(No Model.)

F. H. RICHARDS.

WEIGHING MACHINE.

No. 548,853. Patented Oct. 29, 1895.

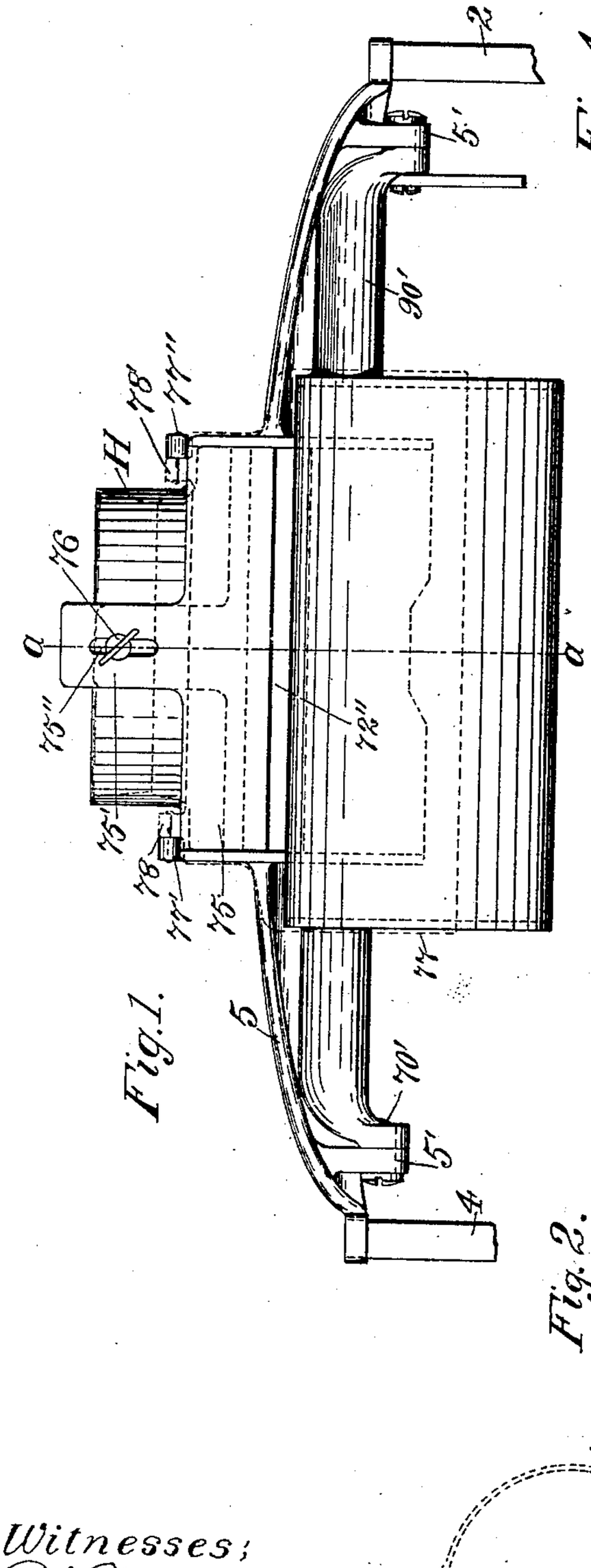

Fig. 1.

