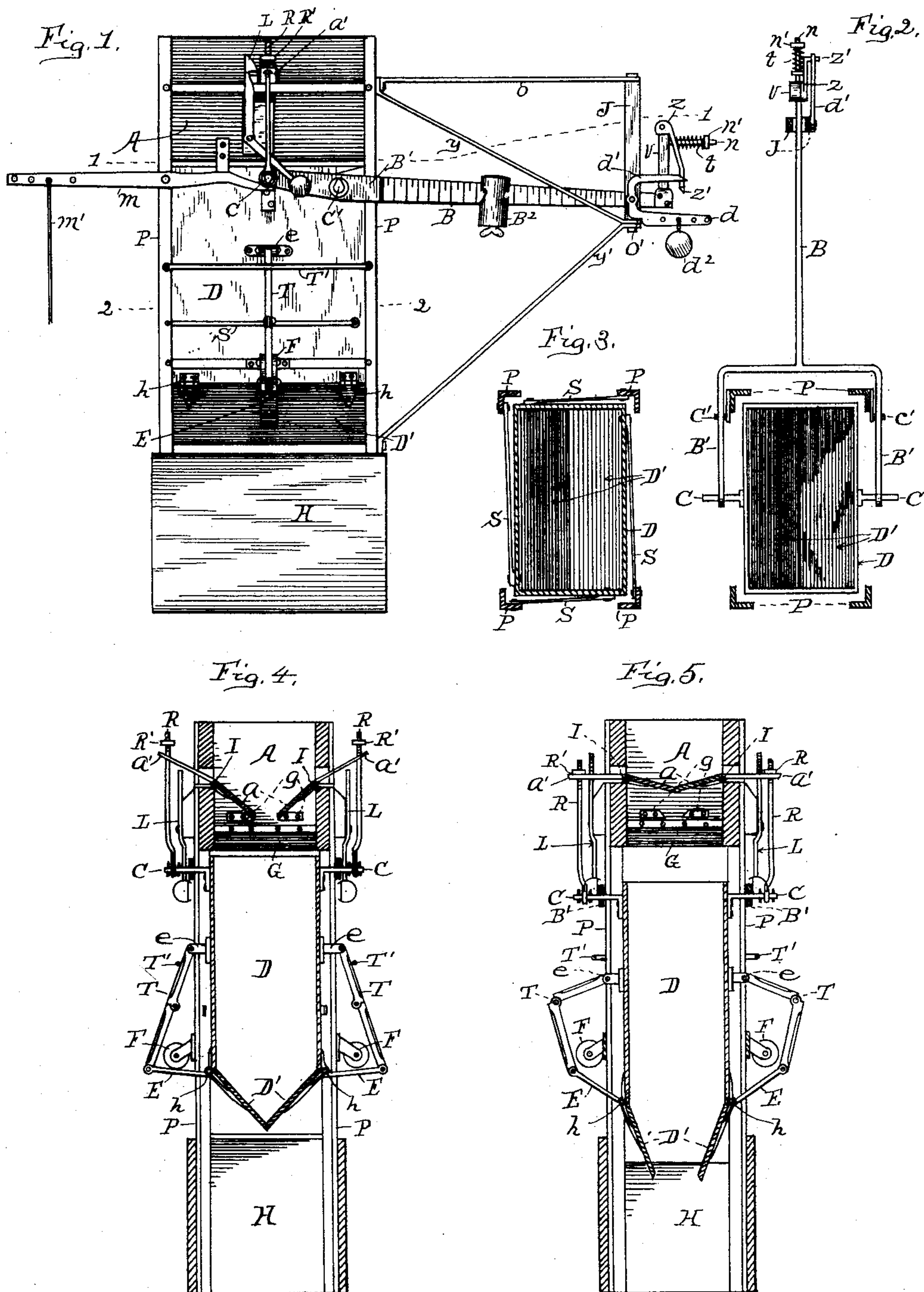


(No Model.)

McCLELLAN COWAN & J. G. RAGAINS.  
GRAIN METER.

No. 477,245.

Patented June 21, 1892.



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# UNITED STATES PATENT OFFICE.

MCCLELLAN COWAN AND JAMES G. RAGAINS, OF WICHITA, KANSAS.

## GRAIN-METER.

SPECIFICATION forming part of Letters Patent No. 477,245, dated June 21, 1892.

Application filed May 15, 1891. Serial No. 392,859. (No model.)

