected to the closer L by a connecting-rod. Such a connecting-rod is illustrated at 556, pivotally connected to the rocker 550, the opposite end of this rod being connected to the closer L. (See dotted lines, Fig. 1.)

In connection with a valve mechanism and with a bucket mechanism I employ two coacting stops, one of which is operative with the valve and the other constituting a bucket-discharge stop, and one of which stops has a compensating stop-movement for maintaining said stop in operative relation with the other stop.

The rocker 550 is shown herein serving as a bucket-discharge stop and as having a stop face 413′, which is illustrated as defined by an arc drawn from the rock-shaft 550′ as a

center, the radius of said arc being considerable relatively to its center. The rocker is also shown provided with a relatively-short stop-face or supplemental stop 413″. The functions of the stop-faces 413″ and 413′ will be hereinafter made apparent.

The valve 70 is shown as provided with a stop 412″, having a relatively-short stop portion or supplemental stop 412 and a stop-face 412′, shown as a curved face defined by a curve departing from an arc struck from the pivot or axis of the valve 70.

Means are provided coacting with the main stops for the valve and the closer for reciprocally limiting and regulating the movements of said stops, and through them the valve and the closer. The means shown has demonstrated in practice peculiar ability to compensate for lost motion between the valve and closer stops and for securing a very quick, close, and responsive action of these members. Through the agency of this means the downward thrust of the stop mechanism upon the bucket is very materially reduced, so that notwithstanding the closer-latch may be unhooked the normal operation of the machine will be practically unaffected by the downward thrust, which will be exerted upwardly against the valve-stop, and therefore by reaction downwardly on the bucket. In machines or this class as heretofore constructed the action just mentioned is so marked that when the closer-latch is unhooked the bucket occasionally does not quite discharge its complete load.

The present improvement obviates the difficulties just described in that it acts as a positive latch when the closer is closed, as will be hereinafter described.

The means employed for reducing the friction between the valve and closer stops and for compensating for lost motion is shown as a locking-stop in the form of a weighted lever having a stop member proper provided with stop-faces for co-operating with the main valve and closer stops.

A stop or lever is shown at 80 as pivoted to the side frame by a pivot-screw 80″, passing through the sleeve or cylindrical portion 80′ of said lever 80. The lever 80 is shown as having formed on the sleeve portion thereof two arms or members 82 and 83. The arm 83 is also illustrated as provided with a counterweight 83′. The locking stop or lever normally, by reason of its counterweight, bears upwardly against the stop portion 412 of the stop 412″. (See Fig. 2.)

The relatively-short arm 82 of the pivoted lever or intermediate stop 80 is shown provided with a T head or end 84, in which are shown journaled the friction-wheels 85 and 86. When the valve is in its closed position, the friction-wheel is seated or rests in the stop-face 412, as shown in Fig. 2, and when the parts are in this position it is assumed that the closer is open. When the closer is closed, the parts assume the position shown in Fig. 1, the friction-wheel resting in the stop-face 413″.

While I prefer to employ friction-wheels in connection with the intermediate stop or lever, it is obvious that they may be dispensed with without departing from the spirit of the present improvement, as in practice the intermediate stop has operated effectively without said friction-wheels.

In Fig. 7 the modification hereinbefore referred to (the T-head) is shown without the friction-wheels 85 and 86.

It will be noticed that the intermediate stop serves alternately as part of the valve-stop and as part of the closer-stop.

On reference to Fig. 1 of the drawings, wherein the intermediate stop device is shown serving as a lock and as forming part of the bucket stop, it will be observed that as the valve closes its supplemental stop-face 412′ rides over the stop-face 85 of the intermediate stop until the valve-stop 412 is opposite the stop-face 85 of the intermediate stop. Just prior to this operation, however, and when the supplemental stop-face 412′ has nearly passed over the stop-face 85, the stop-face 86 has passed out of the bucket stop-face 413″ by reason of the lowering of the bucket, so that the curved face or main stop 413′ of the rocker 550, as said rocker turns on its pivot, rides over the stop-face 86. At the proper period the stop-face 85 will be projected into the valve-stop 412.

On reference to Fig. 2 it will be noted that the parts are in a position serving to lock the valve. In this view the intermediate stop is shown forming a part of the valve-stop. The stop-face 85 is shown seated in the stop-face 412. It will be assumed that the bucket has emptied a load and that it is in the act of rising. The stop-face 413′ gradually rides over the stop-face 86 of the friction-wheel until the valve-stop 413″ is opposite it, at which time the stop-face 86 of the friction-wheel is projected into the stop-face 413″, and simultaneously wherewith the valve-actuating mechanism withdraws the stop-face 85 from engagement with the stop-face 412, to thereby permit the valve to open.

