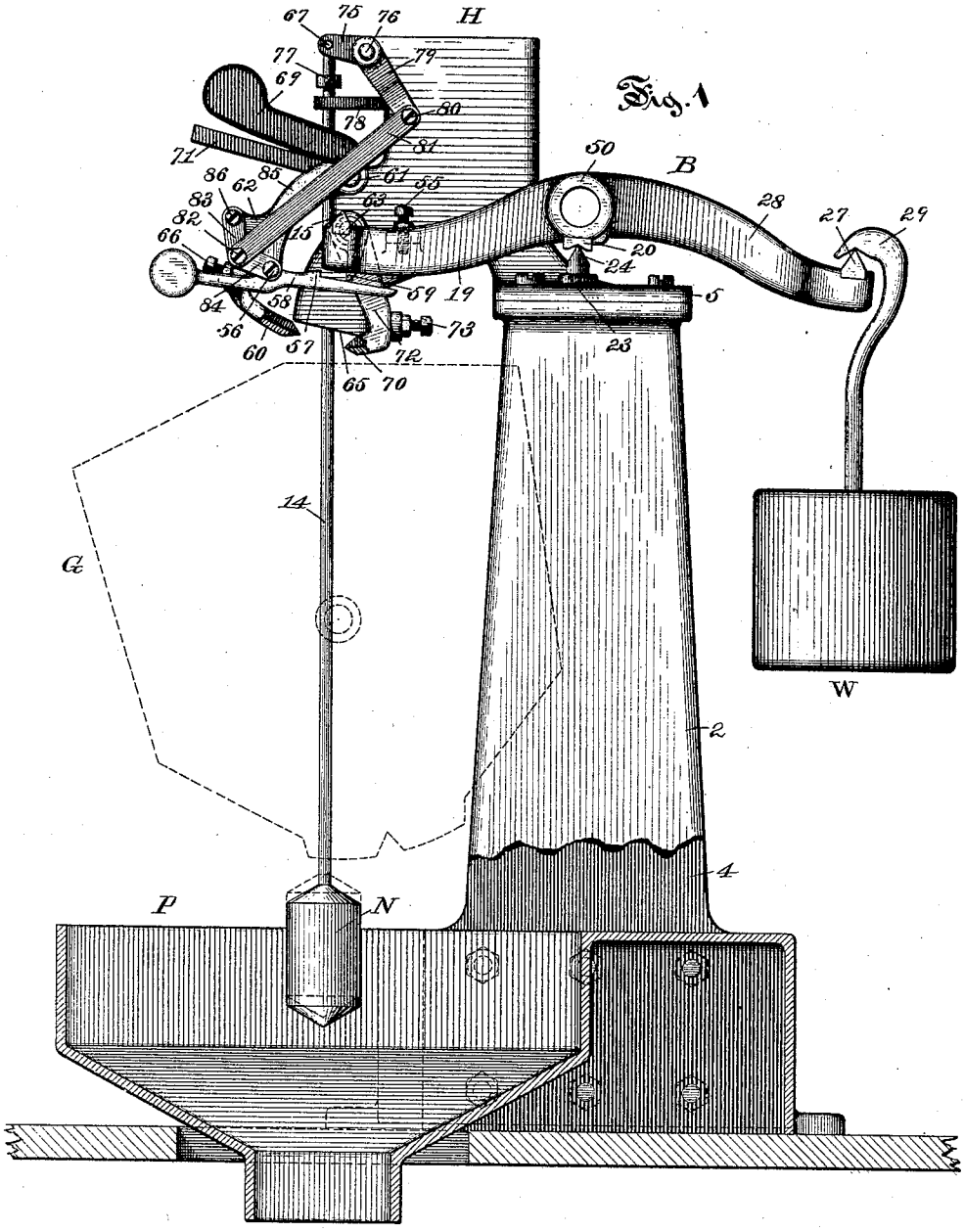
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F. H. RICHARDS.

GRAIN WEIGHER.

