(No Model.) 2 Sheets—Sheet 1.

F. H. RICHARDS.

WEIGHING MACHINE.

No. 559,208. Patented Apr. 28, 1896.

Fig. 3.

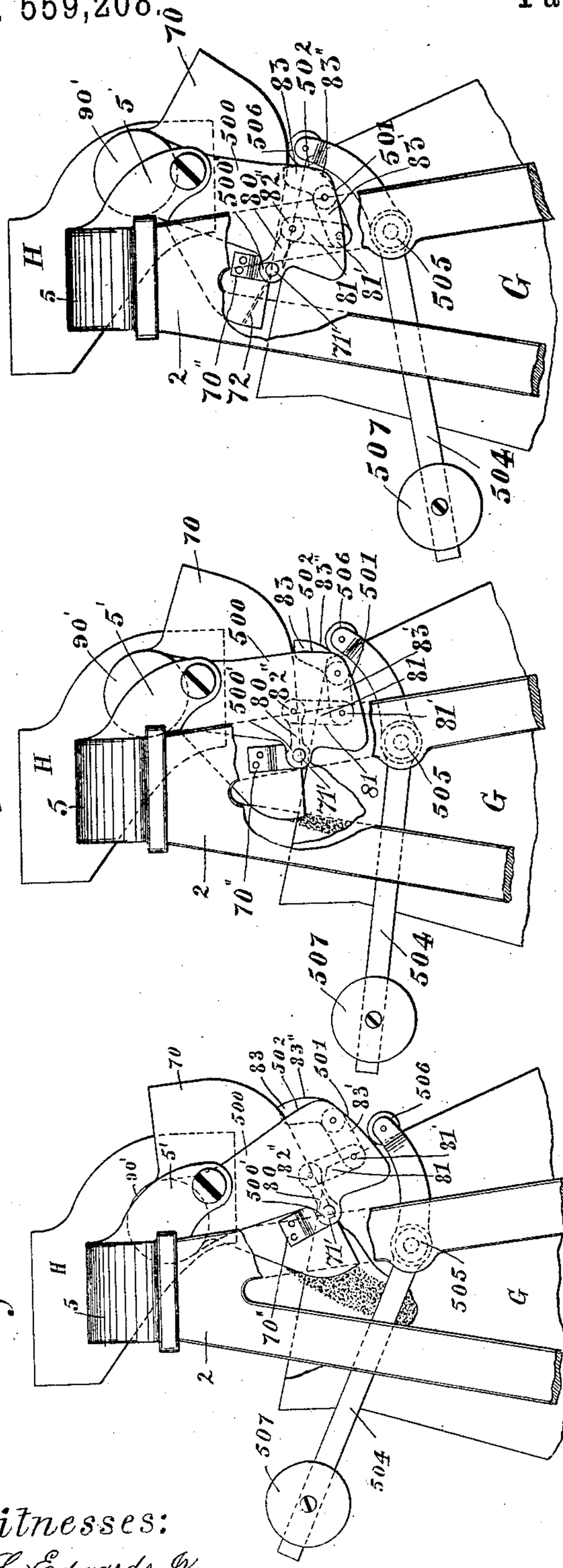


Fig. 3a.

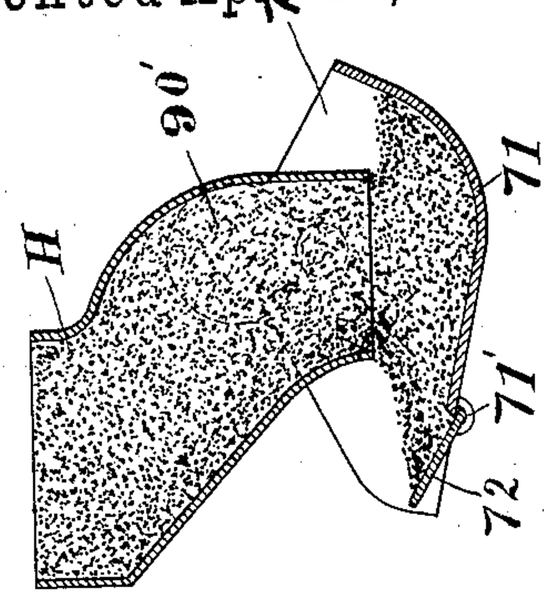


Fig. 2.

Fig. 2a.

