J. B. STONER.

Grain-Meter.

No. 218,594. Patented Aug. 12, 1879.

Fig 1.

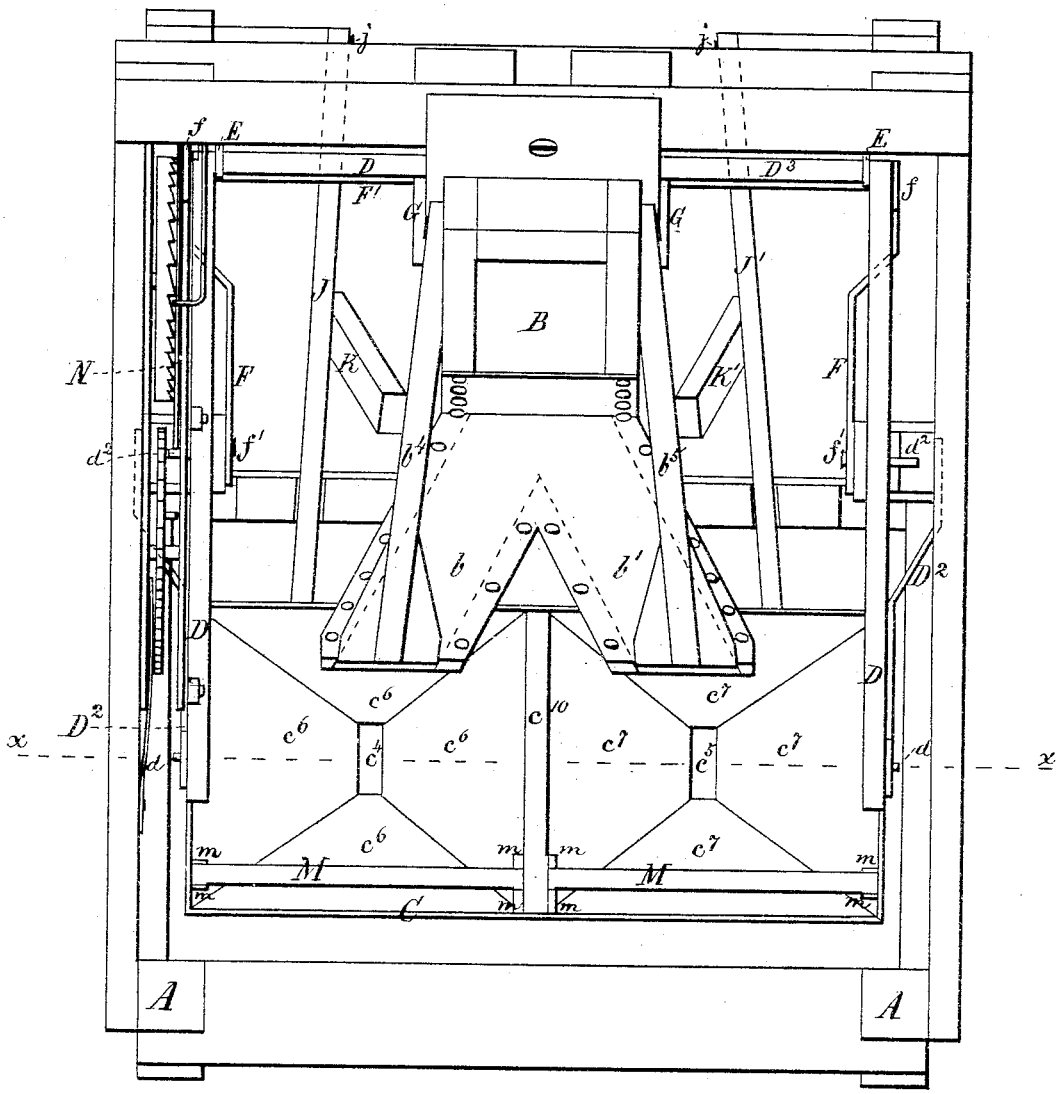

Fig 5.

