(No Model.) 2 Sheets—Sheet 1.

J. W. HILL

GRAIN METER.

No. 302,136. Patented July 15, 1884.

Fig 1.

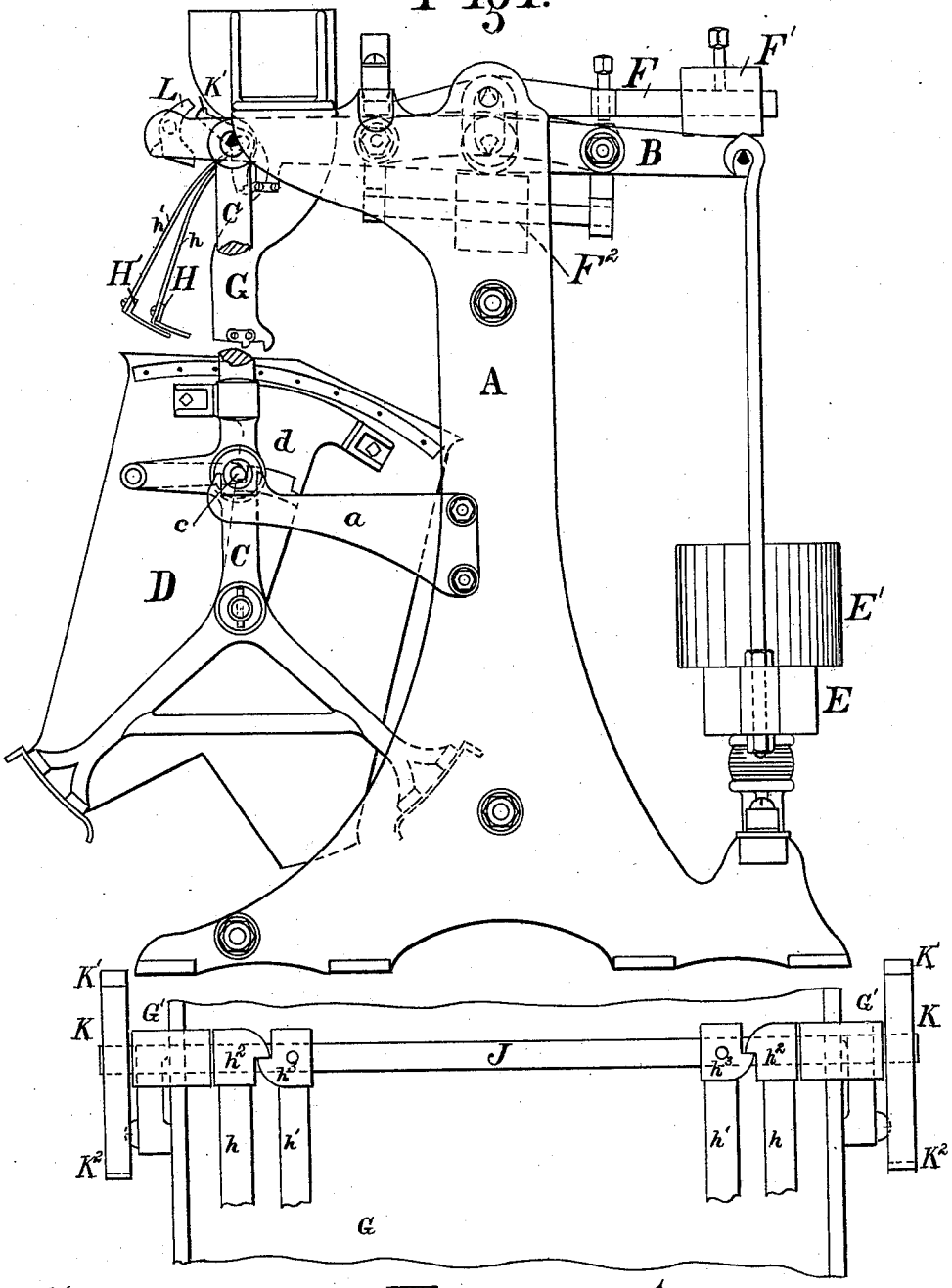

Fig. 2.

Attest
Chas. Andersson
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John W. Hill

(No Model.) 2 Sheets—Sheet 2.