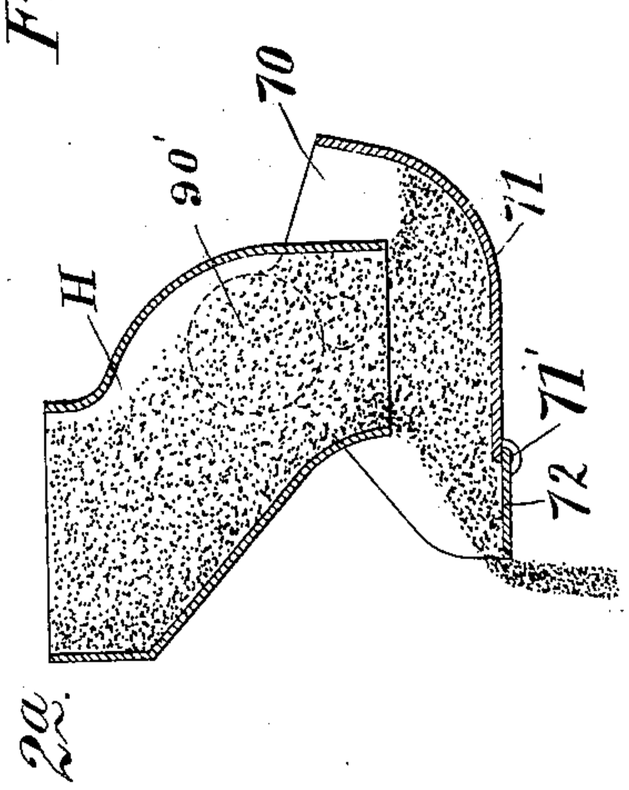
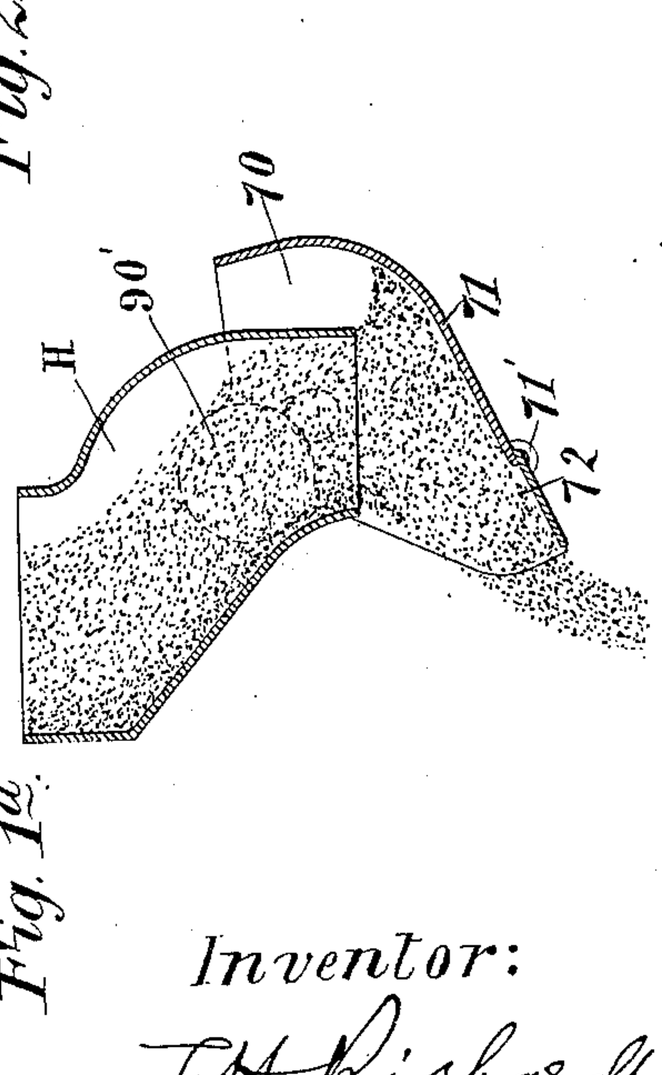


Fig. 1.

Fig. 1a.



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(No Model.) 2 Sheets—Sheet 2.

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WEIGHING MACHINE.

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Fig. 4.

