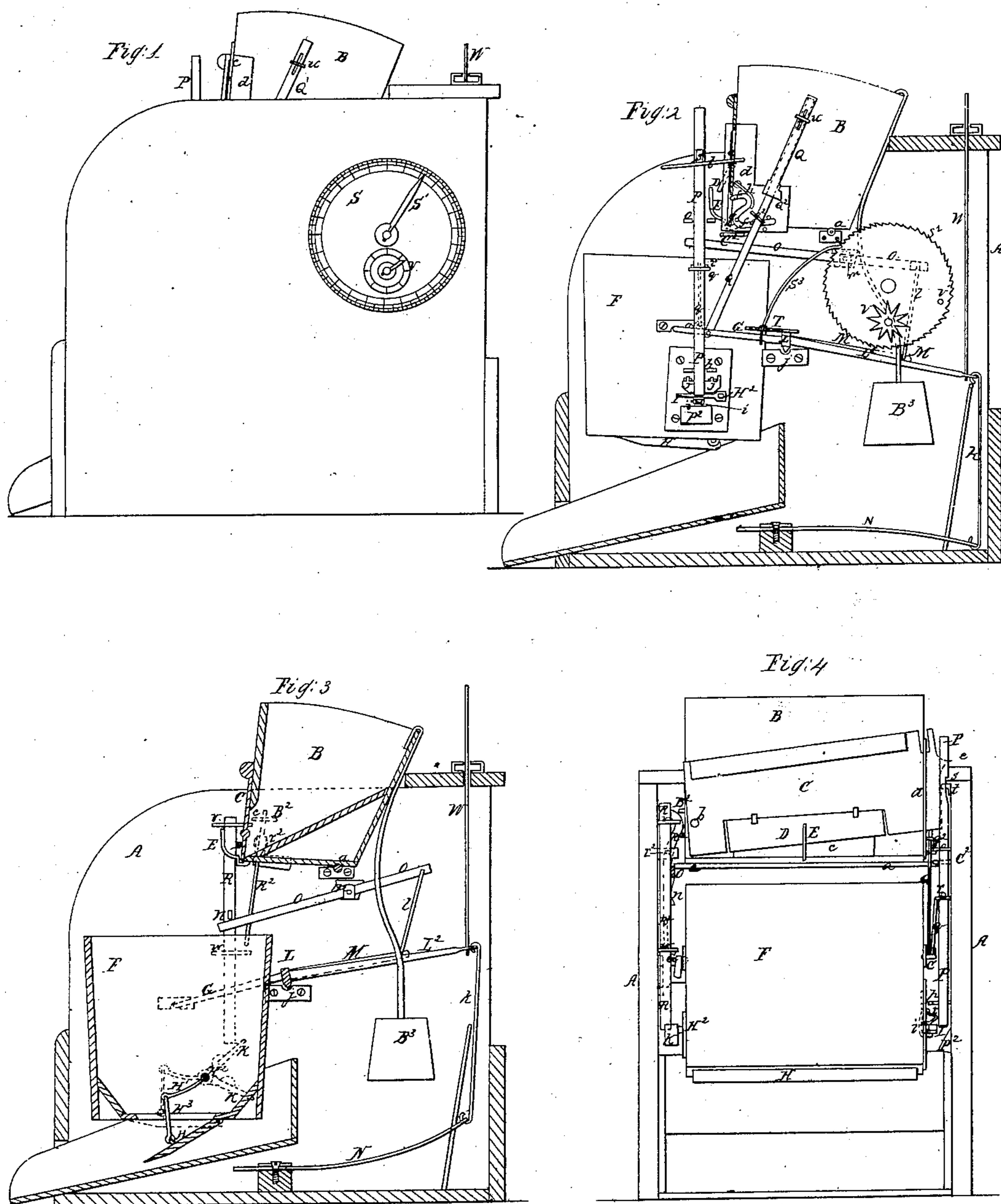


W. BIDDLE.
SELF WEIGHING MACHINE FOR GRAIN, &c.

No. 8,123.

