(No Model.)

W. M. HUNT.

ELECTRICAL WEIGHING SCALE.

No. 356,940. Patented Feb. 1, 1887.

Fig. 1

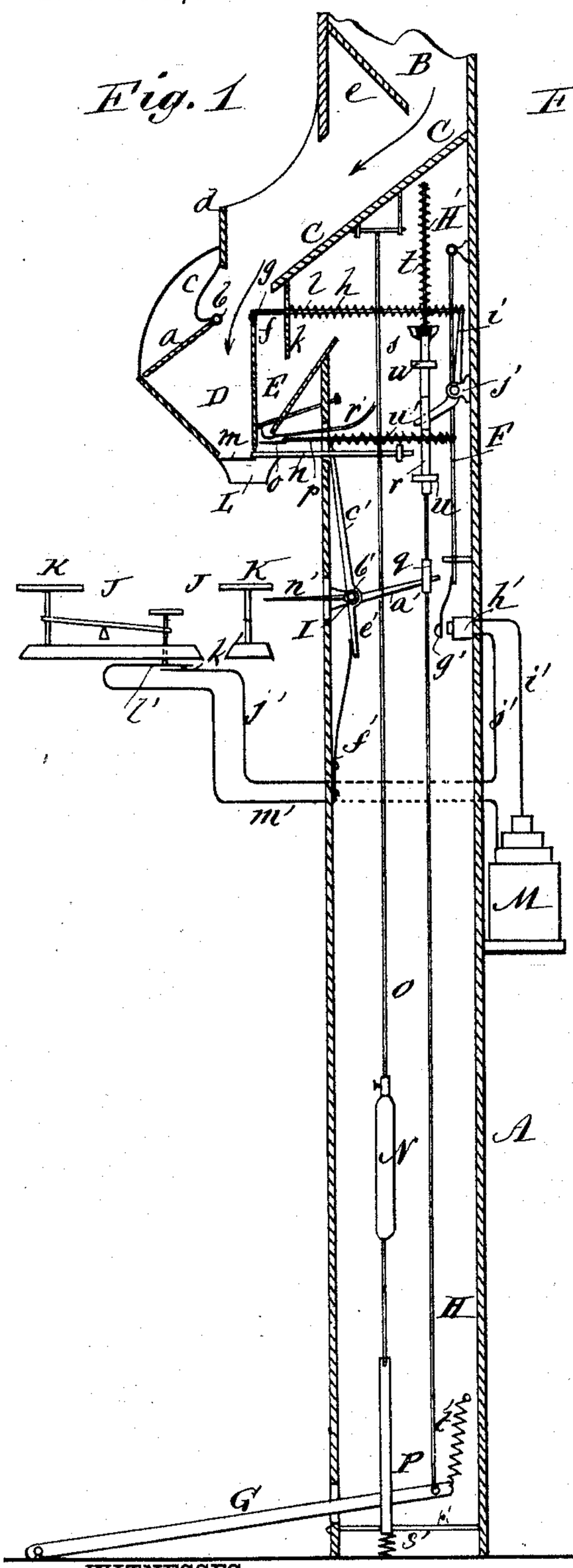


Fig. 2

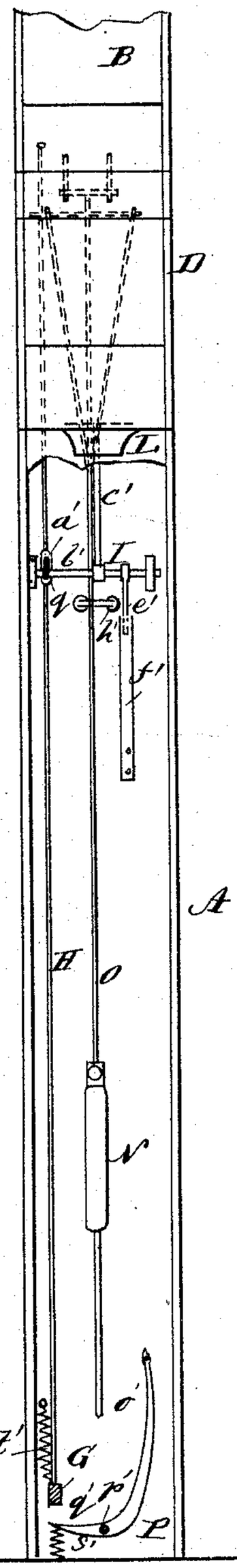


Fig. 3

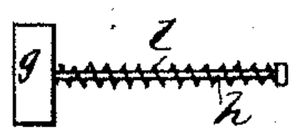


Fig. 5

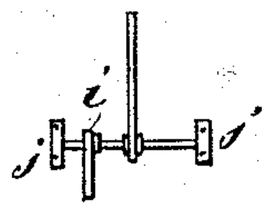


Fig. 4

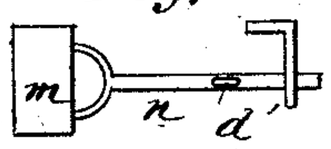


Fig. 6

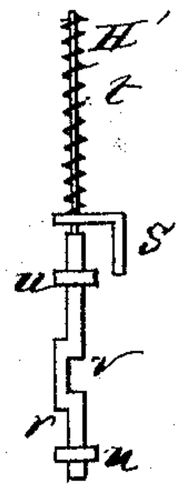
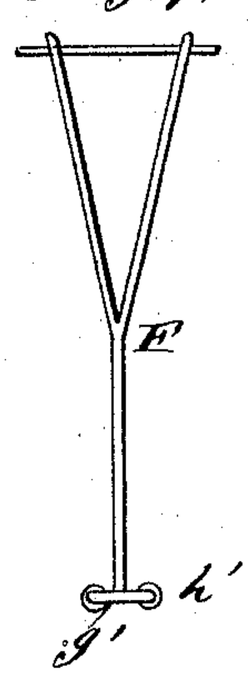


Fig. 7.