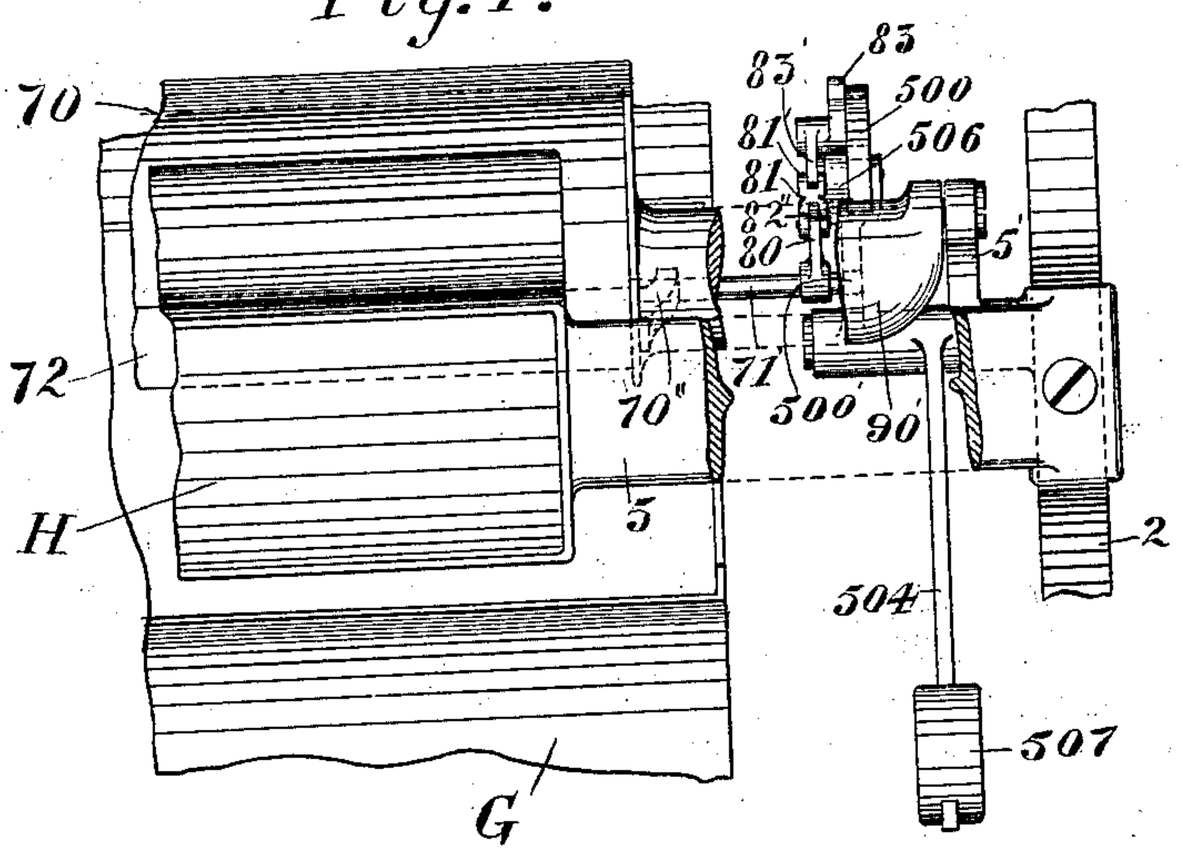
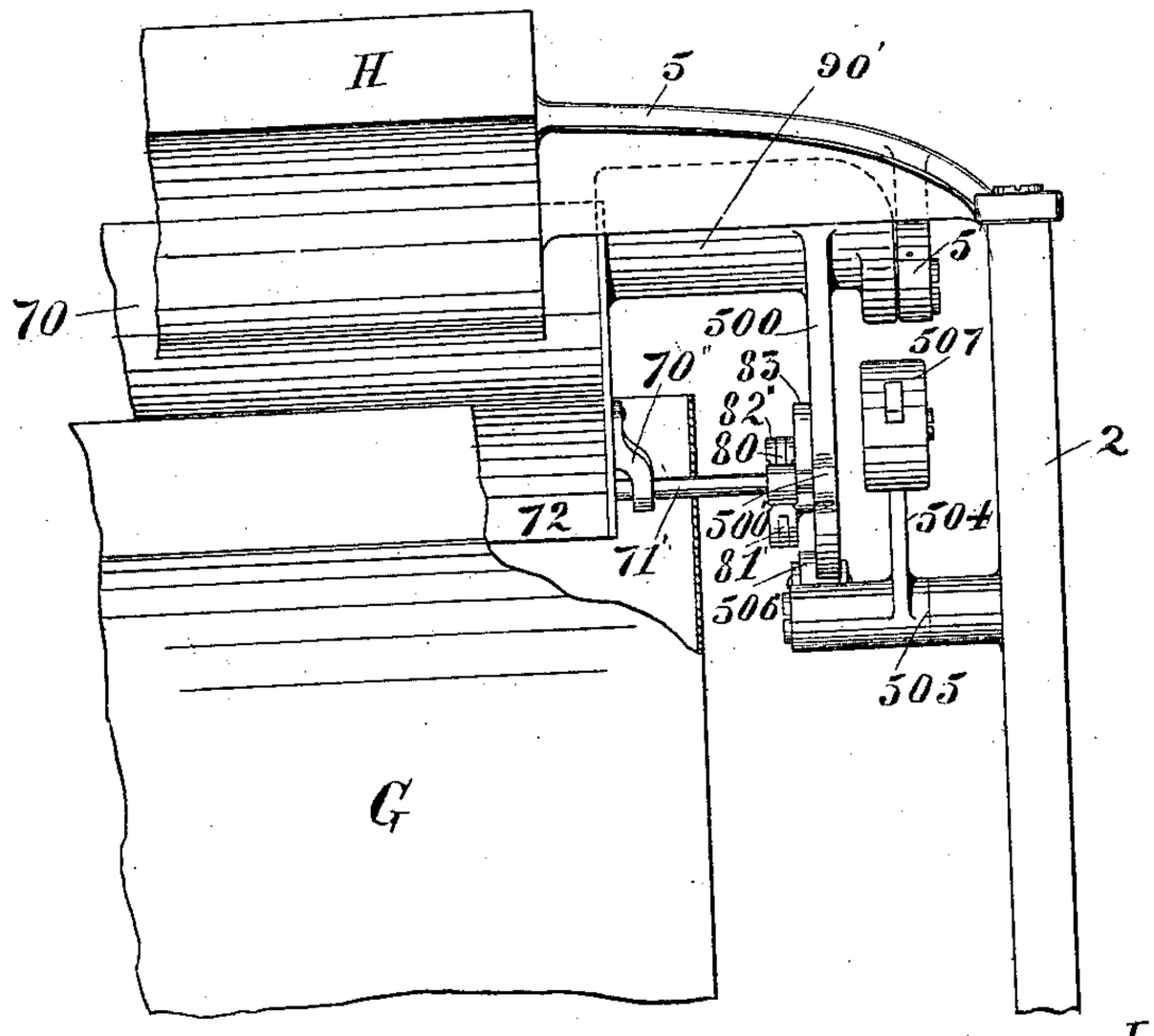