Patented May 27, 1851.



UNITED STATES PATENT OFFICE.

WILLIAM BIDDLE, OF LAFAYETTE, INDIANA.

SELF-WEIGHING MACHINE FOR GRAIN.

Specification of Letters Patent No. 8,123, dated May 27, 1851.

To all whom it may concern:

Be it known that I, WILLIAM BIDDLE, of Lafayette, in the county of Tippecanoe and State of Indiana, have invented certain new and useful Improvements on the Machine for Weighing Grain, &c., which I denominate the "Self Weigher and Indicator"; and I do hereby declare the following to be a full and clear description of the construction and operation thereof, reference being had to the annexed drawings, making part of this specification.

Figure 1, represents an elevation of the side of the machine, showing the dial plate and indicator. Fig. 2, is an elevation, the side of the frame being removed, and showing the position of the hoppers when the grain is being discharged from the upper receiving into the lower suspended hopper. Fig. 3, is a vertical section, showing the position of the hoppers, when the suspended hopper has descended and discharged its contents, and simultaneously with its descent cut off the discharge of the grain from the receiving hopper. Fig. 4, is a front elevation, the hinged door of the receiving hopper being opened.

The same letters indicate the same parts where they occur on the several figures.

The nature of my improvements consists in the arrangement and combination of certain mechanical devices, by which the descent of a hopper, suspended to the ends of two arms, projecting from either extremity of a horizontal transverse shaft, shall simultaneously open a trap door, in the bottom thereof, and close a hinged door attached to a receiving hopper, by the descent of a vertical rod, attached to the right side of the frame; and thus cut off the discharge of the grain therefrom, until the contents shall have been discharged from the suspended hopper, when said suspended hopper is made to rise by the action of a spring attached to an arm of the horizontal transverse shaft, and the receiving hopper made to tilt frontward in the arc of a circle by the weight of the grain therein, and close the trap door of the suspended hopper, by the descent of a vertical bar or rod attached to the left side of the frame, and simultaneously open the hinged door of the receiving hopper, when the grain will again descend to the suspended hopper, and the receiving hopper made to turn rearward by a weight so that on the descent of the suspended hop-

per, the gage plate shall close the hinged door of the receiving hopper, and so on the operation being continuous and the exact quantity of grain indicated at every descending movement of the suspended hopper.

A is the frame made of convenient proportions and form to receive the hoppers with the several devices attached thereto.

B is the upper or receiving hopper, for receiving a continuous supply of grain from the loft or other place having its bearings (a) (a) in plates secured to the inner sides of the frame A. To the front side of the hopper B, is attached by a pin (b) a metallic plate C, which is provided with a hinged door D, for the purpose of opening and closing the opening (c) in the hopper, to allow the grain to descend to the suspended hopper, and cut off or check the same at the proper moment. The right end of this metallic plate C, projects through an opening in a plate (d) attached to the end of the hopper B, to allow it to rise and fall, in opening and closing the hinged door D, the said plate C, having on its end a projection (e) shown by dotted lines in Fig. 4 for disengaging a spring catch (t) from a vertical rod, P on the descent of the suspended hopper to open the trap door in the bottom thereof. To the plate (d) is attached a curved catch plate (f) by a pin (g) said catch plate being provided with an arm (g²) and spring (h), the spring (h) to force its upper curved end beneath the metallic plate C, on the ascent of its right end, and the arm (g²) for receiving the action of a gage bar on the descent of the suspended hopper, to depress the lower or straight end of the catch plate (f) and relieve the same from the plate C, which descends by its gravity and thus cuts off the discharge of the grain; the movement of the catch plate (f) being just sufficient to relieve its upper curved end from the metallic plate C.

B³ is a weight for drawing the hopper B, rearward.