No. 442,714. Patented Dec. 16, 1890.

Fig. 1



Witnesses:

Wm. Bjorkman.

Henry L. Rickard.

Inventor:

Francis H. Richards

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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F. H. RICHARDS.

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Fig. 2

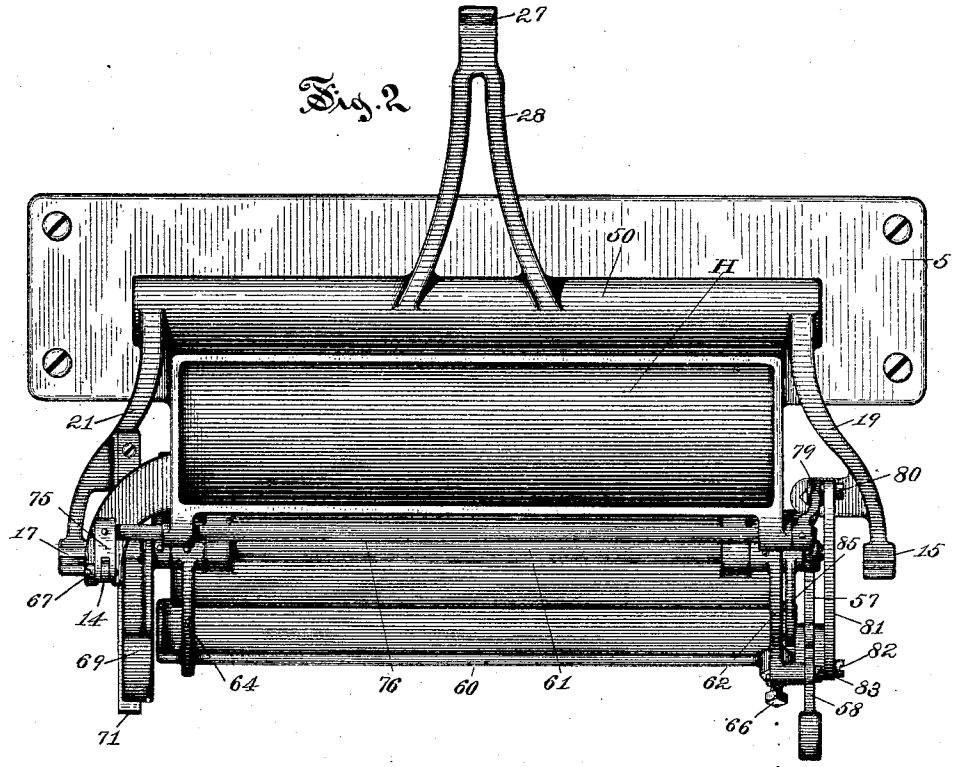
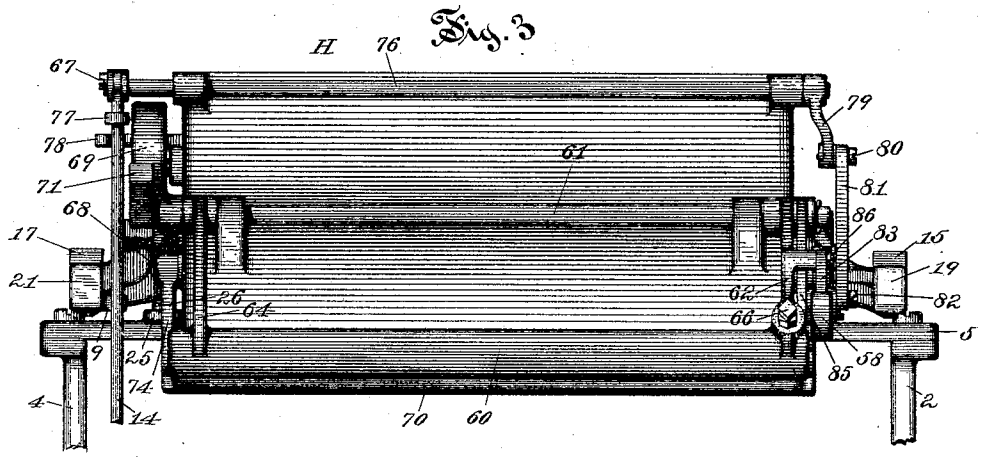


Fig. 3



Witnesses:

Wm. Byorkman.