Fig. 5.



Witnesses:
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UNITED STATES PATENT OFFICE.

FRANCIS H. RICHARDS, OF HARTFORD, CONNECTICUT.

WEIGHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 559,208, dated April 28, 1896.

Application filed May 27, 1895. Serial No. 550,734. (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 valve mechanism embodying a valve carrying a supplemental valve, by which the valve mechanism is adapted for use in connection with machines for weighing free-running materials, such as wheat, corn, and the like, the supplemental valve having a shifting movement relatively to the main valve, whereby said supplemental valve is adapted to hold back or shift the drip-stream when this has completed a bucket-load, thereby obviating occasional slight waste on each successive operation of the machine by preventing overloading of the bucket.

The present improvements are shown in the drawings as applied to the improved weighing-machine described and claimed in my concurrently-pending application, Serial No. 541,087.

In the drawings accompanying and forming part of this specification, Figure 1 is a right-hand end elevation of portions of a weighing-machine embodying my present improved valve mechanism. Fig. 1ª illustrates in cross-section the positions assumed by the valve and the supplemental valve when the full stream is flowing into the bucket, as shown by the main figure. Fig. 2 is a similar view showing the same portions of the machine, Fig. 2ª showing in cross-section the positions assumed by the valve and the supplemental valve when the drip-stream is flowing into the bucket. Fig. 3 is a view similar to Figs. 1 and 2, Fig. 3ª showing in cross-section the positions assumed by the valve and the supplemental valve when the latter has shifted or held back the drip-stream, thereby preventing it from entering the bucket. Fig. 4 is a plan view illustrating the parts in the positions in which they are shown in Fig. 1, and Fig. 5 is a front elevation of the same.