E is a short bent wire rod attached to the bottom of the hopper B, and projecting upward in front of the hinged door D, for the purpose of holding said door closed on the descent of the metallic plate C.

F is the lower suspended hopper, supported upon the ends of two arms G, G, projecting frontward from the horizontal transverse shaft, and provided with a trap door

H, in its bottom, attached to an arm H' projecting from a horizontal rod H^2 by a short rod H^3 , said rod H^2 projecting through either end of the hopper F, and having an arm I, extending frontward from its right end, for the purpose of catching over the end of a spring catch (i) attached to the hopper as seen by dotted lines in Fig. 4 when the trap door H, shall have been closed, for holding it in that position while receiving a supply of grain. Directly above the arm I, is a bent plate J, hinged to the hopper F, and made to bear against the spring catch (i) and is for the purpose of receiving the action of the vertical rod P on the right side of the frame on its descent, which has the effect of forcing the spring catch (i) inward, and thus disengaging its end from the end of the arm I, and permitting the trap door to open. From the left end of the horizontal rod H^2 projects rearward another arm K, in a position to receive the action of the vertical rod R on the left side of the frame, on its descent, for the purpose of closing the trap door, after the grain has been discharged, and the hopper raised to its proper position.

L, is the horizontal transverse shaft, having its bearings (which are knife edged) in plates (j) secured to the frame A, and provided with four arms G, G, L^2 , M, to two of which the discharging hopper is suspended, one, L^2 , projecting rearward from its center, to which is attached by a wire rod (k) a strong spring N, secured to the bottom of the frame A, for elevating the lower hopper F after the grain has been discharged, and one, M, projecting from its left end, rearward and connected by a wire (l) to a spring bar O, extending frontward and secured near its center to the frame by a pin (m) on which it turns, for the purpose of catching beneath a cog (n) on the vertical rod R on the descent of its front end, with the suspended hopper, to raise the rod R on the ascent of said suspended hopper, in a position to descend upon the arm K of the horizontal rod H^2 and depress the same, and with it close the trap door, when the latter is locked by the spring catch (i). P, is the vertical rod confined to the right side of the frame by plates ($o. p.$) and attached to the end of the arm G, by a wire rod (q) so as to allow said arm G, and rod P, to descend with the suspended hopper, and on the ascent of the hopper the wire rod (q) will catch against a pin (r) on the rod P, and raise the same in a position to again descend. Near the upper end of the vertical rod P, is a notch (s) into which a spring catch (t) is made to fit when said rod P is raised, for preventing its descent (to open the trap door) until the proper moment, on the descent of the suspended hopper, when the spring catch will be disengaged from the

notch (s) by the descent of the plate C of the receiving hopper actuated by means of a gage bar.

Q, is the gage bar attached to the end of the arm G, and projecting upward through the arm (g^2) of the curved catch plate (f) and having secured to its upper end a sliding gage plate Q' by a screw (u) passed through a slot in said gage plate Q' to allow it to be raised and lowered and clamped to the bar Q, the lower end of the gage plate being provided with a projection Q^2 Fig. 2 for the purpose of striking against the arm (g^2) of the curved catch plate (f) and disengaging the same from the plate C and allowing it to descend with its hinged door and close the opening of the receiving hopper B. By the use of this gage plate Q' the attendant is enabled to adapt the machine to weigh large or small quantities of grain, by raising or lowering the plate Q' over the bar Q which will increase or decrease the descending movement of the suspended hopper, and consequently the action of the projection Q^2 on said gage plate (to cut off the discharge of the grain from the receiving hopper,) will be governed. R, is the vertical rod confined to the left side of the frame by plates ($v w$) and is for the purpose of descending upon the arm K, of the horizontal rod H^2 when it shall be disengaged from the spring bar O, by means of a plate R^2 secured to the frame by a pin (r^2) on which it turns, and extending downward between the end of the spring bar O, and side of the frame, and having its upper end curved, so that when the receiving hopper shall turn frontward upon its axis (a) after the discharging hopper F, has been raised to its proper position, a projection B^2 , on the left end of the hopper B, will strike the curved end of the plate R^2 and disengage the spring bar O, from the cog (n) of the vertical rod R and permit the latter to descend upon the arm K, and by its weight close the trap door of the discharging hopper. S, is a dial plate. S' is a hand or pointer attached to a ratchet wheel S^2 on the inside of the frame into which a pawl or reaching arm S^3 connected to a plate T, secured to the end of the horizontal transverse shaft L, is made to work, so that on the ascent of the discharging hopper the pawl or reaching arm S^3 will turn the ratchet wheel S^2 and thus by the hand or pointer S' and dial plate S, the quantity of grain that passed from the suspended hopper will be indicated, and tallied by the pointer U, attached to a toothed plate V secured to the inside of the frame and actuated by a pin V' only when the hand or pointer S' has passed around the face of the dial plate S, in the usual manner or shall have performed a revolution.