Henry L. Ruckard.

Inventor:

Francis H. Richards

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 3 Sheets—Sheet 3.

F. H. RICHARDS.

GRAIN WEIGHER.

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Fig. 5

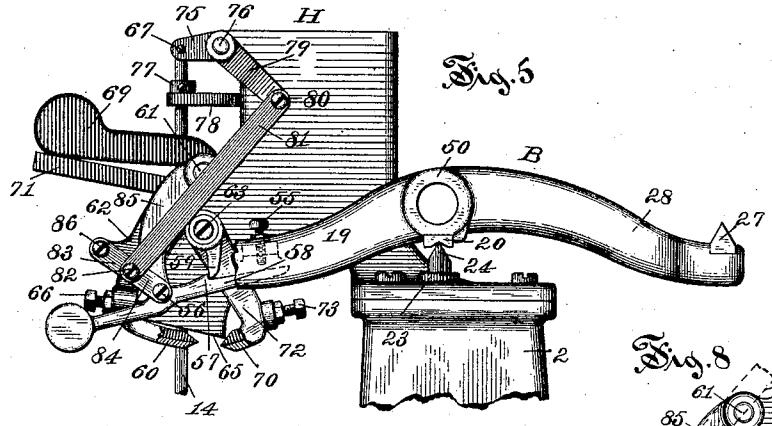


Fig. 8

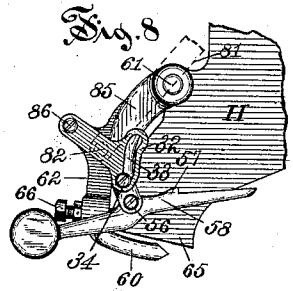


Fig. 6

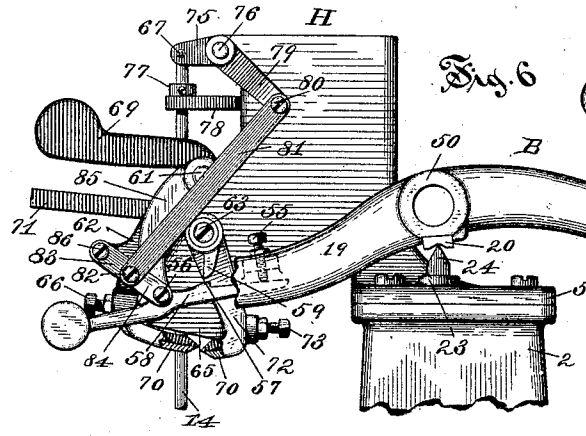


Fig. 4

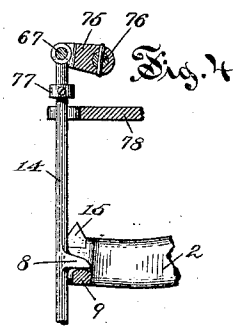
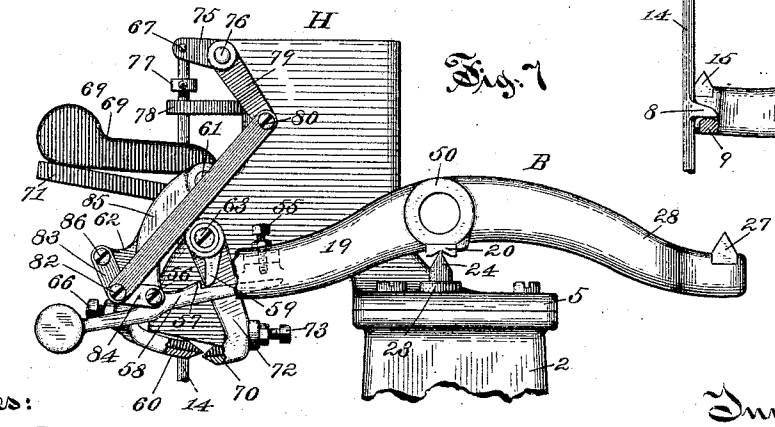


Fig. 7



Witnesses:

Wm. Bjorkman.