Similar characters refer to like parts in all the figures of the drawings.

The operative parts of a weighing-machine are generally carried by two side frames connected at their top by a top plate or beam. There is illustrated at 2 a portion of one of these side frames, and at 5 a portion of the top plate or beam. This top plate or beam 5 is illustrated as carrying a supply chute or hopper H.

The bucket (designated in a general way by G) is illustrated as being of the "single-chambered" type or class and is suitably supported under the supply chute or hopper H to receive supplies of material in the form of a stream, a portion only of the bucket being shown in the drawings.

My improved valve mechanism embodies a supply-chute and a supply-valve therefor, which latter comprises a main or supporting valve and a supplemental or supported valve supported by said main valve for movement relatively thereto, the discharge edges of these valves facing in the same direction, and a single actuator for successively actuating the main valve to close the same and for shifting the supplemental valve relatively to the main valve.

As a means for controlling the supply-stream from the supply-chute I prefer to employ such a valve as that shown in the drawings, which is substantially similar, except as hereinafter specified, to the improved valve described and claimed in Letters Patent No. 535,727, granted to me March 12, 1895. This valve is illustrated at 70 as pivoted for oscillation within arms or brackets 5′, depending from the top plate or beam 5, (there being one of these brackets on each side and but one being shown,) and as 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.

As a means for actuating the valve to close the same I prefer to employ an oscillatory lever, such as 504, which is illustrated pivoted to the frame at 505 and as having at its forward end a friction-roller 506, adapted to engage the cam-faces 501 and 502 of a cam, (also termed a "main" cam,) and to oscillate said main cam and thereby the valve itself. This cam is shown at 500 as an arm depending from the valve-shaft 90′ and movable with the valve, and hence it has an oscillatory

movement, and it is also shown as having a reducing cam-face 501 and a cut-off cam-face 502. The said lever 504 is shown as weighted at its forward end at 507, the weight being preferably adjustable along the forward arm of the lever.

It will be obvious that by reason of the engagement and riding up of the roller 506 on the cam-faces of the cam 500 a progressively-decreasing leverage will be exerted on the valve for actuating the same during the closing movement thereof, and that by reason of the peculiar curvature of the cam-faces the force exerted by the weight 507, acting through the lever 504, will be applied to the valve in a peculiar ratio of decreasing efficiency, it being obvious that the cut-off cam-face will have a relatively greater efficiency than the reducing cam-face, and that therefore the valve-closing actuator will be effective to close the valve quickly as soon as the friction-roller passes off of the reducing-face 501 of the cam 500.

The valve 70 is illustrated as provided with a plate 71, and there is shown in the drawings as pivotally carried at the discharge edge of this plate for oscillatory movement a supplemental valve 72, which is movable relatively to the main plate or valve and on a radius variable with respect to the center of movement of the valve. The pivotal connection of the supplemental valve to the valve-plate is shown at 71′. The supplemental valve is of such relative width as to freely oscillate between the side walls of the main valve, while at the same time it prevents the escape or waste of the material between said supplemental valve and the side walls of the main valve.

While the main and the drip streams are flowing into the bucket, and prior to the completion of the bucket-load, the supplemental valve 72 should preferably be in line with the valve-plate 71, its normal position thereby forming an extension of said plate, so that no additional resistance will be offered by the valve-plate 71 and the supplemental valve 72 to the streams (the main and the drip) while the load is being completed. When the main stream is cut off, a drip or relatively small stream necessary to make up a complete bucket-load continues to flow into the bucket, and it will be obvious that when the drip-stream is cut off the supply-stream is likewise wholly cut off.

Means operative on the completion of a bucket-load are employed for shifting the supplemental valve for projecting the same in an upward direction for immediately cutting off or holding back the drip-stream, whereby irregularities are prevented, and the making up of complete accurate loads on each successive operation of the machine is insured, thereby saving a certain quantity of material which would otherwise flow into the already-loaded bucket. This quantity, though in itself relatively small and a very small percentage of the mass in the bucket, would after a long period of operation, it is obvious, cause a relatively great error in weighing.