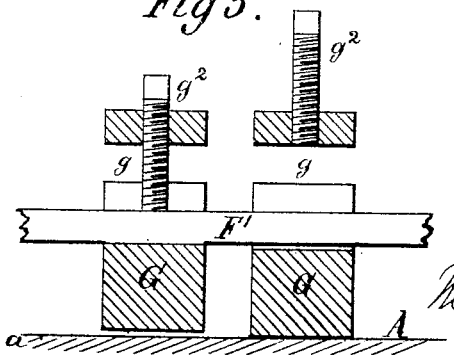

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Fig 2.

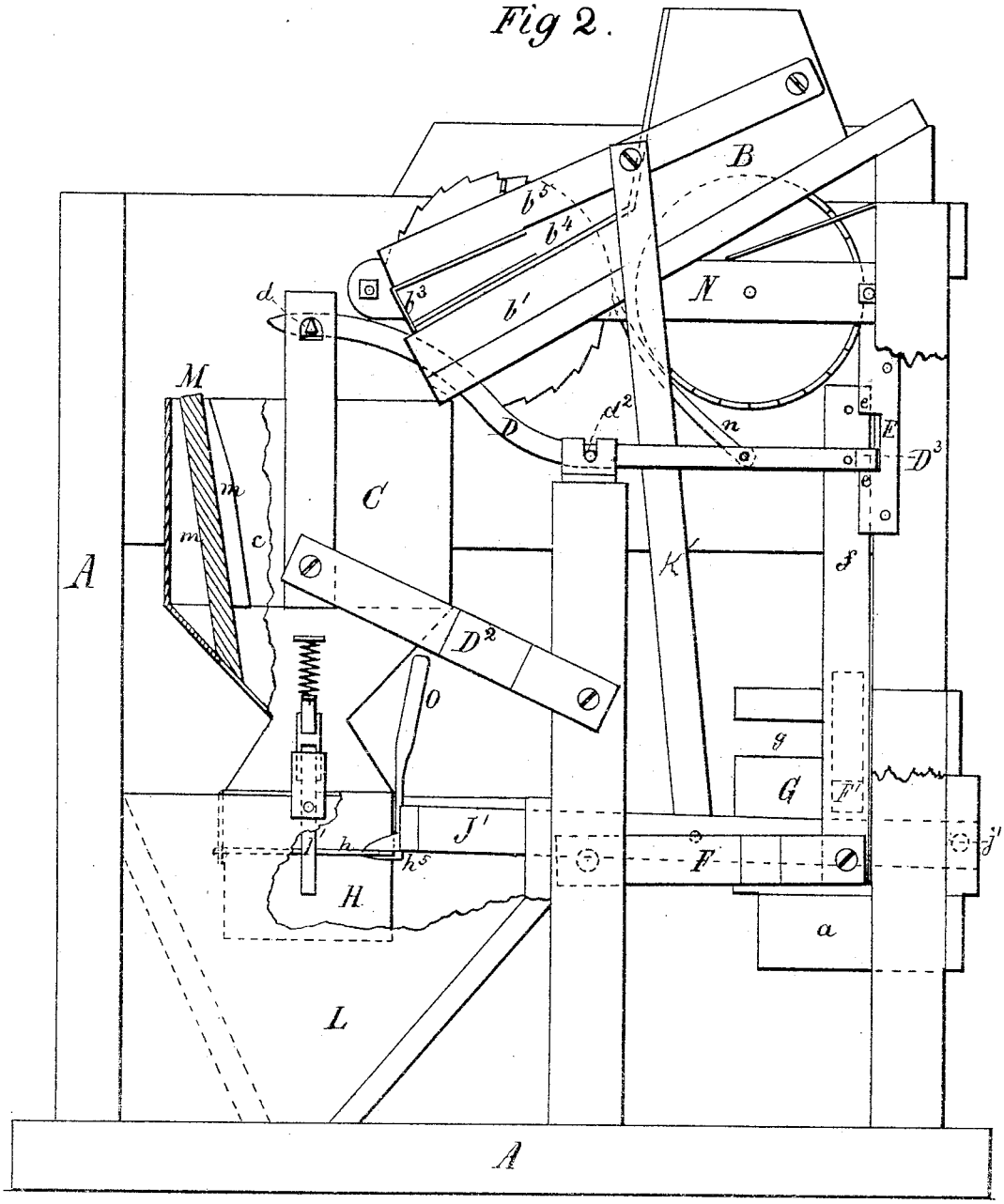

Fig 4.