Henry L. Reckard.

Inventor:

Francis H. Richards

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

FRANCIS H. RICHARDS, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE PRATT & WHITNEY COMPANY, OF SAME PLACE.

GRAIN-WEIGHER.

SPECIFICATION forming part of Letters Patent No. 442,714, dated December 16, 1890.

Application filed February 20, 1890. Serial No. 341,197. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS H. RICHARDS, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Grain-Weighers, of which the following is a specification.

This invention relates to automatic grain-weighers operated by the power or weight of the grain weighing.

The invention has for its object to provide a regulator grain-weigher of the two-valve class, in which the operation of the machine is regulated by means of the improvements hereinafter more fully set forth.

In the drawings accompanying and forming a part of this specification, Figure 1 is a side elevation of so much of an automatic grain-weigher as embodies my present improvements. Fig. 2 is a plan view of the upper portions of the machine. Fig. 3 is a front elevation of the parts shown in Fig. 2, and is drawn in projection therewith. Fig. 4 is a detached view showing certain details of the regulator apparatus. Figs. 5, 6, and 7 are side elevations of the parts shown in Figs. 2 and 3, showing by successive steps the normal operation of the valves and the mode of operation of the regulator apparatus. Fig. 8 shows a modification of one of the devices employed in the valve mechanism.

Similar characters designate like parts in all the figures.

The frame-work for carrying the operative parts of this machine usually, and as shown in the drawings, comprises two side frames or uprights 2 and 4, held together by the top plate 5, carrying the supply-chute H, and by the hopper P, here forming a part of the frame-work. The grain-bucket G, (shown in dotted lines,) of the double-chambered type or class used in the well-known "Hill grain-scale," is suspended in the usual manner under the chute H and discharges its loads of grain intermittingly, in the manner substantially as shown in prior Letters Patent of the United States. The grain-bucket is supported by the usual hangers, (not shown,) that are suspended in a well-known manner on the pivots or knife-edges 15 and 17, respectively, of the principal arms 19 and 21 of the scale-beam B. This beam has V-shaped bearings 20 and 22—one at each end of the hollow shaft 50 thereof—which rest on the pivots or knife-edges 24 and 26, that are suitably supported, as by bearings 23 and 25, on the frame-work. Opposite to arms 19 and 21 an arm 28 extends rearwardly and is provided with a pivot or knife-edge 27, on which the main weight W (also designated as the "counter-weight") is suspended by a hook 29. The form of regulator-hopper P herein shown forms a part of the frame-work of the machine, it being bolted or otherwise secured to the side frames 2 and 4 between the said frames. Said hopper P, the vertically-movable plunger N, the rod 14, and a guide (not shown) for said plunger are or may be the same as the corresponding parts in Letters Patent of the United States No. 410,117, granted to me August 27, 1889.

The reducing-valve 60 is carried by the arms 62 and 64, which are fixed to the pivot or valve-shaft 61, that is journaled in suitable bearings formed on the supply-chute H, a suitable stop, as 66, being provided to limit the closing movement of said valve. The valve 60 is operated from the scale-beam through the beam-arm 71, carried by the arm 21 of said beam, which said arms may be formed integral, if such construction be preferred. Said arm 71 acts on the weighted valve-lever 69, which is fixed to one end of the pivot-shaft 61. When the arm 69 is lowered or raised by the operation of the beam-arm 71, the said arm 69 being fixed to the shaft 61, turns said shaft in its bearings, and thereby opens or closes the reducing-valve 60, as the case may be. The preferred construction of said reducing-valve and its operating means herein shown is more fully set forth and claimed in the prior application of C. H. Cooley, Serial No. 338,818, filed January 31, 1890, to which I have permission to refer.

