2 Sheets—Sheet 1.

E. SAMPSON.

Grain Meter.

No. 50,540. Patented Oct. 17, 1865.

Fig: 1.

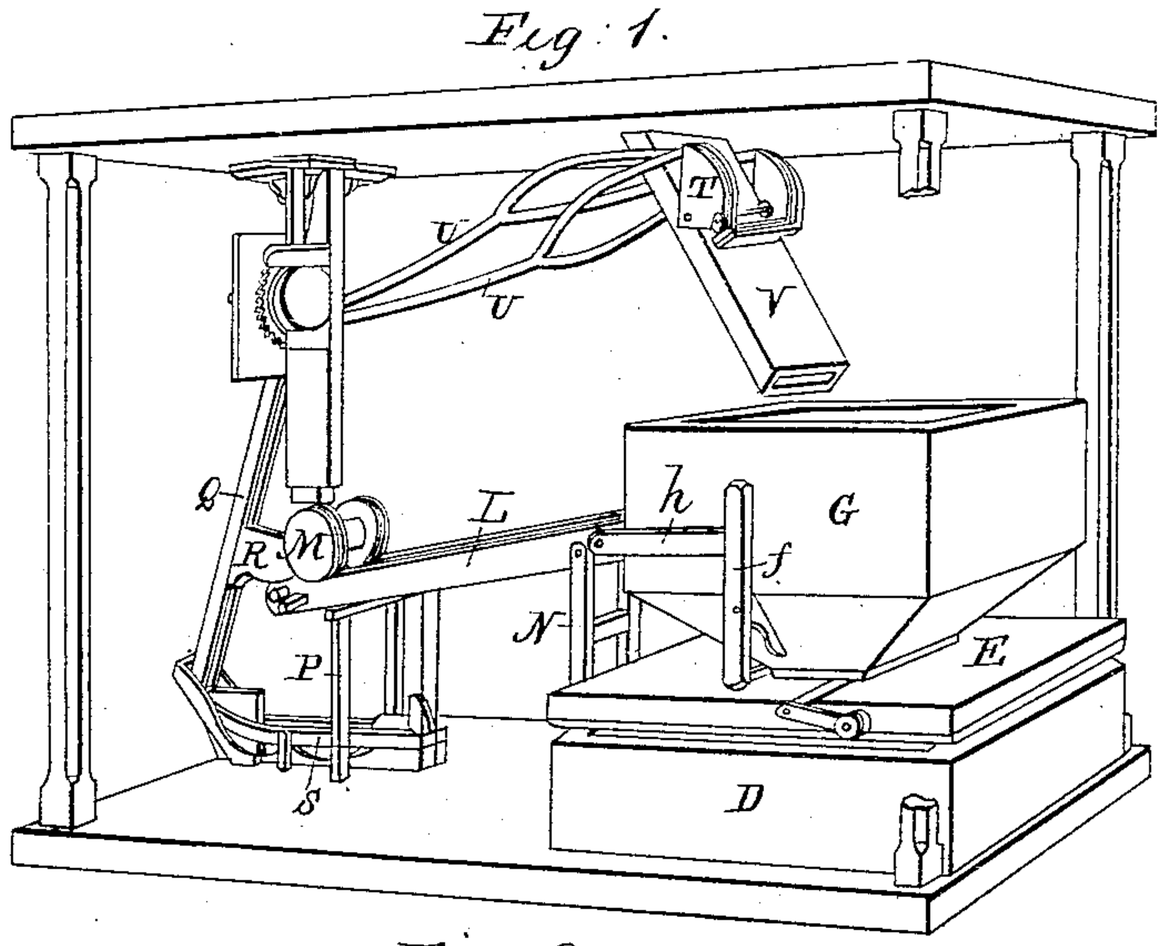
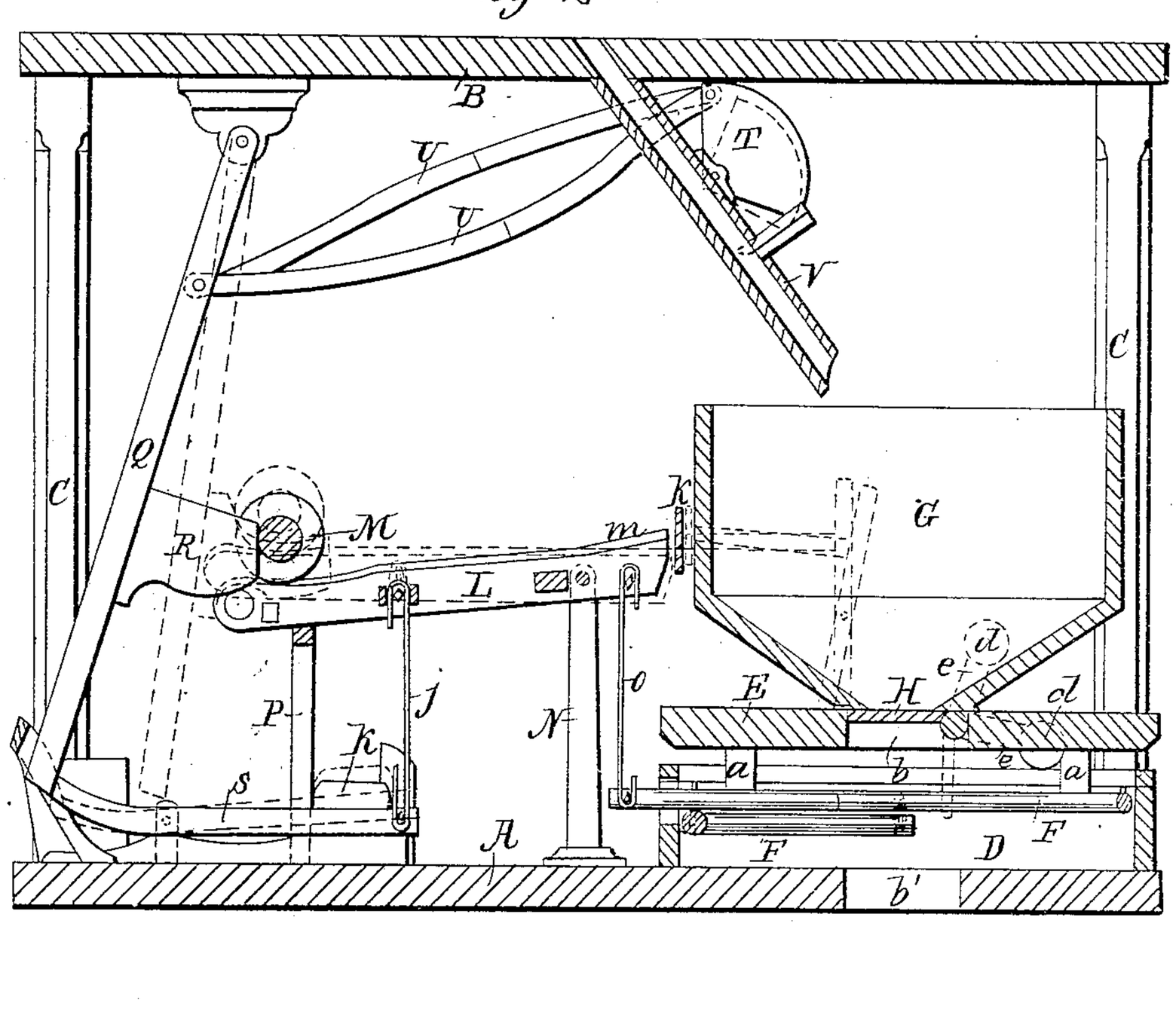