J. W. HILL.

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Fig. 5.

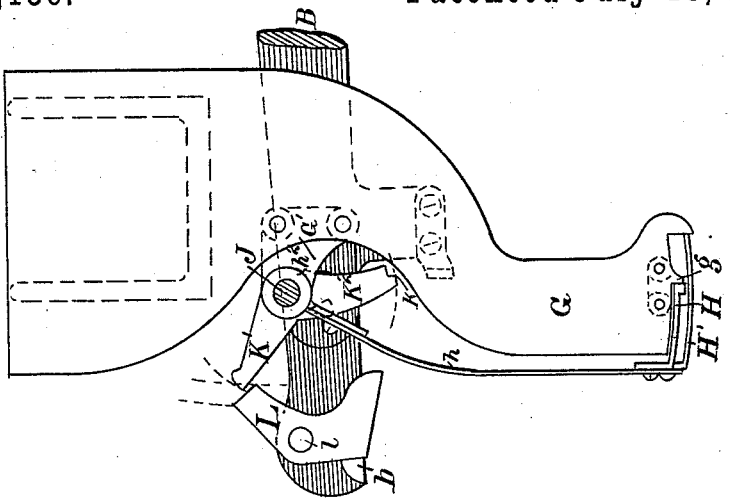


Fig. 4.

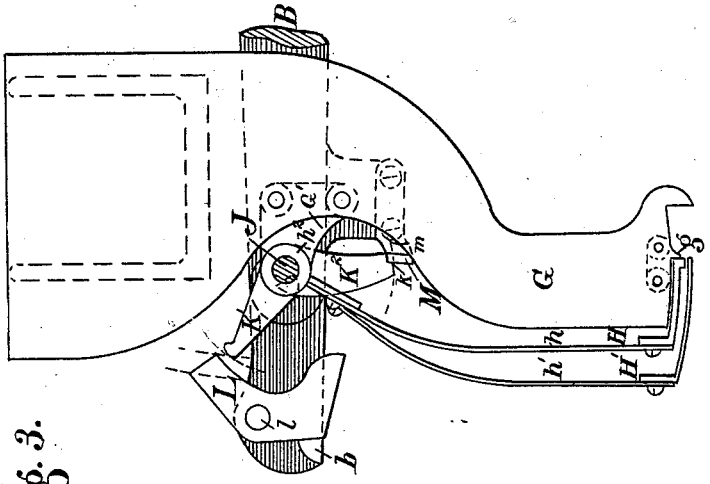
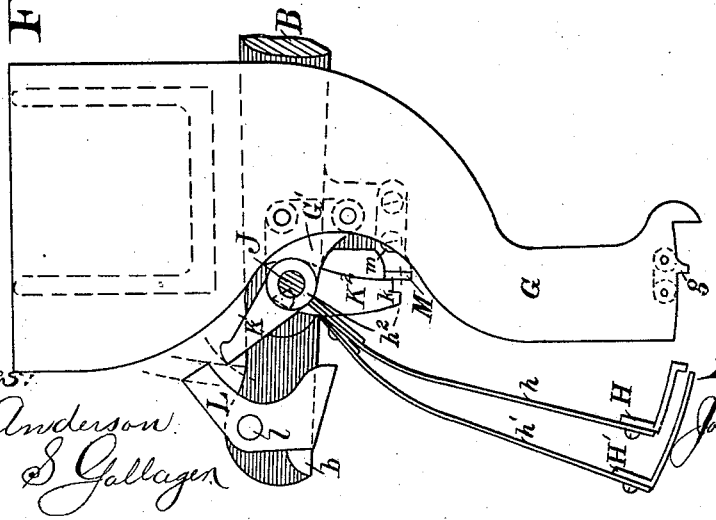


Fig. 3.



Witnesses:
Chas. Anderson.
Charles S. Gallagher.

Inventor.
John W. Hill

UNITED STATES PATENT OFFICE.

JOHN W. HILL, OF CINCINNATI, OHIO.

GRAIN-METER.

SPECIFICATION forming part of Letters Patent No. 302,136, dated July 15, 1884.

Application filed April 30, 1884. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. HILL, of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Grain-Meters, of which the following is a specification.