The cut-off valve 70 is carried by the arms 72 and 74, which are pivoted at 63 and 68 to the sides of the chute H some suitable stop, as 73, being provided to properly limit the closing movement of this valve. This valve 70 is both a cut-off valve and a regulator-valve.

For the first purpose it is operated directly from the reducing-valve 60, and for the second purpose from the regulator, which is below the grain-bucket, and through the shiftable valve-actuator 58, whose catch 57 is adapted to engage the arm 59 of the valve 70. This actuator is carried on a pivot 56, which is fixed in the arm 85, that is carried on the valve-shaft 61 and that normally has a fixed relation to the valve 60, so that as said valve 60 is moved the said actuator is carried with it. Said normally-fixed relation of said pivot 56 and the reducing-valve is secured by means of some suitable connections, which also serve when actuated by the regulator to change said relation. One suitable means for this purpose is a toggle, which comprises the link 84, pivoted at 56 to the pivot of the actuator 58, the link 83, pivoted at 86 to the valve 60 and at 82 to the link 84, and to the connecting-rod 81 for operating said toggle. With a connecting device of this nature there is normally maintained a fixed relation, as set forth, whereby the movement of the actuator 58 is simultaneous and coincident with that of said valve. Thus conditioned, the operation of the valves 60 and 70 and of the actuator 58 is the same as described in my application, Serial No. 341,499, filed February 24, 1890, to which reference may be had.

The cut-off valve 70 remains normally closed during the making up of the greater part of a load of grain in the bucket G. Fig. 1 shows the reducing-valve 60 fully open, leaving the flow of grain from the chute H into the bucket G unobstructed, except by the closure of the "drip space." When the major part of a load has been made up in the bucket, the beam descends and operates through the beam-arm 71 and the weighted arm 69 to close the valve 60, and at the same time bring the catch 57 of the latch 58 into engagement with the arm 59 to open the cut-off valve 70, as in Fig. 5. The column of grain flowing into the bucket is thus reduced to a drip by which the full load is made up, when the beam further descends and the stop 55 strikes the inner projecting end of the actuator 58, disengaging the catch 57 of said actuator from the arm 59. The valve 70 then closes by reason of its own weight, cutting off the flow of grain entirely. The bucket now swings over and at the same time discharges its load into the hopper P. The beam rises and operates, through the means above described therefor, to open valve 60 and allow the grain to again flow freely into the bucket to make up a second load. This constitutes the normal operation of the machine considered independently of the regulator apparatus.

The rod 14 of the feeler or plunger N is suspended by a pivot 67 from the arm 75 of the regulator-shaft 76, which is journaled in suitable bearings on the chute H. A stop 77 is fixed to rod 14 near the upper end thereof (or at some other convenient point thereof) to engage with the stop-arm or bracket 78, that is fixed to or formed on some part of the machine—as, for instance, the chute H. Fixed to the opposite end of shaft 76 is an arm 79, to which is pivoted at 80 one end of the connecting rod or link 81, whose opposite end is pivoted, as aforesaid, at 82 to the links 83 and 84. A catch 8 is formed on rod 14 to engage with the projection 9 on the arm 21 of the scale-beam, as shown in Figs. 3 and 4.

The operation of this regulator apparatus is as follows: The beam on its upward movement lifts the rod 14 from its position in Fig. 5 to that in Figs. 1, 3, and 7. This operates the toggle-links 83 and 84 to throw the actuator 58 into its inoperative position, as there shown; but on the first downward movement of the beam from its position in Fig. 1 to that in Fig. 5 the rod 14 is normally carried down by the descent of the regulator N to again set the toggle as in Fig. 5, and thus throw the actuator 58 into its operative position there shown. Thus the actuator-shifting devices are operated at each stroke of the beam when the regulator is of the class N. (Shown in my said prior Letters Patent.) The mode of operation thus far set forth is that taking place when the hopper P is subtantially free of grain. When the grain accumulates in said hopper, as indicated in Fig. 2 of said prior Letters Patent, then said accumulation will prevent the descent of said regulator N, and thus maintain the actuator-shifting devices in their retracted position, as in Fig. 7, while the reducing-valve is closed. This allows both valves to be closed before the beam descends to the poising-point, and thus stops the machine. On the discharge of said accumulation of grain the weight of said part N and of the rod 14 operates through said shifting devices to actuate the actuator to open the valve 70, as in Fig. 5, and thus start the machine, when the several operations are repeated as before.