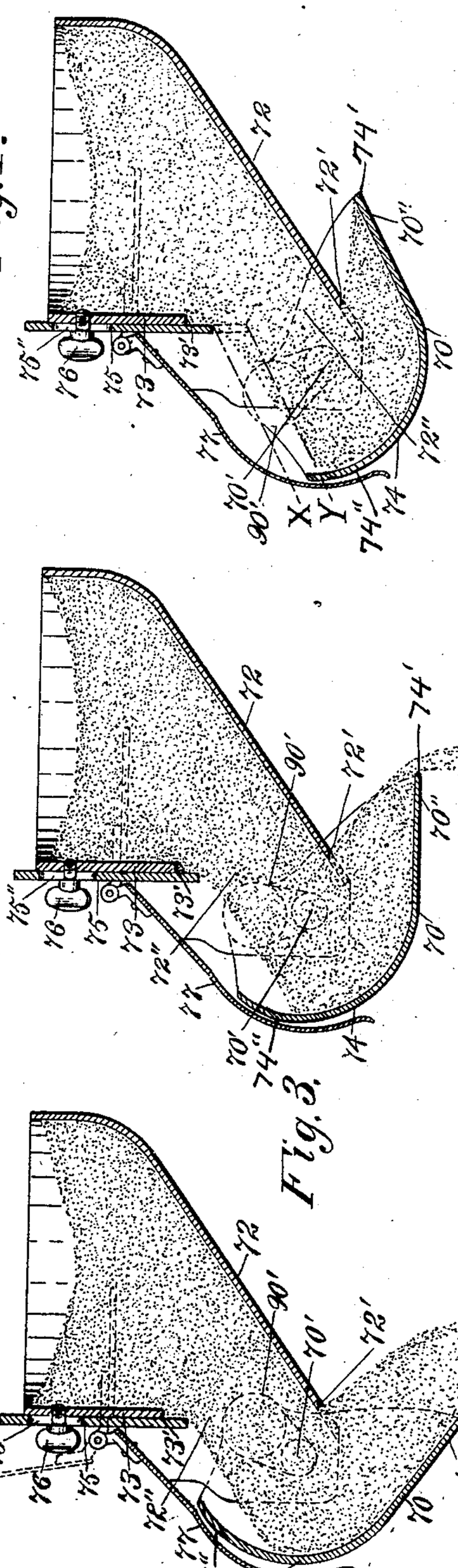

Fig. 4.

Fig. 3.

Fig. 2.

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FRANCIS H. RICHARDS, OF HARTFORD, CONNECTICUT.

WEIGHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 548,853, dated October 29, 1895.

Application filed June 13, 1895. Serial No. 552,678. (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 supply-chute and a stream-controlling valve for the supply-chute and having the supply-chute adapted for directing the supply-stream to the rear of the valve for forming, when the valve is closed, a bank of valve-supported material which is agitated and loosened by and immediately on the valve-opening movement, the agitation of the bank imparting motion to and loosening the mass in the supply-chute, thereby insuring a free flow of the supply-stream.

In the drawings accompanying and forming part of this specification, Figure 1 is a rear elevation of the upper portions of the framework of a weighing-machine and is shown as carrying my improved valve mechanism. Figs. 2, 3, and 4 are central transverse sections taken in line *a a*, Fig. 1, Fig. 2 showing the valve in a position for permitting the full stream to flow into the bucket or other receptacle, Fig. 3 illustrating the valve as having cut off the main stream, while permitting a flow of the drip-stream, and Fig. 4 showing the valve as having entirely cut off the supply-stream.

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

The present improvements are applicable to any ordinary weighing-machine, and are especially adapted for use in connection with improved weighing-machines of the class described and claimed in my concurrently-pending application, Serial No. 541,087, filed March 9, 1895.

The operative parts of a weighing-machine are carried by some suitable framework, and there is shown in the drawings the upper portion of the framework generally employed for this purpose, and which is illustrated as comprising two side frames 2 and 4, connected at their upper ends by a top plate or beam 5. In connection with a valve having a discharge edge at one side thereof and with a rearward wall for confining the material supported on the valve a supply-chute will be employed, which shall have an inclined stream-supporting wall located to direct the stream at an inclination toward the rear and away from the discharge edge of the valve, and having also a mass-confining wall located above the stream-supporting wall, which mass-confining wall will be relatively remote from the discharge edge of the valve as compared with the discharge edge of said inclined wall. This top plate or beam 5 is illustrated as carrying in some suitable manner a supply-chute or hopper, (designated in a general way by H.) The supply-chute is illustrated as having an inclined stream-supporting wall (shown as the front wall 72) and as inclined in a rearward direction, or in a direction extending into the supply-stream, whereby said inclined wall serves as a means for supporting the supply-stream and directing the flow of the stream to a desired point on the valve, which is shown as the rear of the valve, and preferably into the approximately-central concave portion 74 of the valve and away from the front of the valve. The rear wall 73 serves as a confining-wall for confining the mass in the supply-chute H.

It will be observed on reference to the sectional views of the drawings that the confining-wall 72 has its lower edge 72′ located above and in vertical alignment with the lower edge 73′ of the vertical rear wall 73 of the supply-chute and that there is formed between these walls an opening 72″, which constitutes the supply opening or mouth of the supply-chute H, and which extends from side wall to side wall of said chute.

The stream-controlling valve for the chute may except as hereinafter and otherwise specified, be of any suitable construction. That shown in the drawings is substantially similar to the improved valve described and claimed in Letters Patent No. 535,727, granted to me March 12, 1895. Such a valve is illustrated at 70 as pivoted within arms or brackets 5′, depending from the top plate or beam 5 of the framework, the pivot or axis of movement of the valve being designated by 70′. This valve is also preferably balanced, so as to have, normally, no tendency to either

open or close, the balance-weight being shown herein as a shaft 90′, extending from opposite ends of the valve-pan.