My invention is in the nature of an improvement upon a grain-weigher for which Letters Patent were granted me April 15, 1872, (reissued May 25, 1880,) May 18, 1880, May 17, 1881, and August 2, 1881, and relates to the manner of opening and closing the valves of the grain-spout. In all my former Letters Patent a machine is shown in which the grain-valves are opened and closed by the rise and fall of a scale-beam. In some the valves are opened by a positive connection between arms secured to the valve-shaft and to the scale-beam, while in others the arms on the valve-shaft rest upon certain projections on or of the scale-beam, and rise and fall with the scale-beam. In all my former machines, however, the scale-beam sustains the weight of the valves while the spout is open, and when the valves close this weight is removed from the beam, and extraneous weights are required to furnish a load on the scale-beam equal to or greater than that of the grain-valves, as illustrated in my patents of May 18, 1880, and May 17, 1881, by what I term "balance-bobs," to force the beam down after the valves close under the grain-spout.

To furnish a mechanism or system of simple devices which will cause the valves to be opened by the rise of the bucket end of the beam, and hold these valves open until they are automatically closed or permitted to close by the descent of the bucket end of the beam without imposing a load upon the beam during the time of charging the grain-bucket, is the object of this invention. This I accomplish in the following manner: Upon the forward or bucket end of the beam, either outside or inside the pivot-bearings, I mount gravity-pawls, which, upon the rise of the beam, engage with lifting-toes on the ends of valve-shaft, and roll these toes upward until the points of the pawls pass clear of the points of the toes, when the latter are released and gravitate downward until their motion is arrested by holding-toes on the valve-shaft coming in contact with stops on the beam. When the holding-toes first strike against the stops, the valves are entirely clear of the mouth of grain-spout, and the latter wide open for the passage of the grain. Directly the major quantity of grain is taken into the bucket, the latter descends until the stops release the holding-toes and allow the main valve to close, when projections on the holding-toes strike against the stops, and arrest further motion of the toes and of the grain-valves until the full quantity of grain is taken into the bucket, when the beam and stops descend, releasing the holding-toes, and permitting the supplemental valve to close under the grain-spout. The beam in its descent draws the pawls over the points of the lifting-toes, when they fall by gravity into position, to again raise these toes upon the rising of the beam.

In the accompanying drawings, Figure 1 is an elevation of a grain weigher or scale containing my present improvement; Fig. 2, an elevation of the front end or side of grain-spout. Figs. 3, 4, and 5 are end elevations of a portion of the grain-spout, and of the devices for operating the grain-valves.

Similar letters of reference indicate similar parts.

A is the frame of scale or weigher; B, the balance-beam; C, the suspenders, one on each side of grain-bucket D; E, the weight balancing the empty bucket; E′, the grain-weight; F, the supplemental beam; F′, the supplemental weight; F², the poising-weight; G, the grain-spout; H, the main valve, which (as fully explained in several of the Letters Patent referred to) first closes under the grain-spout G and reduces the opening thereof to the smallest convenient aperture (in width) through which the grain being weighed will certainly run; H′, the supplemental valve, which finally passes under the grain-spout and forms a positive cut-off of the flow of grain through spout G to bucket D.

d is a sector secured to the ends of bucket D, with which a latch, *c*, pivoted to an arm on suspender C, engages to retain the bucket D in position to receive grain from spout G.

a is a detent—one on each side of machine—secured to side frame, A, which arrests the descent of latch *c* and raises it clear of holding-contact with sector *d*, permitting the bucket D to swing or oscillate on its bearings and discharge the weighed grain from one compart-

ment, while presenting the opposite compartment under the grain-spout for the next succeeding load.

The devices already described are fully shown and explained in the former Letters Patent referred to, and need not further be alluded to, excepting such as are material to a description of the operation of the present improvement.

Referring to Fig. 2, *et seq.*, J is the customary valve-shaft mounted in bearings G' G' upon the spout G, upon which shaft are hung the valves H H' by arms *h h'*, and actuated by a system of fixed and loose clutches, h^2 h^3, as shown in Fig. 2. The clutches h^2 swing loose on shaft J; but the clutches h^3 are secured rigidly to the shaft.