The plate T, to which the pawl or reaching arm S^3 is attached, is provided with a

series of holes, for adjusting the pawl or reaching arm S^3 to give it more or less movement and thus increase or diminish the movement of the hand or pointer S' . W, is a graduated plate attached to the end of the arm L^2 and projecting vertically through an opening in the top of the frame, and is for the purpose of indicating the number of pounds in connection with the dial plate S, and pointer, said graduated plate W, being made to ascend on the descent of the suspended hopper F, and show the number of pounds while the dial plate exhibits the number of bushels, and thus the quantity of grain weighed is indicated with the nicest accuracy. Instead of the weight attached to the receiving hopper for drawing it rearward after the discharge of the grain therefrom, there may be arranged in the hopper, a plate or blade having on its left end a crank; which is connected to a rod attached to the frame, so that when the hopper tilts frontward the plate or blade will be turned in such a manner as to hold the grain in the rear part of the hopper, and thus produce the same effect as the weight.

Instead of the metallic plate C, of the receiving hopper, I propose to substitute a bent rod of iron attached to the hopper, and extending beyond the right end thereof, in such a manner as to produce the same effect as the metallic plate, C, and connect said bent rod by a connecting arm to the hinged door, which will be attached to the hopper, so that when said bent rod shall be raised, by the tilting of the hopper, the hinged door will be opened, and when the bent rod has descended by action of the gage plate, the hinged door will be closed, and thus cut off the discharge of the grain.

Operation: The hoppers being in the position seen in Fig. 2 and the grain being received into, and discharged from the receiving hopper B, into the lower suspended hopper F, until a sufficient quantity shall have been deposited therein to overbalance the strength of the spring N, the horizontal transverse shaft L, will turn upon its knife edged bearings and the suspended hopper F, will be made to descend and with it the gage bar Q attached to one of the arms G, to which the hopper is suspended, until the projection Q^2 on the gage plate Q' strikes the arm (g^2) of the curved catch plate (f) and disengages the upper curved end of said catch plate (f) from the plate of the hinged door D, and allows it to descend, and close the door D, and cut off the discharge of the grain from the receiving hopper B and simultaneously with the descent of the plate C, and hinged door D, an inclined projection (e) on the end of the metallic plate C. will strike against the spring catch (t) and force it outward and relieve it from the notch (s) in the upper end of the vertical

rod P, and permit the latter to descend by its weight, when its lower end will strike against an inclined jog P^2 on the side of the frame, and be forced toward the hopper, (the opening in the plate (p) being large enough for the purpose) and upon the bent plate J, and thus press the spring catch (i) inward, and relieve the arm I of the horizontal rod H^2 from the end of the spring catch (i) and permit the trap door H to descend, and discharge the grain from the hopper. At this moment the suspended hopper is made to rise by means of the spring N, and with it the vertical rods P R, the rod P by means of the connecting wire (q) catching beneath the pin (r) on said rod, and the rod R, by means of the spring bar O, connected to the arm M, of the transverse shaft L the frontward end of said spring bar O, having descended with the descent of the suspended hopper F, and caught beneath a cog (n) on the rod R; during this movement the pawl or reaching arm S^3 , of the ratchet wheel S^2 , and the graduated plate W is operated, and the exact quantity of grain that passed from the hopper indicated.