When reference is herein made to the movement of the "scale-beam," the movement of the bucket-supporting arms thereof is meant, this coinciding, of course, with that of the bucket itself.

It is not essential to my present invention that the toggle-links described shall be used to shift the actuator, nor that said shifting device shall connect to the pin 56. In Fig. 8 I have shown an improvement wherein the cam 32 is substituted for said links. In this case the cam is pivoted at 86 to the arm 62, and has a cam-slot 33 engaging the pin 34 in the arm 85.

In referring to the actuator 58 in the broader sense it is said to be carried by the reducing-valve, since this valve and all parts thereto, rigidly or connected, constitute for some purposes one integral element of the combinations comprised in this invention.

That feature of the grain-weigher herein described which consists in the shiftable

valve-actuator normally operated by the scale-beam and exceptionably operated by the regulator is broadly claimed in a separate application, Serial No. 340,814, filed February 14, 1890, to which reference may be had.

That feature of the machine herein shown which consists, essentially, in the reducing-valve, combined with a valve-actuator carried thereon for opening the cut-off valve from the closing movement of the reducing-valve, is described and broadly claimed in my application, Serial No. 341,499, filed February 24, 1890, to which reference may be had.

Having thus described my invention, I claim—

1. In a grain-weigher, the combination, with the supply-chute and the scale-beam, and with reducing-valve operated from said beam and carrying the cut-off-valve actuator, of the regulator arranged to be lifted by the beam, and actuator-shifting devices actuated by said regulator to operate said actuator.

2. In a grain-weigher, the combination, with the supply-chute and the scale-beam, and with the reducing-valve operated from said beam and carrying the cut-off-valve actuator, of the regulator constructed to be lifted by the beam, a toggle operating to shift the actuator relatively to the reducing-valve, and connections between the regulator and toggle, whereby the actuator is thrown into its operative position on the descent of the regulator.

3. In a grain-weigher, the combination, with reducing and cut-off valves, of the actuator carried by the reducing-valve and adapted to engage and open the cut-off valve, the toggle-links 83 and 84, the rod 81, the plunger, and connections operating said rod from said plunger to throw said actuator into its inoperative position on the rising of the plunger.

4. In a grain-weigher, the combination, with the scale-beam and the regulator-hopper, and with valve mechanism having a valve-actuator arranged to be shifted from an operative into an inoperative position, of the plunger connected to actuate said shiftable actuator, and having thereon a fixed arm and a corresponding arm carried by the beam and engaging to lift said rod on the upward movement of the beam.

5. In a grain-weigher, the combination, with the scale-beam and the hopper, and with valve mechanism having a cut-off-valve actuator operated through toggle-links carried by the reducing-valve, of the plunger and rod connected to actuate said links, and engaging-stops, one carried by the rod and one carried by the beam, whereby the rod and toggle-links are actuated on the rising of the beam.

6. In a grain-weigher, the combination, with the frame-work having a hopper below the grain-bucket and a supply-chute above said bucket, of the scale-beam, the reducing-valve operated from said beam, the cut-off valve, the shiftable actuator carried by the reducing-valve and actuating the cut-off valve, actuator-shifting devices, a stop on the beam disengaging said actuator, and the regulator connected to said shifting devices to act through said actuator for the opening of the cut-off valve on the descent of the regulator.

FRANCIS H. RICHARDS.

Witnesses:
HENRY L. RECKARD,
W. M. BYORKMAN.