The valve 70 preferably has its axis or center of movement located substantially midway or intermediate of the lines of flow of the supply-stream. It will be obvious that by reason of this disposition of said axis or center of movement the supply-stream will be projected against the valve in such a manner that said stream will be distributed substantially equally and evenly on both sides of said axis or center of movement of the valve, so that but a minimum expenditure of power is required to actuate the valve for either opening or closing the same.

For actuating the valve any suitable mechanism may be employed. For example, that described and claimed in the Letters Patent first hereinbefore referred to may be used. The central portion of the valve-plate 70″ is illustrated at 74 as concaved or depressed and in line with the inclined wall 72 of the supply-chute, and the inclined wall 72 tends to direct the stream to the central depression or concavity, rendering possible the employment of a relatively-large valve, as well as a relatively-large supply-chute, while requiring, as hereinbefore stated, but a minimum expenditure of power to actuate the valve. These results, are attained without affecting the accuracy of the machine. It will be obvious then, that the efficiency of the machine will naturally be increased by the use of larger valves and supply-chutes than are ordinarily used.

It will be noticed on reference to the drawings that by means of the inclined wall 72 the supply-stream is directed toward the rear and away from the front of the valve and at an inclination to a vertical line, which renders the valve and its supporting mechanism less liable to derangement than where the impact of the supply-stream is received by the valve in a vertical direction.

The valve 70 opposite to the discharge edge 74′ thereof is shown provided with a rearward wall 74″, which rearward wall constitutes the means for confining the material supported on the wall.

The inclined wall 72 of the supply-chute H performs an important function. It will be noticed by reference to the sectional view of the drawings that said wall is located between the valve and the rear wall of the chute. This inclined wall serves as a stream-supporting wall for the purpose of breaking the force of the descending mass or column of material and also forms the means by which the rearward flow of the stream is positively directed toward the rear and away from the front of the valve and renders practicable the perfect control of the rearward-flow line of the stream.

For the purpose of adapting the present improvements to the successful weighing of different classes of materials I provide means for varying the depth of the rearward-flow line of the supply-stream, so that said stream may be directed at all times with different materials to substantially the same point on the rear of the valve.

For so adjusting or regulating the depth or rearward-flow line of the supply-stream I employ a regulating-plate, which is interposable between the front and the rear walls of the supply-chute or the supply-mouth of said chute. It will be apparent, then, that this adjusting-plate coacts entirely with the inclined wall of the supply-chute for regulating the size and rearward flow of the supply-stream by being projected into the mass from above.

It will be seen from an inspection of the dotted lines in Fig. 4 that the volume of the supply-stream is increased or decreased at the point where the adjusting-plate is projected into the supply-stream. This of course does not affect the capacity of the machine, as this adjustment is merely for varying the lines of repose of different materials, so as to have the different materials at all times impacted on the valve uniformly and to the rear of the valve.

By reason of the open rear side of the supply-chute the valve, when closed, does not support directly the entire weight of the column of the material in the chute.

On reference to Fig. 4, which view illustrates the valve as being closed, it will be noticed that substantially at its rear the valve supports a relatively-small portion of the mass constituting the supply-stream, which portion rests in the concavity or depressed portion of the valve-plate and forms a relatively-deep bank. When the valve is opened, this bank of material will be agitated, and this in turn, immediately on the valve-opening movement, will so agitate the adjacent portions of material supported on the inclined wall of the supply-chute as to loosen the entire mass to insure a free flow of the supply-stream.

It is well known that the lines of repose of different materials vary as these issue from a confined space, such as the supply-chute of a weighing-machine, and in accordance with the character of the material so confined.

As hereinbefore stated, Fig. 4 represents the valve as closed. It will be assumed that the rear boundary-line of the material shown by the stippled surface in this figure represents wheat. The mass of material resting in the valve is shown as extending nearly to the top of the rear wall of the valve. It is obvious that were the parts to remain in the positions in which they are shown in Fig 4 and a material the angle of repose of which is less than that of wheat were being weighed (the line of the angle of repose being designated by the dotted line X) the material would of course flow over the rear wall of the valve, and thereby occasion considerable waste. This difficulty I overcome by providing means for adjusting the depth or rearward-flow line of the supply-stream, whereby at all times

and with different materials the material being weighed will be still directed to the rear of the valve and will be evenly distributed on each side of the center of movement or axis of the valve, thereby minimizing the power required to actuate the valve, as well as preventing waste.