*To all whom it may concern:*

Be it known that we, MCCLELLAN COWAN and JAMES G. RAGAINS, citizens of the United States of America, residing at Wichita, in the county of Sedgwick and State of Kansas, have invented certain new and useful Improvements in Grain-Meters, of which the following is a specification, reference being had therein to the accompanying drawings and the letters of reference thereon, forming a part of this specification, in which—

Figure 1 is a side elevation of the meter; Fig. 2, a horizontal section thereof on line 1 of Fig. 1; Fig. 3, a similar section on line 2 of Fig. 1. Fig. 4 is a vertical cross-section of the meter, represented with its parts in position to receive the grain which is to be weighed; and Fig. 5 is a like section representing the parts in position as when discharging the weighed grain from the meter.

This invention relates to certain improvements in a machine for weighing grain or any substance adapted to pass through the machine in a like manner, which class of machines is commonly known as "grain-meters;" and it consists of a vertical frame supporting a hopper at its upper portion, of a grain receiving and weighing receptacle suspended below the hopper by means of a forked and pivoted weigh-beam, of downwardly-opening doors in the bottom of said hopper and receptacle, and of the particular mechanism for opening and closing said doors and locking them closed, which improvements are fully set forth in the following specification, and pointed out in the claims.

Referring to the drawings, P represents a set of four posts connected together at suitable intervals by means of cross-bars, as shown, and provided at their lower portions with the open-bottom inclosure H.

A is a hopper supported by means of and within said posts' inclosure, which hopper has arranged therein a pair of opposite downwardly-opening doors *a*, hinged to the side walls, as shown at I I, each door being provided with an arm *a'*, extending one to each side of the machine through openings in the side walls of the hopper. Said doors are adapted to assume two given positions—one when open, as represented in Fig. 4, when grain entering the hopper will pass through

and into the receptacle below, and one when closed, as represented in Fig. 5, when grain entering the hopper will be retained therein. As a means of preventing said doors opening too far the stops *g g* are provided, secured to the walls of the hopper, which are engaged by the end portions of the doors, and as a means of preventing the doors moving too far up when closing they are made to register with each other before they assume a horizontal position, as shown in Fig. 5. Also within said hopper, below the end portions of said doors, is arranged a pair of opposite inclined slats *G*, which extend a short distance toward the hopper center to lessen the area of its bottom opening, so that said opening will be smaller than the receptacle below; but said slats are not essential and may be omitted. D represents said receptacle and is suspended below said hopper within the space between the posts P by means of the forked end of the weigh-beam B through the agency of a pair of opposite arms or trunnions *c* of the upper side portions of said receptacle, which arms or trunnions rest in holes of said forked portions B' B' of said beam, and in turn said beam is pivotally supported by means of a pair of fixed studs *c' c'*, arranged in a pair of opposite holes of the forks of said beam, as shown, and the lower portion of the receptacle is prevented from swaying sideways by means of a set of four links S, one link being arranged at each side, secured by means of loosely-fitted pivots at one end to the receptacle side and at its opposite end to a post P, as shown in Fig. 3. The bottom of said receptacle is provided with a pair of oppositely-arranged doors D', hinged to the receptacle side walls, as shown at *h h*, and are each provided with a side extending arm *e*, one at each side of the machine, which arms are respectively connected with an eye-lug *e* of the receptacle side walls above said bottom doors through the agency of the toggle-joints T T, one at each side of the machine, as shown, which toggles when straight hold said doors locked closed and when thrown at their joint permit said doors to open downwardly by their gravity. The movement of the receptacle during operation is vertical, being weighed down when it has been filled with grain, and when the grain has been discharged



it again assumes its highest position by means of the weight of the weigh-beam.

F represents wheels supported by means of extending bracket-bearings, which are fixed to a cross-bar of the machine, one at each side of the machine, respectively, above the arms E of the receptacle-doors and adjacent the inner side of the toggles, and are for the purpose of opening and closing the said receptacle-doors by pressing the toggles outward by means of the engagement therewith as the receptacle lowers, which will permit the doors D' to open, as shown in Fig. 5, and by being engaged by the door-arms E, which will hold said arms, causing them to turn on their hinges (of the doors) when the receptacle rises, thus causing said doors D' to close and the toggles to straighten, thereby locking the doors, and as a means of insuring positiveness in the movement in straightening the toggles a cross-rod fixed to the posts and, as shown at T', at each side of the machine is provided, under which the upper joints of the toggles pass as the receptacle nears its up position, which cross-rods positively force said toggles into their straight position, if not otherwise caused to assume such position.