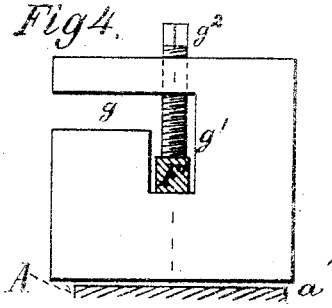

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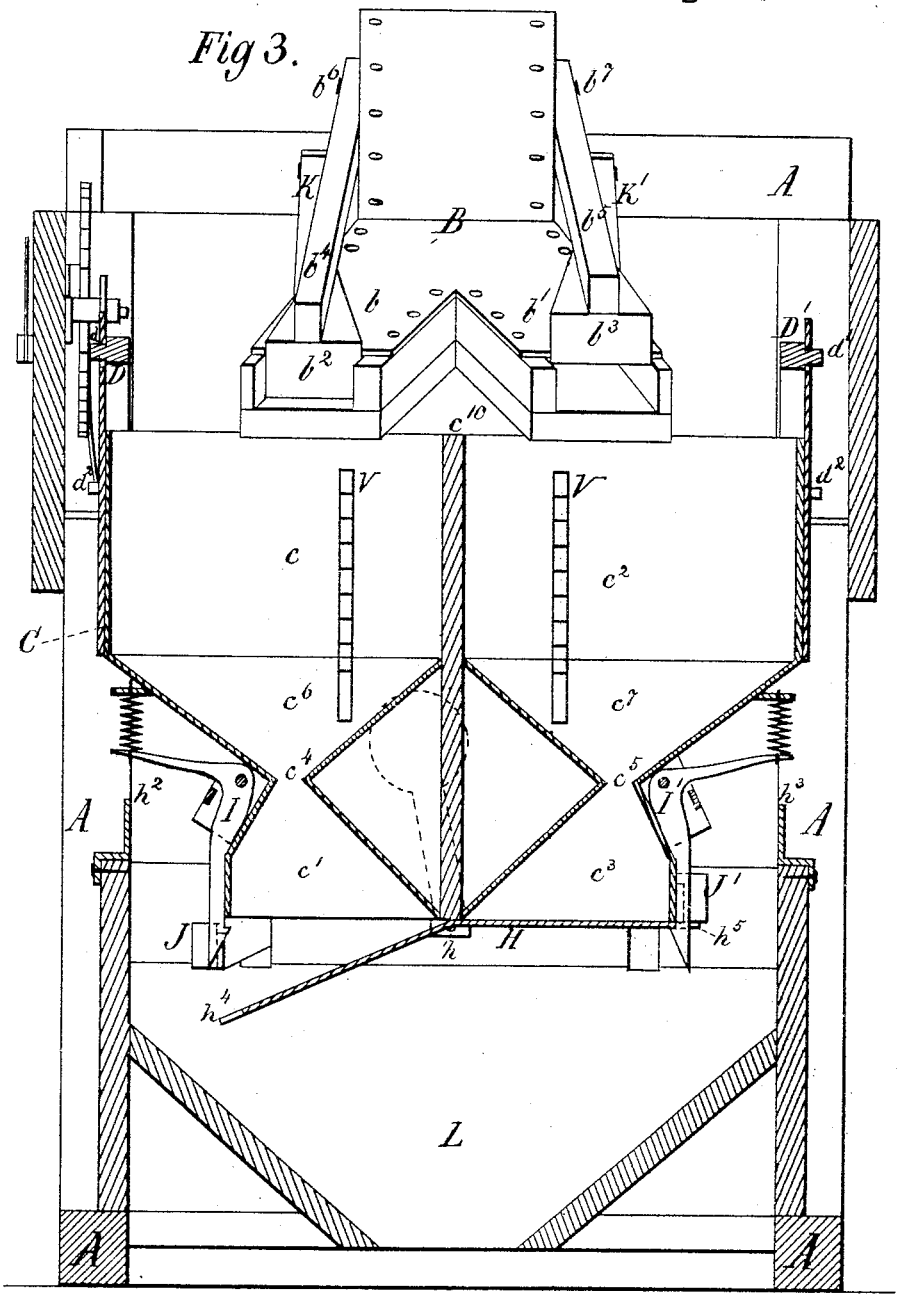
Fig 3.