Upon both ends of shaft J are secured toes K, the upper ends of which form lifting-toes, and the lower ends form holding-toes; or the lifting-toe and holding-toe may each be of a separate piece and independently secured to valve-shaft J; but I prefer to make the two toes in one piece, as shown, constructing the end K' as a lifting-toe and the end K^2 as a holding-toe. The arcs of motion of the toes K', K^2, or K, and of the supplemental valve H', are the same, and as the toes K and arm *h'* of supplemental valve H' are rigidly secured to valve-shaft J, it follows that the angular motion of both is simultaneous and equal.

L are gravity-pawls pivoted one on each side of beam B, at *l*, and striking against stops *b* upon the beam M are stops secured to the beam B by screws *m*. These stops may be adjustable, if desired.

The toes K', K^2, pawls L, and stops M constitute the valve-operating mechanism. The pawls L and lifting-toes K' open the valves H' H upon the rise of the beam B, the point of pawl L passing above and clear of the point of toe K', as shown in Fig. 3, when the valves H' H and toes K' K^2 gravitate downward through their arc of motion until arrested by contact of holding-toe K^2 with the stop M, same figure. Directly the major part of the load of grain is taken into bucket D, the bucket and beam B descend until the supplemental weight F' rests upon the beam. Meanwhile the stop M has descended with the beam until the holding-toe is released, when the valves H' H swing under the spout G, and the projection *k* on holding-toe K^2 strikes against the stop M, as shown in Fig. 4. During this movement the main valve H has closed against the stops *g* on spout G. Directly the final quantity of grain is taken into the bucket D, the bucket and beam B, and consequently the stops M, descend lower, releasing the holding-toe K^2 and permitting it to gravitate to the position shown in Fig. 5, and the supplemental valve H' to close under the spout G. During the descent of the beam B the pawl L has drawn over the point of lifting-toe K', as shown in Fig. 5, in position to roll the toe upward into the position shown in Fig. 3, when the bucket D and beam B rise. The pawls L and toes K' K^2 are in duplicate upon opposite sides of machine, to insure greater certainty in the action of the mechanism; but one set of these elements is sufficient for the described purpose. The pawl L and toes K' K^2 may take various forms; but those which I have shown are the simplest and cheapest of construction, and from experience the most reliable in operation.

I have shown and described my present invention as part of an automatic weigher containing two valves, one for the partial suppression of the stream from spout G, and the other for the final and complete cut-off; but I do not wish to limit it to a weigher having two valves, for it is just as applicable and useful to a machine with a single valve, as shown in my original patent of April 15, 1873, (reissued May 25, 1880.) In the latter case, however, the projection *k* on holding-toe K^2 would be omitted; otherwise the devices would be constructed and operated as shown and described.

It is obvious that the described devices will be as applicable to machines for weighing other commodities as for the weighing of grain.

Having described my invention, what I claim is—

1. In an automatic weigher, a valve-operating mechanism consisting of a pawl, L, mounted upon the scale-beam, lifting-toe K', and holding-toe K^2, secured to the valve-shaft, and stop M, secured to the scale-beam, when arranged and operating substantially as described.

2. In combination with the scale-beam B and valve-shaft J of an automatic weigher, the gravity-pawl L, pivoted to the scale-beam, and the lifting-toe K', secured to the valve-shaft, for the purpose of imparting an upward rolling motion to the said shaft upon the rise of the scale-beam, substantially as described.

3. In combination with the scale-beam B and valve-shaft J of an automatic weigher, the stop M, secured to the scale-beam, and the holding-toe K^2, secured to the valve-shaft, for the purpose of regulating the downward rolling motion of said shaft during the descent of the scale-beam, substantially as described.

4. In combination with the scale-beam B and valve-shaft J of an automatic weigher, a gravity-pawl, L, pivoted to the scale-beam, and a lifting-toe, K', secured to the valve-shaft, so arranged and operating with relation to each other that upon the descent of the scale-beam the pawl engages with the lifting-toe automatically, and upon the rise of the scale-beam the pawl raises the lifting-toe through its full arc of motion and passes clear of said toe, substantially as described.

In testimony whereof I have signed my name to the foregoing specification in the presence of two subscribing witnesses.

JOHN W. HILL.

Witnesses:

CHAS. ANDERSON,

CHARLES S. GALLAGER.