It will be apparent that when the main stream is cut off, by moving or shifting the supplemental valve 72 in an upward direction to cross the line of flow of the drip-stream, said drip-stream will be effectively cut off and that it cannot enter the bucket, thereby making it possible to secure an accurate load or predetermined quantity. The means illustrated for moving or shifting this supplemental valve 72 is actuated by the mechanism that actuates the cam 500, which is shown as depending from the shaft 90′ of the valve. As hereinbefore stated, this cam 500 has two faces, a reducing cam-face 501 and a cut-off cam-face 502, the latter being of relatively greater efficiency than the former, so that when the friction-roller 506 of the valve-closing actuating-lever 504 is riding over the cam-face 502 the valve will be closed quickly.

The means employed for shifting or moving the supplemental valve 72 is in the nature of an oscillating cam, also termed a "supplemental" cam, operatively connected with the supplemental valve 72. Such a cam is shown at 83, pivotally carried by the main cam 500, and as having an arm 83′, and as also having a cam-face 83″, disposed in the path of the friction-roller 506 of the valve-closing actuating-lever 504, so that when the valve has been brought to a position for permitting the drip-stream to flow into the bucket (see Fig. 2) the friction-roller will be on the cam-face 501, and will then ride over the cam-face 83″ of the cam 83 for shifting or moving the supplemental valve in an upward direction for the purpose of holding back or cutting off the flow of the drip-stream on the completion of a bucket-load.

On reference to Figs. 1, 2, and 3 of the drawings and particularly to Fig. 1, which illustrates the normal position of the parts when the supply-stream is entering the bucket, it will be observed that the supplemental cam 83 is shown as having its face 83″ disposed at an acute angle relatively to the cut-off cam-face 502 of the main cam 500, though shown as practically forming a continuation of the reducing cam-face of said main cam 500. It will be obvious that when the friction-wheel 506 of the valve-closing actuator passes from off the reducing-face 501 of the main cam 500 that it will engage and ride up the cam-face 83″ of the supplemental cam, which, through the operative connection of said supplemental cam 83 with the supplemental valve 72, will oscillate said supplemental valve 72 for holding back the drip-stream, which then cuts off the supply of material to the bucket G.

The supplemental valve 72 is illustrated as provided with a rock-shaft 71′, preferably formed integral therewith. The opposite end

of this rock-shaft is shown as being journaled in an enlargement or projection 500′, formed on the main-cam arm 500.

As a means for operatively connecting the supplemental valve 72 and its actuating-cam 83, a connecting-link 81 is illustrated at 81′ pivotally connected to the arm 83′ of said cam 83, and said link 81 is also shown pivotally connected with the rock-arm 80, which latter is illustrated rigidly secured to the rock-shaft 71′ of the supplemental valve 72.

It is obvious that when the friction-roller 506 of the valve-closing actuator rides over the cam-face 83″ the cam 83 will be oscillated or rocked and the arm 83′ will be drawn or pulled downwardly, which, by means of the described connections with the rock-shaft, will rock said shaft, and will shift or move the supplemental valve 72 in an opposite or upward direction to intersect the line of flow of the drip-stream, to thereby cut off or hold back said stream when this has completed the bucket-load.

A hanger is illustrated at 70″ as depending from the side wall of the valve, and as having a journal-opening which is adapted for carrying the rock-shaft 71′, the purpose of the hanger being to maintain the rock-shaft 71′ in an operative position at all times.

The operation of a weighing-machine embodying my present improvements, briefly described, is as follows: On reference to Fig. 1 it will be observed that the full stream is entering or flowing into the bucket and that the supplemental valve is shown in line with the valve-plate 71, which permits the whole stream to enter the bucket. As the bucket descends the counterweighted valve-closing actuator exerts a force through the friction-wheel 506 on the reducing cam-face 501 of the cam 500 sufficient to slowly close the valve by riding over said cam-face 501. When the friction-wheel has passed beyond this reducing cam-face 501, and as it passes onto the cam-face 502, it is brought into contact (see Fig. 3) with the cam 83 and is momentarily held for permitting the drip-stream to flow into the bucket for the purpose of completing the bucket-load. Means (not shown) are generally employed for holding the valve in a position to permit the drip-stream to flow into the bucket. When the valve is released from its drip position, the friction-wheel 506 of the counterweighted valve-closing actuator tends to exert a power on the cut-off cam-face 502 of the cam 500 sufficient for quickly closing the valve, and simultaneously therewith the cam-face 83′ of the cam 83 is engaged by the friction-wheel 506, and by the connection hereinbefore described the supplemental valve is oscillated for reversing or holding back the drip-stream, as shown in Fig. 3.