The rod P is engaged on its ascent with the spring catch (t) and the rod R held in a position to descend by the bar O. The receiving hopper B having been tilted rearward by means of the weight B^3 , and by this time been again filled with grain, is made to tilt or turn frontward in the arc of a circle scribed from its bearings (a) when the projection B^2 , on the left end of the hopper B is made to force the upper curved end of the plate R^2 , outward and its lower end inward and relieve the end of the spring bar O, from the cog (n) on the vertical rod R, and permit the latter to descend when its lower end will strike upon the arm K of the horizontal rod H^2 and bear it downward—which turns the rod H, and with it raises the arms H' , I, and thus closes the trap door H when the spring (i) will catch beneath the arm I, and the trap door will be locked. Immediately after which the plate C, of the receiving hopper comes in contact with a bent wire or block C^2 projecting from the frame, which elevates said plate C, until the end of the catch plate (f) is forced beneath the right end of the plate C and opens the hinged door D, and permits the grain to descend into the suspended hopper, when the same operation and movement of the hopper is produced when a sufficient quantity of grain shall have descended into the suspended hopper, the gage plate Q' of the bar Q being adjusted to govern the action of the projection Q^2 of the gage plate Q' upon the arm g^2 of the catch plate (f) to cut off the grain from the receiving hopper, to weigh large or small quantities of grain.

The grain after having been discharged from the suspended hopper, may be conducted to any desired place.

Having thus described my self weighing machine for grain, and shown the operation of the same, I desire that it shall be understood that I do not claim a self weighing machine operated by the weight of the grain, so as to form an automatic weighing machine, by which with the aid of a register or index, the amount weighed is ascertained. Nor do I claim opening a gate or door in the bottom of a receiving hopper by the descent of a steelyard, simultaneously with the discharge of the grain from a rotating hopper. But

What I do claim as new and of my own invention, is—

1. The employment of the metallic plate C or its equivalent attached to the receiving hopper B, and made to rise and fall by the action of said hopper and a gage Q' in such a manner that on the descent of a suspended hopper F, the gage plate Q connected therewith will disengage a catch plate (f) from the right end of the metallic plate C and permit the latter to fall, and cut off the discharge of the grain, and simultaneously therewith open a trap door H, in the bottom of the suspended hopper, and on the ascent of the same, the receiving hopper B, will be made to tilt frontward by the weight of the grain so as again to raise the plate C, and open the hinged door D, of the said plate C simultaneously with the closing

of the trap door, as fully described and represented.

2. I also claim the employment of the gage plate Q' when combined with the lower or discharging hopper F for the purpose of determining the quantity of grain to be weighed by limiting the descending movement of the suspended hopper F and consequently gaging the action of the projection Q² on said gage plate Q' to actuate the plate C, to cut off the discharge of the grain from the receiving hopper.

3. I also claim the employment of the vertical pendant rods P, R confined to either side of the frame, when combined with a suspended hopper F provided with a trap door H, for the purpose of opening and closing said trap door, by their descent alternately, said vertical pendant rods, P, R, being respectively actuated by the descent of the metallic plate C to disengage the spring catch (t) from the rod P, to open the trap door, and by the tilting frontward of the receiving hopper B to disengage the spring bar O, from the vertical rod R, and allow its descent, to close the trap door H, as set forth in the specification and shown in the drawings.

In testimony whereof I have hereunto signed my name before two subscribing witnesses.

WILLIAM BIDDLE.

Witnesses:

WM. P. ELLIOT,

A. E. H. JOHNSON.