R represents rods, one at each side of the machine, having an eye formed at their lower ends, respectively sleeved on the arms or trunnions c of the receptacle at the outer ends of said arms, and are arranged, respectively, at their upper end portions through holes of the hopper-arms a', and are screw-threaded at their upper end, and have turned thereon a nut R' (on each rod) or provided otherwise with an enlargement at that place to serve as a stop, and when the receptacle is up and the hopper-doors open said nuts or enlargements will be a little above said arms of the hopper-doors, and as the receptacle lowers under weight of the grain therein said rods will be carried down with it and during their first-part movement will move free; but when the nuts R' or enlargements thereof engage arms a' said arms will likewise be carried down at their outer ends, which will cause the hopper-doors to close, and thereby prevent more grain entering the receptacle until the quantity contained therein has been discharged, and when said door-arms have reached such position to close their doors they are caught and retained by means of a gravity-latch, a latch at each side of the machine, as shown at L, which latches are each provided at their lower end with curved portions extending downward at an angle across the path of the extending arms c of the receptacle and are weighted at such end, so they will operate by gravity to cause them to engage and hold the hopper-door arms when the receptacle has moved down to bring its arms c from engagement with said curved latch portions, and by means of said curved portions of said latches they are operated to disengage said door-arms when the receptacle moves up by means of said receptacle-arms c again engaging and moving

to one side said lower portions of the latches, which will correspondingly but reversely move their upper portions, and by means of such described mechanism the doors of the hopper and those of the receptacle are operated alternately, so that during the time the receptacle is being filled the hopper is open at its bottom to permit grain to pass through it, and during the time the receptacle is discharging said hopper-doors are closed to hold the grain.

A distance to one side of the meter-frame is arranged a pair of parallel vertical bars J a little distance apart, which are supported by means of braces y, y', and o, as shown, which bars inclose and form a guide for the outer end portion of the weigh-beam B.

d is a weight-lever fulcrumed to one side of one bar J and is arranged to extend horizontally in the direction of the weigh-beam, and is provided with a shouldered portion o', resting against a corresponding shoulder of said bar J, which holds it in such extending position, and is provided with a series of holes along its length, into which at some given point a weight d<sup>2</sup> is attached, and above its fulcrum it is further provided with a latch-arm d', likewise extending in the same direction.

V represents a standard fixed to the end of the weigh-beam and is arranged vertically and is provided with a laterally-extending arm n, screw-threaded at its end portion, and has pivotally secured to its upper end a depending latch-arm Z, which is provided with a hole through which the arm n passes, and sleeved on said arm n is a coil-spring t, given tension by means of a nut turned on the arm n, which spring yieldingly holds the lower end of the said latch-arm toward the standard V. The lower end of the latch-arm Z is provided with a laterally-extending portion Z', which when the weigh-beam comes down from an elevated position engages the end portion of the lever-arm d', which is made beveled, and rides down the beveled end of said lever-arm and passes below it by means of compressing the spring t. When in such position, which is represented in Fig. 1, the receptacle is up and the weigh-beam has its sliding weight B<sup>2</sup> adjusted for properly weighing the kind of grain entered into the meter, and as the receptacle becomes partially filled it overcomes the weigh-beam weight B<sup>2</sup> and causes the said beam to move up at its outer end until the depending latch portion Z' engages under the end of the lever-arm d', where it is held until the proper weight of grain has entered the receptacle, when the lever-weight d<sup>2</sup> will be overcome and permit its lever and the arm d' to rise at their end, which permits the weigh-beam latch to pass said arm d<sup>2</sup> and free the weigh-beam of said outer weight, and as the weigh-beam becomes thus freed it is much lighter than the receptacle and the grain therein, and the receptacle will therefore lower the remainder of its distance with sufficient speed and force to properly open its doors and



close the hopper-doors, and when the bottom doors are open the grain is discharged quickly, which lightens the receptacle so quickly that the weigh-beam and its weight  $B^2$ , which is then much heavier than the empty receptacle, will speedily and with force raise the receptacle and by such force close its doors and open those of the hopper, thus giving force to each movement and making the machine automatic.

As a means of registering the grain as it is weighed by the meter a lever, as shown at  $m$ , is fulcrumed to one post  $P$  in such manner that one end thereof rests under one arm  $c$  of the receptacle, while its opposite end extends from the machine, where it is provided with a rod  $m'$ , which is designed to be connected to a registering device, which is not necessary to be shown, as it in itself is common and forms no part of this invention. By means of such lever the actuation of the receptacle is utilized to register each down movement, and thereby automatically tally each discharge of grain.

In use the meter is placed to receive grain from an elevator-spout or other spout and with its bottom inclosure over a bin or other receptacle, or it may be connected with a spout so that the grain weighed may pass either into such bin or receptacle or pass on through the attached spout; also, the meter may be arranged intersecting a grain-spout or passage, and thereby weigh and register the grain as it passes through it and not materially retard its progress.