Having thus described my invention, what I claim is—

1. In a weighing-machine, the combination with a supply-chute; of a supply-valve therefor comprising a main valve and a supplemental valve supported by the main valve for movement relatively thereto, and having the discharge edges of said valves facing in the same direction; and a single actuator for successively actuating the main valve to close the same, and for shifting the supplemental valve relatively to the main valve, substantially as specified.

2. In a weighing-machine, the combination with a supply-chute; of a supply-valve therefor comprising a main valve and a substantially flat supplemental valve supported at the discharge edge of the main-valve plate for movement relatively thereto, and normally forming an extension of the main-valve plate; and means for closing the main valve, and for projecting the supplemental valve in an upward direction, substantially as specified.

3. In a weighing-machine, the combination with a supply-chute; of a pair of valves therefor, and having one of said valves supported by the other; a cam operatively connected with said supported valve, actuating mechanism for said supporting-valve and for actuating said cam, whereby the supported valve will be shifted relatively to the supporting-valve, substantially as specified.

4. In a weighing-machine, the combination with a main valve; of a supplemental valve carried by the main valve; a pair of cams operatively connected, respectively, with the main valve and the supplemental valve; and an actuator in position and adapted for successively actuating, respectively, the main-valve cam and the supplemental-valve cam for cutting off the supply-stream, substantially as specified.

5. In a weighing-machine, the combination with a main valve; of a supplemental valve; a cam operatively connected with the main valve; a cam operatively connected with the supplemental valve, and carried by the cam for the main valve; and an actuator in position and adapted for successively actuating, respectively, the main-valve cam and the supplemental-valve cam for cutting off the supply-stream, substantially as specified.

6. In a weighing-machine, the combination with a main valve; of a supplemental valve; an oscillatory main cam operatively connected with the main valve; a supplemental cam carried by the main cam and operatively connected with the supplemental valve; and an actuator in position and adapted for successively actuating, respectively, the main-valve cam and the supplemental-valve cam for cutting off the supply-stream, substantially as specified.

7. In a weighing-machine, the combination with a main valve; of a supplemental valve carried by the main valve; a pair of cams constituting main and supplemental cams, and oscillatory relatively to each other, and operatively connected, respectively, with the main valve and the supplemental valve, and having the supplemental cam carried by the main

cam; and an actuator in position and adapted for successively actuating respectively, the main cam and the supplemental cam for cutting off the supply-stream, substantially as specified.

8. In a weighing-machine, the combination with a main valve; of a supplemental valve carried by the main valve and movable relatively to the main valve; a cam operatively connected with the main valve; a supplemental cam carried by the main cam, and operatively connected with the supplemental valve, and having its cam-face disposed at an acute angle relatively to the reducing cam-face of the main cam; and an actuator in position and adapted for successively actuating the main cam and the supplemental cam for respectively cutting off the supply-stream, substantially as specified.

9. In a weighing-machine, the combination with a main valve; of a supplemental valve carried by the main valve and movable relatively to the main valve; a main cam operatively connected with the main valve, and having a reducing cam-face and a cut-off cam-face continuous with each other; a supplemental cam carried by the main cam and operatively connected with the supplemental valve, and having a cam-face continuous with the reducing cam-face of the main valve and normally disposed at an acute angle to said cut-off cam-face of the main cam; and an actuator in position and adapted for successively engaging and riding up the reducing cam-face of the main cam and the cam-face of the supplemental cam and the cut-off cam-face of the main cam to thereby cut off the supply-stream, substantially as specified.

10. In a weighing-machine, the combination with a main valve; of a supplemental valve carried by the main valve; a cam operatively connected with the main valve; a supplemental cam operatively connected with the supplemental valve and carried by the main cam; a connecting-link for operatively connecting the supplemental cam and the supplemental valve; and an actuator in position and adapted for actuating said cams, to thereby operate said valves and cut off the supply-stream, substantially as specified.

11. In a weighing-machine, the combination with an oscillatory main valve; of an oscillatory supplemental valve carried by the main valve; a cam operatively connected with the main valve; a supplemental cam carried by the main cam; a toggle connection operatively connecting the supplemental cam and the supplemental valve; and an actuator in position and adapted for actuating said cams to thereby oscillate said valves and cut off the supply-stream, substantially as specified.

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