Fig: 2.



Witnesses
E. Cowen
John F. Lamprey

Inventor
Ebenezer Sampson

2 Sheets—Sheet 2.

E. SAMPSON.

Grain Meter.

No. 50,540. Patented Oct. 17, 1865.

Fig: 3.

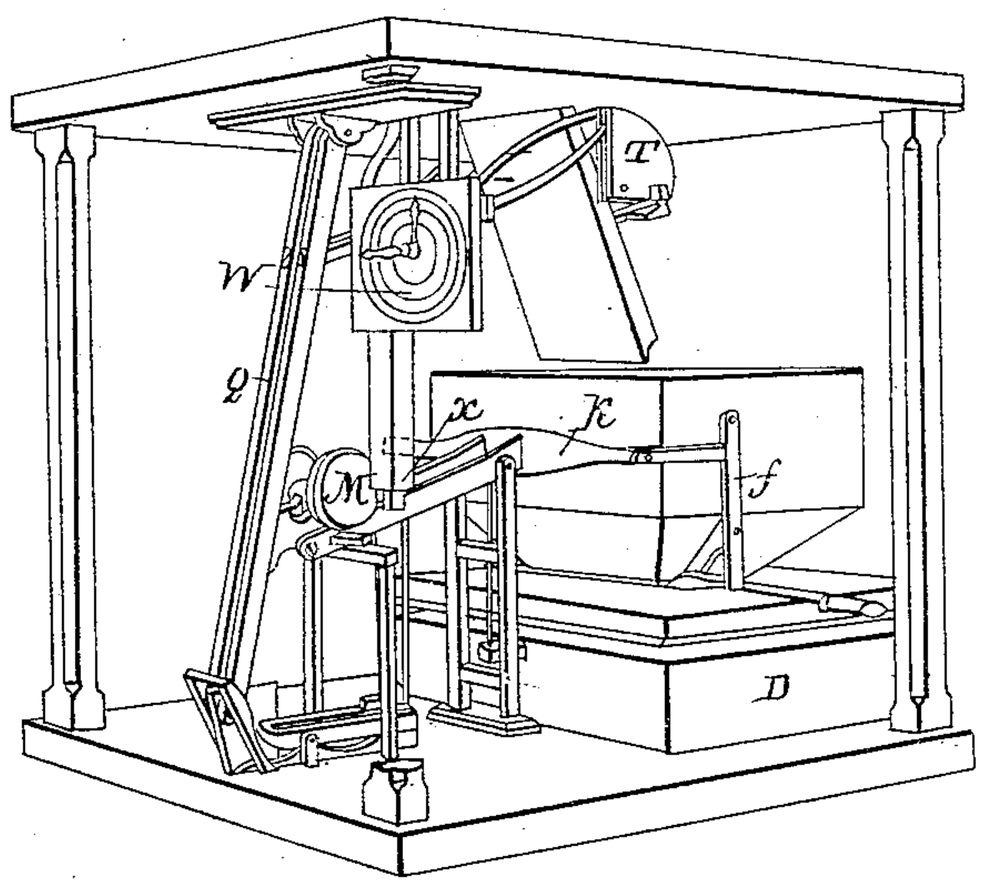


Fig: 4

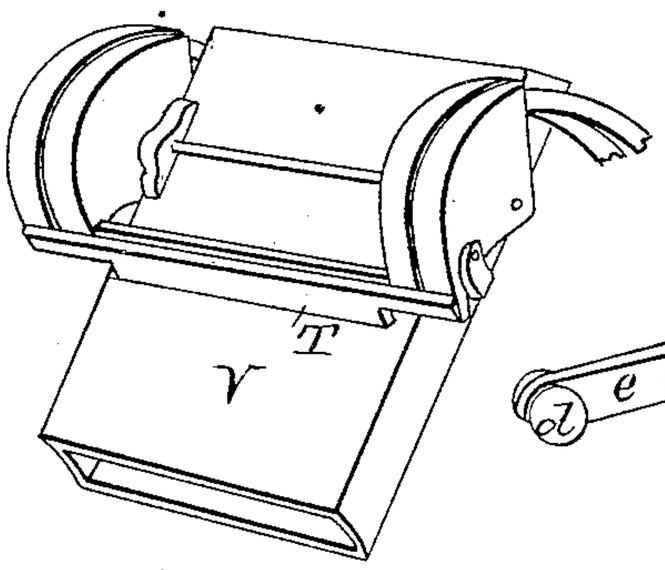
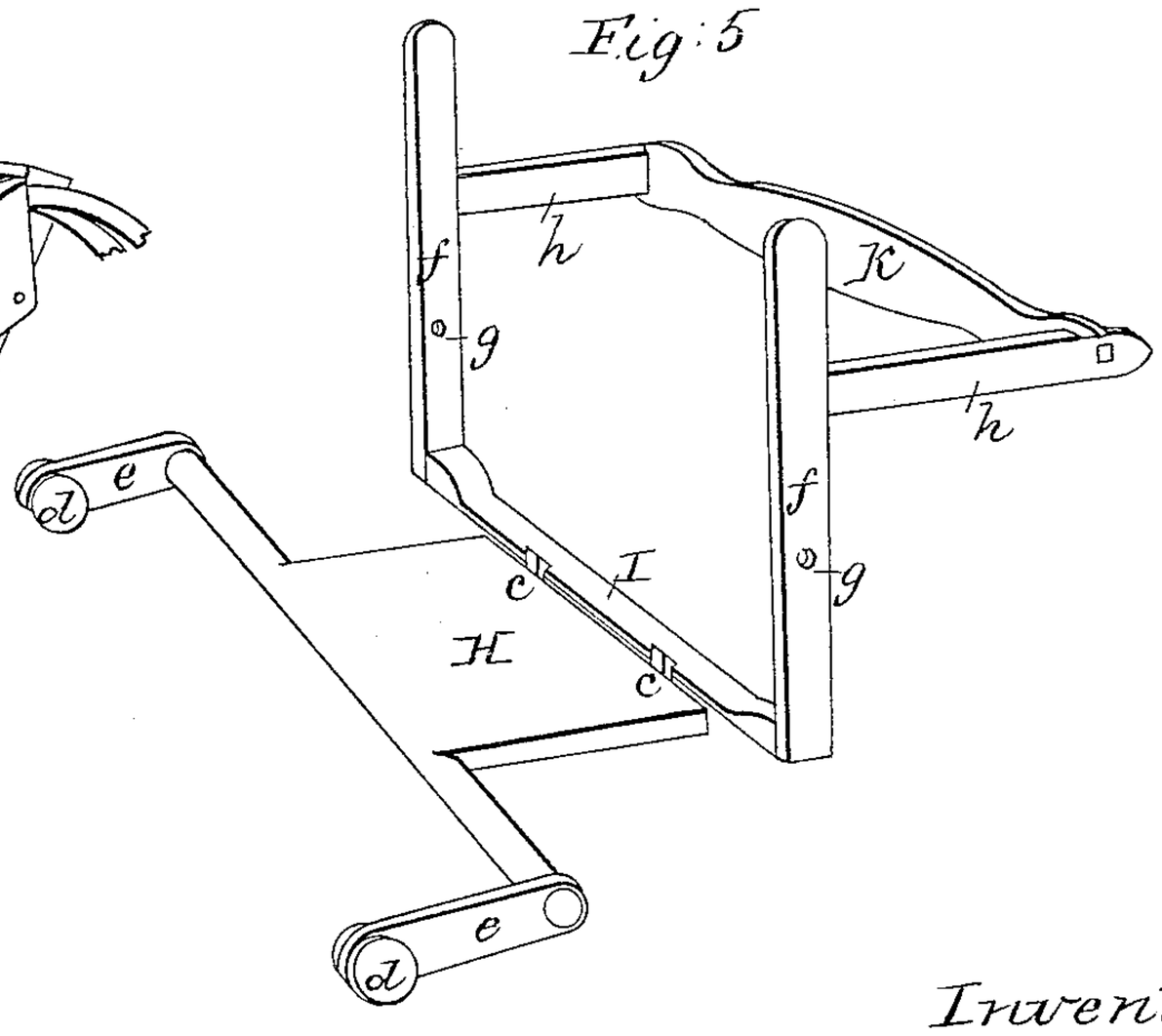