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UNITED STATES PATENT OFFICE.

JOHN B. STONER, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF HIS RIGHT TO WILSON D. SUYDAM, OF DENVER, COLORADO.

IMPROVEMENT IN GRAIN-METERS.

Specification forming part of Letters Patent No. **218,594**, dated August 12, 1879; application filed February 17, 1879.

To all whom it may concern:

Be it known that I, JOHN B. STONER, of the city, county, and State of New York, have invented a new and useful Improvement in Automatic Grain-Weighing Machines, which improvement is fully described in the following specification and drawings accompanying same, in which—

Figure 1 is a top view of one of my improved grain-weighing machines. Fig. 2 is a side elevation of the same, showing parts of the frame broken away to expose the operating mechanism and part of a measuring-funnel broken away and sectioned to expose the inner construction of the same. Fig. 3 is a vertical transverse section in the line *x x* of Fig. 1. Fig. 4 is a side view of one of the balancing-weights employed in my machine suspended and as it appears when in operation. Fig. 5 is a vertical central transverse section of two balancing-weights, one of which is shown in and one out of operation.

My invention relates to machines operated by the weight of grain, which is passed into it in a stream or current from a "bin" or reservoir, and which causes the machine to indicate at intervals each bushel or given number of bushels of grain thus received by the machine, according to the bushel-weight of the grain to be measured.

The first part of my invention consists in a double-chambered hopper provided with an oscillating discharge-valve at the bottom, and with a large upper and a small lower compartment in each chamber, the two compartments of each chamber being connected by a contracted throat, whereby a sudden discharge of both chambers and premature operation of the supply-gates are prevented, as will be shown.

The second part of my invention consists in the combination of the said hopper with a branching double supply-chute, with two cut-off gates and suitable mechanism for operating the same, for the purpose of alternately supplying the upper chambers of the hopper.

The third part of my invention consists in the construction of the balancing-weights used in my machine, whereby they may be readily set into and out of operation without removing them from the machine.

The fourth part of my invention consists in an adjustable partition in each upper chamber of the hopper, whereby the capacity of said chambers may be either enlarged or contracted, accordingly as the specific gravity of the different grains being weighed may require.

The fifth part of my invention consists in the combination of an oscillating weighted lever-arm, the double-chambered hopper, and the oscillating double discharge-valve.

In the drawings, A represents a suitable frame, having at its top an inclined forked chute, B, which, in practice, is connected at its upper end with the bottom discharge-opening of a grain bin or elevator by means of an ordinary spout or funnel. The branches b b^1 of the chute are closed by means of gates b^2 b^3, fastened to the ends of levers b^4 b^5, which have fulcrums b^6 b^7 on the chute. The branches b b^1 terminate above two chambers, c c^2, of a hopper, C, which is suitably suspended upon two knife-edge bearings, d d^1, of two parallel scale-beam lever-arms, D D, having suitable fulcrums d^2 d^2 on the frame of the machine, which fulcrums are on a lower level than the said knife-edges d, in order to accelerate the descent of the hopper, as will be hereinafter explained. The rear ends of these lever-arms are united by a transverse scale beam or bar, D^3, the play or dip of which is limited by stopping-plates E, having projecting upper and lower abutments e, as shown in Fig. 2.