In weighing different kinds of grain the weights of the meter are so set as to accommodate each kind by moving weight  $d^2$  from hole to hole of its lever and by sliding weight  $B^2$  along on the weigh-beam. For example, should oats be the grain being weighed the weight  $d^2$  will be suspended from the third hole from the outer end of its lever, as shown in Fig. 1, and in such position we will presume that it will require fifteen pounds weight of grain in the receptacle to cause the latch  $Z Z'$  to overcome and rise and pass lever-arm  $d'$ . In such instance the weight  $B^2$  will be moved out on the weigh-beam to a scale indicating seventeen pounds, which, together with the former fifteen pounds resistance, will hold the weigh-beam latch from moving higher than the lever-arm  $d'$  until a bushel of oats (thirty-two pounds) has been deposited in the receptacle, when both weights will be overbalanced and the receptacle will lower to discharge its load, and the instant the weigh-beam latch is released there will remain but the seventeen pounds resistance to prevent the receptacle from lowering with its load, which will permit it to lower with considerable force to operate the machine-doors, as described, and when its load is discharged the receptacle will be overbalanced by the seventeen pounds of the weigh-beam weight, as scaled, which will

cause the receptacle to reverse movement with equal force.

Having thus described our invention, what we claim as new and useful, and desire to secure by Letters Patent, is as follows:

1. In the herein-described grain-meter, the combination, with the frame, of the pivotally-supported weigh-beam, the weighing-receptacle suspended from said weigh-beam, the spring-latch fixed to the outer end of the weigh-beam, the weight-lever and latch-arm thereof pivotally attached adjacent said spring-latch, and the lever and weigh-beam weights, substantially as and for the purpose set forth.

2. In the herein-described grain-meter, the combination, with the frame, of the hopper fixed in the upper part of said frame and provided with downwardly-opening doors having side extending arms, the weighing-receptacle likewise provided with downwardly-opening doors having side extending arms, the forked weigh-beam for pivotally supporting said receptacle, the toggles for connecting said receptacle-door arms with fixed studs or eyes of the receptacle, the stationary wheels for actuating said toggles and arms, the rods for connecting the arms of the hopper-doors with the receptacle, and the gravity-latches for retaining said arms, substantially as and for the purpose set forth.

3. In the herein-described grain-meter, the combination, with the vertically-movable weighing-receptacle, of the downwardly-opening doors hinged thereto and provided with actuating-arms extending therefrom, the toggles arranged connecting said arms with the receptacle sides, and the stationary wheels arranged to be engaged by said toggles and arms to open and close the said doors when the receptacle lowers and rises, substantially as set forth.

4. In the meter described, the combination, with the receptacle  $D$ , of the doors  $D'$ , hinged thereto and provided with side arms extending therefrom, the toggles  $T$ , arranged connecting said arms with the receptacle sides, the stationary wheels adapted to operate said arms and toggles by engagement therewith during the movement of the receptacle for operating said receptacle-doors, and the cross-rods  $T'$ , arranged to be engaged by said toggles to insure positiveness in straightening said toggles to hold said doors locked, substantially as described and set forth.

5. In the herein-described grain-meter, the combination, with the weigh-beam, of the spring-latch attached to the end thereof, the shouldered weight-lever fulcrumed at one side of said beam and provided with the extending latch-arm in the path of said spring-latch and adapted to be engaged by said latch when the weigh-beam is moved up or down, and the lever and weigh-beam weights, wherein said latch mechanism and weight-lever assist in



holding down the weigh-beam and release it when the receptacle of the meter has become charged with a proper measure of grain, substantially as and for the purpose specified.

5 6. A grain-weighing machine consisting of the combination, with a frame, of a grain-receiving hopper having downwardly-opening doors in its bottom portion actuated by means of extending arms, a grain-weighing recepta-  
10 cle having side extending arms and suspended from the forked end of a pivoted weigh-beam below said hopper and also provided with downwardly-opening doors in its bottom actuated by means of extending arms, a pair of  
15 toggles arranged connecting said arms with the receptacle, a pair of stationary wheels adapted to be engaged by said toggles and arms to open and close said receptacle-doors, a pair of rods arranged connecting the recep-  
20 tacle with the arms of the hopper-doors for operating said doors, a pair of gravity-latches arranged to hold said doors closed during the time grain is being discharged from the re-

ceptacle and releasing said doors to permit them to open thereafter, the weight-latch pro- 25  
vided with the spring-latch at its free end, the supplemental weight-lever having a latch-arm adapted to be engaged by said spring-latch to assist in retaining the weigh-beam, and the compound weights, substantially as 30  
and for the purpose set forth.

7. In the herein-described grain-meter, the combination, with the weigh-beam, of the spring-latch attached to the end portion there-  
of, the supplemental shouldered weight-lever 35  
fulcrumed adjacent said latch and provided with a horizontally-extending latch-arm arranged in the path of said latch, and the supplemental adjustable weight of said lever, substantially as and for the purpose set forth. 40

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