Fig: 5



Witnesses.
E. Comen
John T. Lamport.

Inventor
Ebenezer Sampson

UNITED STATES PATENT OFFICE.

ELNATHAN SAMPSON, OF LANSINGBURG, ASSIGNOR TO ALFRED CLARKE HITCHCOCK, OF GREEN ISLAND, NEW YORK.

IMPROVEMENT IN MACHINES FOR WEIGHING GRAIN.

Specification forming part of Letters Patent No. **50,540**, dated October 17, 1865.

To all whom it may concern:

Be it known that I, ELNATHAN SAMPSON, of Lansingburg, county of Rensselaer, and State of New York, have invented certain new and useful Improvements in Automatic Grain-Weighing Machines; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation thereof, reference being hereby had to the accompanying drawings, and to the letter of reference marked thereon, which drawings form a part of this specification.

Like letters represent and refer to like or corresponding parts.

Figure 1, Sheet 1, is a front perspective view, showing the different parts of my said invention and improvements, and each more fully hereinafter described and set forth. Fig. 2, Sheet 1, is a vertical section lengthwise through the center of my said machine and the several parts thereof. Fig. 3, Sheet 2, is a rear perspective view of my said machine, and showing various parts and improvements therein, and each more fully described and set forth hereinafter. Fig. 4, Sheet 2, is a section view, showing the grain-supply tube or spout and the devices by which the supply of grain is regulated in the manner and by the means substantially as hereinafter described and set forth. Fig. 5, Sheet 2, is a plan and perspective view of the device by means of which the grain is permitted to escape or pass from the weighing receiver or hopper in the manner substantially as hereinafter described and set forth.

In the drawings I have made two sheets, which I denominate "Sheet 1" and "Sheet 2," so as to more correctly show my said invention and improvements.

The nature of my said invention and improvements consists in the employment of mechanical means by which grain in large quantities may be weighed continuously without other aid than that which will supply said grain to such machine and start the operation of the machine and continue the same, in the manner substantially as herein described and set forth.

It also consists in the employment of a scale-beam which shall vibrate sufficiently to produce an inclination of the same in such manner that the weight on such scale-beam shall roll alternately from one end thereof to the other with force or power enough to open the gates or valves in the supply tube or spout, and also to open the gate or valve in the bottom of the weighing receiver or hopper, in the manner and for the purposes substantially as herein described and set forth.