It will be obvious from the foregoing description that either one face or the other of the locking-stop is in constant engagement with the valve-stop or the closer-stop and that lost motion during the closing or opening movements of the valve and closer is prevented. During the valve-opening and closer-opening movements the locking-stop has a radial movement, and by reason of its pivotal connection to the frame one or the other stop-faces of the locking-stop is kept in contact with the valve-stop or bucket-stop, thereby locking said valve and closer stops.

On reference to Fig. 1, wherein the valve is shown open, permitting a flow of the supply-stream to the bucket, it will be observed that the lower stop-face 86 is shown seated in the stop-face 413″. As the bucket fills with

material said bucket of course slowly descends, and in descending carries with it the rocker 550, having thereon the stop-face 413″. While the bucket is descending the curved face 412′ of the valve-stop rides over the upper stop-face of friction-roller 85 of the stop device 84 until the stop-face or friction-roller is opposite the stop-face 412 of the valve-stop, when by the force of the counterweight the stop-face or friction-roller 85 is projected into the stop-face 412 of the valve-stop. When the stop-face or friction-roller 85 has nearly traversed the whole distance of the curved face 412′ of the valve-stop, or when the stop-face 85 is nearly opposite the stop-face, the friction-wheel or stop-face 86 slowly rides out of the stop-face 413″ of the rocker 550. When the stop-face 85 is just opposite the stop-face 412, the bucket of course descending, the stop-faces 413″ and 86, respectively, of the rocker 550 and stop device 84 are disengaged, the stop-face 85 being forced into its place in the stop-face 412, and simultaneously with its entrance therein the stop-faces 413″ and 86 are disengaged and the curved surface of the rocker rides over the stop 86. As the stop-face 85 enters the stop-face 412 the valve-actuating mechanism closes the valve.

It will be obvious that by reason of the curvature of the stop-faces 413′ and 412′ relatively to their axes as centers practically no resistance is opposed by them to the stops 85 and 86 during the closing or opening movements of the valve and closer and that substantially all lost motion is compensated for by the peculiar organization just described, operating as set forth.

The stop-faces 412 and 413″, respectively, of the valve and closer stops are preferably made at about the angle of repose of the metals composing these parts, so that but a minimum expenditure of power will be required to operate the same, and by reason of their cam-surfaces they form effective locking devices, acting conjointly with the intermediate locking-stop.

Having thus described my invention, I claim—

1. In a weighing-machine, the combination with a valve mechanism and with a bucket mechanism; of a pair of stops, one operative with the valve as a valve-stop, and the other constituting a bucket-discharge stop; and a locking-stop intermediate of the valve-stop and the bucket-discharge stop, and in position and adapted for operation by one of said stops, to engage and limit the operation of the other of said stops, substantially as specified.

2. In a weighing-machine, the combination with a valve mechanism and with a bucket mechanism; of a pair of stops, one operative with the valve as a valve-stop, and the other constituting a bucket-discharge stop; and a locking-stop intermediate of the valve-stop and the bucket-discharge stop, and in operative relation with said stops, and alternately effective with the same, substantially as specified.

3. In a weighing-machine, the combination with a valve mechanism and with a bucket mechanism; of a pair of oscillatory-stops, one operative with the valve as a valve-stop, and the other constituting a bucket-discharge stop; and a locking-stop intermediate of said oscillatory-stops, and in operative relation with said oscillatory-stops and reciprocally effective therewith, substantially as specified.

4. In a weighing-machine, the combination with a valve mechanism and with a bucket mechanism; of a pair of stops, one operative with the valve as a valve-stop, and the other constituting a bucket-discharge stop; and an oscillatory-locking stop intermediate of the valve-stop and the bucket-discharge stop, and in position and adapted for operation by one of said stops, to engage and limit the operation of the other of said stops, substantially as specified.

5. In a weighing-machine, the combination with a valve mechanism and with a bucket mechanism; of a pair of stops, one operative with the valve as a valve-stop, and the other constituting a bucket-discharge stop; and a counterweighted-locking stop intermediate of the valve-stop and the bucket-discharge stop, and in position and adapted for operation by one of said stops, to engage and limit the operation of the other of said stops, substantially as specified.

6. In a weighing-machine, the combination with a valve mechanism and with a bucket mechanism; of a pair of stops, one operative with the valve as a valve-stop, and the other constituting a bucket-discharge stop; and a counterweighted-locking stop intermediate of the valve-stop and the bucket-discharge stop, and in operative relation with said stops, and reciprocally effective with the same, and exerting a constant upward pressure against the valve-stop, substantially as specified.

7. In a weighing-machine, the combination with a valve mechanism, and with a bucket mechanism; of a pair of oscillatory main-stops, one operative with the valve as a valve-stop, and the other constituting a bucket-discharge stop, each of said main-stops being located and adapted to serve as a stop device for the other main-stop, and each of said main-stops also having a supplemental-stop; and a locking-stop in position and adapted for alternate locked engagement with said supplemental-stops, to thereby limit the operation of the respective main-stops, substantially as specified.

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