The rear ends of the lever-arms D D are, by means of rods f, connected with the rear ends of two lower levers, F, having their fulcrums at f' on the frame of the machine.

A transverse scale beam or bar, F′, is fastened to the rods f, and upon this beam a weight or weights, G, are fitted loosely, and at will fastened thereto, in order to keep up the hopper C while one of its compartments is being supplied with grain, and also serve as the weights for weighing the grain.

The weight G is provided with an angular slot, the horizontal part g of which permits the weight to be applied to and withdrawn from the beam F′ in a horizontal direction when said beam is in line with said slot, and the vertical part g^1 of said slot permits the rod F′ to move

freely up and down therein when either one of the weights is not in use for weighing.

A set-screw, g^2, in the top of each of the weights G serves to clamp the weights to the beam F′, as seen in Fig. 4, in order to make them operative for weighing purposes. This set-screw is screwed up, as seen in Fig. 5, when one of the weights is not to be used for weighing. A cross-piece, *a*, of the frame supports the respective weights when not in use. By this construction of weights corresponding with the number of pounds contained in any given bushel of grain they may be mounted upon the supporting cross-piece *a* in a row, so as to be successively used for weighing purposes without the necessity of removing them when not required for immediate use.

The motions of the hopper C are steadied by ordinary guide-stays D^2. The hopper C, by means of a partition, c^{10}, is divided into two compartments, each of which is subdivided into two connected chambers, c c^1 and c^2 c^3. The connection of said chambers is effected by means of contracted throats c^4 c^5 in the inclined bottoms c^6 c^7 of the upper chambers.

The lower chambers, c^1 c^3, are alternately closed and opened by means of an oscillating angular valve, H, having its fulcrum *h* at the center of the bottom of the hopper. Two angular spring-catches, I I′, are attached to the hopper, one to either end of the same, and serve to latch alternately either side of the valve H to the bottom part of the hopper in the act of weighing, and two abutting stops, h^2 h^3, are attached to the frame A below an upper arm of each of the spring-catches at such an altitude that the descent of the hopper will cause the upper arm of said spring-catches to come in contact with the said abutting stops, and the latching end of the catches to be thrown out by them, thereby disengaging the valve H.

At the ends of the valve H projections h^4 h^5 are provided, whereby the ends of two levers, J J′, are supported when the valve is closed. The levers J J′ have their fulcrums *j j′* at the rear part of the frame, and they are connected by means of rods K K′ with the levers b^4 b^5, carrying the supply-cut-off gates b^2 b^3.

A stationary hopper, L, fastened to the frame below the hopper C, receives the grain from the hopper C, and conducts it to a bin below, or to a transporting-vessel.

A sliding partition, M, secured in guides *m*, is provided in each chamber, *c* and c^2, which partition may be adjusted high or low, in order to give the required capacity for grain of different specific gravity, and thus the hopper be capable of containing so much grain delivered from the supply-chute at the moment of the closing of the chute as shall be equal in weight to the weight or weights G employed for measuring, the grain weighed being always at the same level in the hopper at the moment of cutting off the supply.

A weighted lever-arm attached to the oscillating valve H serves to steady the valve H in either of its two main positions, and facilitates the operation of the latch-hooks I I′.

One of the scale-beam levers D is provided with a pawl, *n*, which operates an ordinary counting mechanism, N, secured to the side of the machine, whereby, with the aid of a suitable dial or dials, the correct number of pounds measured is always indicated.

In the hopper C, Fig. 3, I have indicated scales V V, the office of which is to show the fraction of a cargo of grain which may remain in the hopper, but of not sufficient quantity to be weighed in the hopper. In such case the scale will be so graduated as to show the number of bushels by "stroke" measure, and such fractional portion of the cargo can then be discharged from the hopper by disengaging by hand the catch I or I′, as the case may be, from the valve H.