It also consists in the employment of vertical levers and horizontal trip levers, in combination with the scale-beam and rolling weight, in the manner and for the purposes substantially as herein described and set forth.

It also consists in the employment of two gates or valves in the supply tube or spout, which shall check and stop the supply of grain to the weighing receiver or hopper when the same shall have received the required or desired quantity of grain, in the manner substantially as herein described and set forth.

It also consists in the employment of a gate or valve so constructed and arranged at or near the bottom of the weighing receiver or hopper that the same shall open when the required amount of grain shall have been received in such hopper, and for the discharge of such grain into a proper receiver or place below, in the manner substantially as herein described and set forth.

It also consists in the employment of a scale-beam constructed with an inclined plane, which plane shall commence to rise at or near the pivot-bearing of the scale-beam and continue so to rise until it reaches that part or end of such beam nearest the weighing-hopper, and which beam shall also be so constructed as to contain and allow a circular weight to move from end to end alternately, in the manner and for the purposes substantially as herein described and set forth.

Having thus described the nature of my said invention and improvements, I will, in order to enable others skilled in the art to which the same relates to make and put it into use, proceed to describe the construction and operation thereof, which is as follows, to wit:

The frame containing my said improvements may be constructed of any size, shape, or material which shall answer the required purpose.

A is the bottom part or piece of the frame.
B is the top part or piece.

A and B are connected at the required dis-

tance apart by means of the posts or upright pieces C, of which I usually put one at each corner of the said frame. There may be center posts, if required, in addition to the corner ones, in order to give the necessary strength, which frame, so constructed, may be braced and bolted together in any manner desired for the purpose of giving additional strength, if required. At or near one end of such frame I construct a weighing apparatus within the box D, Figs. 1 and 2, Sheet 1, and Fig. 3, Sheet 2. Any good and sufficient weighing apparatus may be used in the said box D for the purposes hereinafter described and set forth.

E, Figs. 1 and 2, Sheet 1, and Fig. 3, Sheet 2, is the platform resting upon the scale or weighing apparatus. This platform may be of any size, shape, or strength which may be deemed best. It has four downward projections, *a*, two of which only are seen at Fig. 2, Sheet 1. The other two corresponding thereto are upon opposite corners of the said platform E. These projections may be of any length desired, in order to give the said platform free action during the operation of weighing. The lower ends thereof will rest upon suitable bearings set in the levers F, Fig. 2, Sheet 1, which levers are so constructed and arranged as to form or constitute a weighing or balancing apparatus, so as to operate the scale-beam L, in the manner hereinafter described. The said platform E, being so arranged with regard to the said levers F, or equivalents therefor, will have freedom to move up or down, as required, during the operation of weighing grain. Upon the said vertical moving platform I construct and arrange the grain-weighing receiver or hopper G, Figs. 1 and 2, Sheet 1, and Fig. 3, Sheet 2. This receiver or hopper may be of any size, shape, or capacity required to weigh and to discharge any grain put therein, in the manner hereinafter described. The inside thereof will be so constructed as to allow a free or easy discharge of the grain through the gate or valve at the bottom thereof. The immediate bottom or lower part of the said receiver or hopper rests upon the upper surface of the said platform E, and is there firmly fastened, if so required, by any suitable means. At the bottom of the hopper, and through the said platform E, I construct an opening, *b*, through which the grain in said hopper G is discharged down and through the opening *b'* in the bottom A of said frame, and thence in or to any proper place to receive the same so discharged, after having been weighed in the manner herein described and set forth. At or near the bottom of the said hopper G, I construct and arrange a gate or valve, H, Fig. 2, Sheet 1, and Fig. 5, Sheet 2, which gate or valve, of course, in size or shape will correspond to and with the said opening *b*. This gate or valve is so constructed that when the grain is fully and entirely discharged from the said hopper G it immediately thereafter closes and becomes secured or fastened, so as to receive and retain the next supply or quantity of grain to be weighed. The said gate or valve is so held by means of the hooks or catches *c c*, Fig. 5, Sheet 2, and which hook onto or catch upon the horizontal bar I, same figure, and thus and in that position will permit said hopper G to receive and hold grain to the full amount of the required weight. When the required amount of weight of grain is received in said hopper G, the horizontal bar I will be moved by means of the rolling weight M, in the manner hereinafter described, and thereby will be withdrawn from said hooks or catches *c c*, and then the said gate or valve H will open by the pressure of the grain thereon, as aforesaid, and when the said grain is discharged, as hereinbefore stated, then the said gate or valve will again close by means of the weights *d* upon the arms *e*, Fig. 2, Sheet 1, and Fig. 5, Sheet 2. The said gate or valve is shown in an open position at Fig. 2, Sheet 1, in dotted lines. The said horizontal bar I is removed or relieved from the said catches or latches *c c* by means of the vertical levers *f*, Figs. 3 and 5, Sheet 2, which levers are operated upon by means of the cross-bar K, same figures, which cross-bar K is moved or operated by means of the circular or rolling weight M, in the manner hereinafter described and set forth. The said levers *f* have points or pivot-bearings *g*, Fig. 5, Sheet 2. At or near the upper end of the said vertical levers *f*, I attach the said horizontal bar *h*, Fig. 1, Sheet 1, and Figs. 3 and 5, Sheet 2, and which bars *h* are combined by means of the said bar K, Fig. 2, Sheet 1, and Figs. 3 and 5, Sheet 2, for the aforesaid purposes. The said bars and levers for unlatching and permitting the said gate or valve in the bottom of the said weighing-hopper to open in the manner and for the purposes substantially as aforesaid may be of any length required. The said latches or catches *c c* may be so constructed with reference to the latch-bar I as to permit said bar to be removed therefrom with as little friction as possible when it is desirable to open the said gate or valve H for the purposes aforesaid.