The means shown in the drawings for regulating the depth and the line of repose of the material issuing from the chute and for controlling the rearward-flow line of the supply-stream, so that the stream may be at all times directed substantially to the same rearward point on the valve with different materials, is in the form of a stream-regulator or adjusting-plate.

If, as assumed hereinbefore, the machine were weighing a certain material the angle of repose of which as it issued from the supply-chute was less than that shown in the drawings—for example, that indicated by the dotted line X, Fig. 4—it is apparent that, as hereinbefore stated, the material would flow over the edge of the valve; but if this line is lowered, still maintaining, of course, its parallelism with respect to the line X, to a point coincident with the dotted line Y, Fig. 4, the material or upper line thereof would be directed against the valve at a point substantially coincident with the line of repose of the material indicated by the stippled surface, which, it will be observed, would distribute the material equally on each side of the valve-axis and also prevent waste of the material and still permit the material to be directed to the rear of the valve.

The means employed for adjusting or controlling the rearward-flow line of the supply-stream comprises a stream-regulator or adjusting-plate, which is shown at 75 as having a reduced portion 75′, provided with a longitudinal slot 75″, through which passes a set-screw 76, which is seated in the supply-chute H.

If the machine were weighing wheat and it were desired to use the same for weighing a material the angle of repose of which is less than wheat, it would be necessary to simply lower the stream-regulator so that this would direct or control the rearward flow of the supply-stream so as to project said material onto the valve on a line coinciding with the dotted line Y.

The supply-chute H is provided with some suitable means, such as grooves or slideways, in which the adjusting-plate 75 may work to prevent lateral displacement thereof.

The stream-regulator or adjusting-plate 75 is shown as being in position and adapted for regulating the stream at a point between the lower edge of the rear wall and the lower edge of the front wall, and it will be obvious that said plate 75 co-operates with the inclined wall 72 in regulating and controlling the rearward flow of the supply-stream, so that the stream may be directed to the rear of the valve.

Occasionally from a point above the supply-chute of a weighing-machine, when the machine is at rest, relatively-small quantities of the material descend and strike the empty valve with such force as to rebound, and in rebounding generally pass out of the space between the valve and supply-chute, thereby causing more or less waste. In the valve mechanism shown herein means are provided for preventing this waste. The means shown in the drawings comprises a guard or a guard-plate 77, which is carried by the supply-chute and has a substantially free oscillatory motion.

The supply-chute H is shown as provided with enlargements or projections 77′ and 77″ on each side thereof, and in each of which there is formed a journal-opening.

The guard-plate 77 is shown as provided with trunnions 78 and 78′, formed on the upper portion thereof, and which are adapted to work in the journals of the enlargements or projections 77′ and 77″. This plate 77 is mounted, as stated, for oscillatory or pivotal movement and normally is in the position which it is shown as occupying by the full lines in the drawings. Should the valve become clogged from any cause, it will only be necessary to raise the guard 77 to the position shown by the dotted lines, Fig. 2, when the difficulty may be readily seen and overcome.

As hereinbefore stated, the valve-plate has a concaved or depressed portion and a relatively-straight portion. It has also been stated that the inclined wall of the supply-chute delivers the supply-stream directly into the concave portion.

On reference to Fig. 2, which shows the valve as open for permitting the flow of the full stream, it will be observed that the relatively-straight portion, which is shown as forming a continuation of the concave portion, serves the function of a blade for directing the stream and giving it a relatively-accelerated movement immediately subsequent to the time said stream leaves the concave portion 74 of the valve. It will be apparent that by reason of the central location of the valve-axis relatively to the lines of flow of the supply-stream the latter is not cut off by a direct thrust of the valve through a vertically-descending mass or stream, but that the forward edge of the valve approaches the stream and cuts it off by a gradual radial movement.

On reference to Fig. 3, which shows the valve as nearly closed and in a position for permitting the flow of a relatively-small or drip stream generally required to make up a completed load in the bucket of a weighing-machine, it will be observed that to the rear of the center of movement of the valve there is a relatively-considerable mass, which mass serves as an adjunct in closing the valve.