Operation: The machine in its normal condition stands with one of the supply-gates open and the corresponding lower chamber of the hopper closed by the valve H.

The drawings show the gate b^3 and the chamber *c* open and the sliding partitions M and weights G in position and ready for operation.

The grain to be measured is supplied from a bin above the machine, or from an elevator, into the chute B, and it fills the closed branch *b*, and passes through the open branch b^1 into the chamber c^2, and through the throat c^5 into the closed chamber c^3. After the chamber c^3 is filled the upper chamber, c^2, becomes gradually filled with grain until its weight corresponds with the weight on the scale-beam, when the hopper is caused to descend. During this descent of the hopper C the angular latch-hooks I I′ are tripped by the abutments h^2 h^3, and the grain in the chamber c^3 forces the valve H down, thereby closing the chamber c^1. The contents of the chamber c^3 are discharged instantly, and by their discharge the weight of the hopper is so much lessened that the weight G begins to descend and causes the hopper to rise. While the hopper is descending, the lever J′ also descends and closes the gate b^3, and cuts off the supply from the branch b^1. While the hopper is ascending, the weighed grain in the chamber c^2 continues to discharge itself through the throat c^5 upon the valve below, from which it descends to the hopper L. Meantime the valve H is kept by the weight of the discharging grain and by the weight O in its reversed position until the upper end of the latch-hook leaves the abutment-stop h^2, and by its lower end latches the valve H to the bottom part of the chamber c^1. This done, the further ascent of the hopper causes the projection h^4 of the valve to come in contact with and lift the lever J, whereby the gate b^2 becomes opened. The branch *b* now discharges the grain into the chambers c c^1, the gate b^3 remaining closed, because the lever J′ is not operated by the projection h^5 of the valve when the parts are in this position.

The size of the throats c^4 c^5 is such that the weighed grain in one chamber is discharged

before the quantity supplied in the other chamber is heavy enough to commence to move the hopper down.

The operation of the described parts is the same alternately on either side of the partition c^{10}, so that supply and discharge go on without interruption, changing from right to left, and vice versa, in the hopper.

One of the weights G, used for weighing the lightest kind of grain, is clamped to the center of the beam F′ and remains there, and when heavier grains are to be weighed, additional weights G, corresponding to the difference of the weight of such heavy grains as compared with the lightest, are attached in the manner described to the beam F′.

Having described my invention, I claim—

1. A hopper having its two chambers formed, respectively, with a large compartment at top and a small compartment at bottom, and the two compartments in communication with each other by means of a contracted portion or throat, in combination with a two-way chute provided with cut-off gates, a scale-beam, a double-acting valve, and tripping mechanism for operating the cut-off gates, this combination being such that the chute remains stationary, while the two chambers of the hopper and the large and small compartments of each chamber thereof rise and fall together, and that the valve is opened on one side of the partition of the hopper and closed on the other side thereof when only a small weight from the full chamber of grain is resting directly upon it, and that the sudden discharge of the whole chamber of grain cannot take place when the valve is thus opened, substantially as and for the purposes set forth.

2. The hopper C, having a large upper compartment and a small lower compartment, the two compartments being rigid with one another and connected by a contracted portion or throat, whereby the weight of the larger portion of the grain in a chamber of the hopper is supported in a great measure in the upper compartment above the grain in the lower compartment while the discharge-valve is being opened, and gradually discharged after the valve is opened, substantially as and for the purpose described.

3. The double valve provided with a counter-balance, in combination with the hopper having two chambers and relatively large and small compartments in each chamber, which are connected by a narrow throat, substantially as and for the purpose described.

4. The weights, slotted as at $g\,g^1$, and provided with the set-screw g^2, substantially as and for the purpose described.

5. The hopper C, provided with the vertical sliding partition M, substantially in the manner shown and described.

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