L, Figs. 1 and 2, Sheet 1, and Fig. 3, Sheet 2, is the scale-beam, which contains the circular or rolling weight M. The said scale-beam may be constructed in two parts from end to end, if deemed best so to make it, and if so constructed each part will be connected with the other, so as to permit the said circular or rolling weight M to move thereon from end to end alternately, for the purposes herein described. If in two such parts, each part will contain upon the upper edge thereof such shape or form as will correspond to and with the V or other shape in said circular weight, which shall retain and hold the same upon said scale-beam while passing from end to end, so as to prevent said weight from falling therefrom during the operation of the machine. The said groove I construct in the periphery of the said weight at or near each end thereof; or the

said scale-beam may have a flange constructed upon and along each side thereof, which shall project upward far enough to receive said circular weight and prevent the same from falling off or from the said scale-beam. The said scale-beam L may be constructed in but one piece, and will be of any required length or material which shall answer the purpose. At or upon that end of said scale-beam I construct an inclined plane, *m*, Fig. 2, Sheet 1. The said plane will commence at or near the pivot-bearing of the said scale-beam, and extend and continue to rise until it reaches the end of the said beam near the said weighing-hopper, and it may rise upon any angle or inclination required. This inclined plane is for the purpose of returning the said circular weight from the said horizontal bar K to or near the pivot-bearing of the said scale-beam L when the said weight shall have operated against the said bar K and by means thereof opened the said gate or valve H, as aforesaid, and being thus returned from said bar, the said valve or gate H will be permitted to be closed and latched as aforesaid without obstruction. Otherwise, were the said circular weight to remain against the said bar K until all the grain in the said weighing-hopper G had passed out, as aforesaid, the said gate or valve H might close and not be secured by the said latches or catches *c c;* but with the said weight thus removed from said bar K the said vertical levers *f* are free to act and to move the said horizontal bar I, which is done by means of the weight of the said cross-bar K and by the weight of the said arms *h*. The said inclined plane also contributes to return at a proper time the said circular weight M to the opposite end of the said scale-beam L, for having returned said weight to or near the pivot-bearing of the said scale-beam before the grain is entirely emptied from the said weighing-hopper G, as aforesaid, it will be at the right place and in proper condition to be continued upon such scale-beam toward the opposite end thereof after the said grain shall have passed entirely out from the said hopper. The upper surface of such inclined plane will be constructed in form or shape to correspond to that of the said scale-beam for the purpose of guiding and controlling the movement of the said rolling weight thereon. The said scale-beam operates or turns upon a pivot-bearing at or near the upper end of the vertical post N, Figs. 1 and 2, Sheet 1, and Fig. 3, Sheet 2, which bearing is at any required distance from either end of such scale-beam L, and is also in said vertical post N, at any required distance from the bottom thereof. The said scale-beam will be so adjusted as to correspond to the desired weight of grain in said hopper or receiver G. At that end of said scale-beam near to the said hopper or receiver I connect the said weighing apparatus underneath the said platform E by means of the vertical rod *o*, Fig. 2, Sheet 1, which rod is of any length, shape, or strength required. Near to and directly under the said scale-beam I construct the frame P, Figs. 1 and 2, Sheet 1, and which is for the purpose of receiving that part of said scale-beam L which is the farthest from the said pivot-bearing of said scale-beam, and then holding the same in its proper place and condition during the operation of said scale-beam. The said circular weight M may be of any size or form required, and its weight, together with the weight upon the trip-lever S, must in all cases correspond to the weight of the grain in the said hopper G to be weighed, as hereinafter set forth. The said circular weight M rolls upon the upper surface of the said scale-beam L and inclined plane *m* alternately. When it moves and comes in contact with the said cross-bar K it will be with sufficient force to operate the same, with other bars and levers combined therewith, as shown in dotted lines, Fig. 2, Sheet 1, and which disengages the said horizontal bar I from the said latches or catches *c c* upon the said gate or valve H, and thus permits the same to be opened by the weight or pressure of grain thereon and such grain to escape from said hopper G in the manner as aforesaid, and when the said rolling weight returns to the opposite end of the said scale-beam it will come in contact with the projections R and R′ upon the vertically-oblique levers Q and Q′, Figs. 1 and 2, Sheet 1, and Fig. 3, Sheet 2, and thus striking against said projections, it will be with sufficient force to move back said vertically-oblique levers, in the manner and for the purposes substantially as herein described and set forth.