Having thus described my invention, I claim—

1. In a weighing-machine, the combination with a supply-chute having an inclined stream-supporting wall adapted to direct the

stream at an inclination, and toward the rear and away from the front of a valve; and having also a mass-confining wall, and having the lower edge of said mass-confining wall approximately in vertical alignment with the lower edge of the stream-supporting wall; of a stream-controlling valve, substantially as described, adapted when closed, to support a bank of material, and when opened, to agitate the bank of material and the adjacent portions of the material supported on the stream-supporting wall of the supply-chute, whereby the mass will be loosened, to thereby cause a free flow of the stream, substantially as specified.

2. In a weighing-machine, the combination with a supply-chute having an inclined stream-supporting wall adapted to direct the stream at an inclination to a vertical line, and to the rear and away from the front of the valve; and having also a mass-confining wall and having the lower edge of said mass-confining wall approximately in vertical alignment with the lower edge of the stream-supporting wall; of a stream-controlling valve, substantially as described, having a concaved portion in line with the inclined stream-supporting wall of the supply-chute, and located substantially centrally of the valve, and having said valve adapted, when closed, to support in the said concaved portion and to the rear thereof, a bank of material, and when opened, to agitate said bank of material and the adjacent portions of the material supported on the stream-supporting wall of the supply-chute, whereby, the mass will be loosened to thereby cause a free flow of the supply-stream, substantially as specified.

3. In a weighing-machine, the combination with a supply-chute having an inclined stream-supporting wall adapted to direct the stream at an inclination, and toward the rear and away from the front of a valve; and having also a mass-confining wall, and having the lower edge of said mass-confining wall approximately in vertical alignment with the lower edge of the stream-supporting wall; of the stream-controlling valve adapted when closed, to support a bank of material, and when opened, to agitate the bank of material and the adjacent portions of the material supported on the stream-supporting wall of the supply-chute, whereby the mass will be loosened, to thereby cause a free flow of the same; and a stream-regulator carried by the supply-chute, and in position and adapted for regulating the depth of the supply-stream, substantially as specified.

4. In a weighing-machine, the combination with a supply-chute having an inclined stream-supporting wall adapted to direct the stream at an inclination to a vertical line, and to the rear and away from the front of the valve; and having also a mass-confining wall, and having the lower edge of said mass-confining wall approximately in vertical alignment with the lower edge of the stream-supporting wall; of the stream-controlling valve having its axis located substantially midway of the lines of flow of the supply-stream, whereby said stream will be distributed on each side of the valve-axis; and a vertically adjustable stream-regulator in position and adapted for co-operating with said inclined stream-supporting wall to regulate the rearward flow of the stream for thereby distributing the supply-stream on each side of the valve-axis with different materials, substantially as specified.

5. In a weighing-machine, the combination with a supply-chute having an inclined stream-supporting wall adapted to direct the stream at an inclination, and toward the rear and away from the front of the valve; and having also a mass-confining wall, and having the lower edge of said mass-confining wall approximately in vertical alignment with the lower edge of the stream-supporting wall; of a stream-controlling valve adapted, when closed, to support a bank of material, and when opened, to agitate the bank of material and the adjacent portions of the material supported on the stream-supporting wall of the supply-chute, whereby the entire mass will be loosened, to cause a free flow of the supply-stream; and a guard carried by the chute and closing against the rear end of the valve for preventing waste of material, substantially as specified.

6. In a weighing-machine, the combination with a valve having its discharge-edge at one side of the valve, and having on the opposite side of the valve a rearward wall for confining the material supported on the valve; of a supply-chute having an inclined stream-supporting wall located to direct the stream at an inclination toward the rear of the valve and away from the discharge-edge thereof, and having also a mass-confining wall located above said inclined stream-supporting wall, and relatively remote from the discharge-edge of the valve, as compared with the discharge-edge of said inclined wall, substantially as specified.

7. In a weighing-machine, the combination with a supply-chute having its front wall rearwardly inclined and adapted for supporting and directing rearwardly the supply-stream, and having also a mass-confining wall located above the lower edge of the front wall of the supply-chute; of a stream-controlling valve for said chute, adapted when closed to support a bank of material extending from the valve to the mass-confining wall of the chute, which bank will be agitated and loosened on the valve opening movement to thereby cause a free flow of the supply-stream, substantially as specified.

8. In a weighing-machine, the combination with a supply-chute having its front wall rearwardly inclined and adapted for supporting and directing rearwardly the supply-

stream, and having also a mass-confining wall located above the lower edge of the front wall of the supply-chute, thereby forming a rearward supply-opening between said front and rear-walls; of a valve located below the supply-chute, and in position and adapted for cutting off the supply-stream by a movement substantially with and following said stream; and means for regulating the size of said supply-opening, substantially as specified.

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