S and S′, Figs. 1 and 2, Sheet 2, and Fig. 3, Sheet 2, are horizontal trip-levers, so arranged as to catch and hold the lower end of the said vertically-oblique levers Q and Q′ when the said circular weight M shall have forced the said levers Q and Q′ back, as aforesaid. The said vertically-oblique levers Q and Q′ are for the purpose of operating the gates or valves T in the supply spout or tube V, Figs. 1 and 2, Sheet 1, and Figs. 3 and 4, Sheet 2. The said gates or valves T are connected to and with the said levers Q and Q′ by means of the connecting-rods U, same figures, which may be of any length, form, or shape required. Each of said rods are connected to the respective valve or gate belonging thereto in such manner as to open or close the same, and thereby regulate the flow of the grain into said weighing hopper G from and through the said supply spout or tube V, as herein described and set forth. The said supply spout or tube is made of any size or shape required or deemed best to use, and it is connected with the store-room or place containing the grain to be weighed as aforesaid in any good and convenient manner. In the said spout or tube, at some suitable place therein, I construct and arrange the aforesaid gates or valves T in the manner substantially as herein described. Whenever the said scale-beam L rises by means of the weight of grain in the said weighing-hopper G to or near to a

level, then that vertically-oblique lever, Q′, which is combined in the manner aforesaid with the inner gate or valve T will be operated, and its movement will be toward the said hopper G, whereby the said inner gate or valve will be closed, thereby cutting off or checking the supply of grain, so as to prevent any undue force or pressure of grain upon the grain in the said hopper at that time, and thereby cause overweight. The said inner gate is so constructed as not to shut off entirely the supply of grain, but to let a small quantity continue to flow through said supply-spout to the said weighing-hopper until the exact amount to correspond to the said circular weight, and the small weight K upon the inner end of the said trip-lever S shall have been received by said weighing-hopper G, which when done, the vertically-oblique lever Q, combined with the said outer gate or valve T in the manner aforesaid, is operated by the further rise of the said scale-beam L until the same shall have reached that point above a level thereof required to move said circular weight from the said projection R upon said vertically-oblique lever Q, which would, of course, allow the said lever to move toward the said hopper G, and thereby close the said outer valve or gate T, which gate or valve is so constructed as to entirely cut off and stop the supply of grain. It will be seen that the exact weight of grain to correspond to and with the said circular weight M and said small weight K upon the inner end of said trip-lever S, as aforesaid, will be obtained by the stopping of the supply of grain to said hopper G in the manner and by the means aforesaid. The supply of grain which passes into the said weighing-hopper after the said inner gate or valve in the said supply tube or spout V shall have been closed will continue until a quantity sufficient shall have entered said hopper G to continue the upward movement of the scale-beam L, which also raises the said trip-lever S by means of said rod *j*, connecting or combining the two. The said rod *j* is constructed of greater length than the corresponding rod which connects the other and opposite trip-lever to and with the said scale-beam, which is for the purpose of preventing any operation of said trip-lever, which holds the vertically-oblique lever by means of which the said outer gate is operated in the manner and for the purpose aforesaid. The said circular and rolling weight M is started in its movement across the said scale-beam toward the said weighing-hopper after the operation of the horizontal trip-lever S′ and scale-beam L, and the lower end of the vertically-oblique lever Q′ is set free or disconnected from the said trip-lever S′, so as to allow it to operate by reason of its own weight, and then the projection R′ will pass directly under the said weight M, as seen in dotted lines at Fig. 2, Sheet 1, thereby closing the inner gate or valve T, for the purposes aforesaid, which when done, the said projection R of said lever Q is brought against said rolling weight with sufficient force in the manner aforesaid, the said lever Q operating, when said scale-beam shall have risen still higher by reason of the increased weight of grain, in the manner substantially the same as I have described in relation to lever Q′, and when the said scale-beam L shall have risen by reason of the weight of the grain in said hopper above a level said weight will continue to roll across the said scale-beam, and, reaching the opposite end near to said hopper G, will force open the said gate or valve H in the bottom of said hopper G in the manner aforesaid. It will therefore be seen that by the force of said circular weight the devices combined with the said gate or valve H are operated upon so as to allow of the discharge of the grain from said hopper G, as aforesaid, and upon being returned to the other and opposite end of the said scale-beam it operates the devices which open the said gates or valves T, and thereby supplies grain to said hopper G, as aforesaid, and the said circular weight, used together with the weight K upon the said trip-lever S, will determine the weight of grain in the said hopper G. The said vertically-oblique levers Q and Q′ are pivoted or hinged at the upper ends thereof in any suitable manner, and are arranged in an oblique position so as to allow a movement of the same toward the said scale-beam and weighing-hopper by their own weight for the purpose of operating the said gates or in the said supply tube or spout V in the manner aforesaid, and at the same time lever Q will give momentum to the said circular or rolling weight by bringing the said projection R in contact with the periphery of the said weight, as hereinbefore described. The said connecting-rods U may be pivoted to said vertically-oblique levers Q at any point which will be required to operate said gates or valves T for the purposes aforesaid.

At W, Fig. 1, Sheet 1, and Fig. 3, Sheet 2, will be seen an indicator which registers the amount of grain weighed, and has pointers and a dial constructed for that purpose. The pointers for indicating the amount weighed are operated by means of any suitable machinery for that purpose, which machinery is operated by means of a projection or pin at or near the end of the said scale-beam near the said lever Q, which projection, by the upward movement of the said scale-beam, will come in contact with the rod *x*, Figs. 1 and 3, which rod extends upward and connects with the said machinery which operates the said pointers. Any machinery which will register or indicate the amount of grain weighed may be used for that purpose with any part of the said machine which will correctly operate the same.

To start the said machine into operation, weighing grain as aforesaid, I open the said gates or valves T in the said supply spout or tube V, and thereby supply the said weighing-hopper G with grain, and when the same shall have received the required weight it will

be discharged therefrom and again supplied in the manner and by the means substantially as herein described and set forth, and thus the operation will continue so long as the supply of grain from said spout or tube V continues.

The aforesaid grain-weighing machine may be stationary and fixed or portable, as the case may require, and it may be constructed of any capacity required.

Having thus described the construction and operation of my said invention and improvements, what I claim, and desire to secure by Letters Patent of the United States of America, is—

1. The arrangement and combination of the means herein described and set forth by which grain may be weighed in large quantities continuously, and without other aid than that which will supply grain to the machine, start its operation, and continue the same, in the manner substantially as herein described and set forth.

2. The employment of the circular or rolling weight M, in combination with the vibrating scale-beam L, in the manner and for the purpose substantially as herein described and set forth.

3. The employment of the oblique levers Q, in combination with the horizontal trip-levers S and with the circular or rolling weight M, in the manner and for the purposes substantially as herein described and set forth.

4. The employment and combination of the trip-levers S with the scale-beam L and with the oblique levers Q, in the manner and for the purposes substantially as herein described and set forth.

5. The employment of the gates or valves T, arranged and combined so as to check and stop the supply of grain to the weighing receiver or hopper G from the tube V, in the manner and for the purposes substantially as herein described and set forth.

6. The arrangement of the gate or valve H, or its equivalent, at or near the bottom of said weighing receiver or hopper G, in combination with the horizontal bar I, each operating in the manner and by the means and for the purposes substantially as herein described and set forth.

7. The employment of the means herein described and set forth for opening and closing the gates or valves T, in the manner substantially as herein described and set forth.

8. The employment of a scale-beam having thereon arranged and combined the inclined plane *m* and guides to direct the movement of the circular weight M, in the manner substantially as herein described and set forth.

In testimony whereof I have hereunto set my hand this 30th day of August, A. D. 1865.

ELNATHAN SAMPSON.

Witnesses:
E. COWEN,
JOHN T. LAMPORT.