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WILLIS M. HUNT, OF GLEN GARDNER, NEW JERSEY.

ELECTRICAL WEIGHING-SCALE.

SPECIFICATION forming part of Letters Patent No. 356,940, dated February 1, 1887.

Application filed April 7, 1886. Serial No. 198,072. (No model.)

To all whom it may concern:

Be it known that I, WILLIS M. HUNT, of Glen Gardner, in the county of Hunterdon and State of New Jersey, have invented a new and useful Improvement in Electric Scales, of which the following is a specification, reference being had to the annexed drawings, forming a part thereof, in which—

Figure 1 is a vertical transverse section of my improved electric scale. Fig. 2 is a front elevation, partly in section. Figs. 3 and 4 are plan views of the valves. Fig. 5 is a plan view of the valve-operating lever. Fig. 6 is a detail view of the valve-lever-operating slide. Fig. 7 is a detail view of the armature-lever.

Similar letters of reference indicate corresponding parts in the different figures of the drawings.

The object of my invention is to provide for weighing-scales an automatic electric device for stopping the feed to the pan or package supported by the scales when the scale-beam is tipped.

My invention consists in the combination, with a scale of ordinary construction, of feeding-hoppers arranged above the scale-pan, and in valves operated by connection with the foot-lever for discharging the hoppers into the scale-pan, and in combination therewith of an electro-magnetic holding and releasing device, for holding the feed-valve open until the prescribed quantity of material to be weighed has been discharged into the scale-pan or package supported thereby, as hereinafter more fully described.

Upon the hollow standard A is supported a hopper, B, provided with an inclined bottom extending beyond the side of the standard A, and forming a chute, C, which discharges into an auxiliary hopper, D, supported in front of the standard A. The front side of the hopper D is provided with a plate, *a*, turning on pivots *b*, and arranged to adjust the capacity of the hopper D. The upper edge of the plate *a* is connected by a flexible apron, *c*, with the stop-board *d*.

The hopper B is provided with an inclined board, *e*, secured to the front and extending obliquely downward toward the rear for checking the flow of the material to be weighed, so as to render the feed of the material through the chute C to the hopper D automatic. Behind the hopper D is arranged a smaller hopper, E, whose mouth *f* is provided with a sliding valve, *g*, attached to the end of a rod, *h*, which extends backward, and is pivotally secured to the longer arm of a bent lever, *i*, fulcrumed in bearings *j*, secured to the back of the hollow standard A. Between the lever *i* and the board *k*, forming the back of the mouth of the hopper E, and on the rod *h*, is placed a helical spring, *l*, which tends to hold the valve *g* normally over the mouth *f* of the hopper E.

The hopper D is provided with a valve, *m*, which is attached to the rod *n*, and closes the opening in the lower end of the hopper.

The hopper E is provided with a valve, *o*, attached to the rod *p*, extending backward into the hollow standard A, and pivotally connected with the armature-lever F.

A foot-lever, G, pivoted to the floor and extending into the hollow standard A, is pivoted to a rod, H, which extends upward through the standard and carries the mortised block *q* and the offset bar *r*. The continuation H′ of the rod H above the bar *r* passes through a guide-bracket, *s*, secured to the side of the hollow standard A, and is surrounded by a helical spring, *t*, which is fixed to the upper end of the rod-extension H′, and abuts upon the bracket *s*. The offset bar *r* moves in guides *u*, supported by the hollow standard A, and in the offset or notch *v*, formed in the bar *r*, is received the shorter arm of the lever *i*. In the mortised block *q*, carried by the rod H, is received the arm *a′* of the three-armed lever I, secured to the rock-shaft *b′*. The longer arm *c′* of the lever I is received in a mortise, *d′*, in the rod *n* of the valve *m*. The arm *e′* of the lever I is pressed by the flat spring *f′*, secured to the inner surface of the front wall of the hollow standard A. The spring *f′* tends to hold the valve *m* in a closed position, as shown in Fig. 1.

The armature-lever F lies in the path of the rod *n*, so that when the rod *n* nears the completion of its rearward stroke it engages the armature-lever and carries it backward, together with the valve *o*, until the armature *g′*, carried by the lever, is brought into contact

with the poles of an electro-magnet, *h'*, secured to the rear wall of the hollow standard A.

In front of the hollow standard A is supported a weighing-scale, J, whose pan K is located immediately under a funnel, L, arranged to receive material from the hoppers D E, and discharge it into the pan of the scale, or into the package carried thereby. For convenience in explaining the construction and operation of my improved scale, I have shown the scale J in two positions in Fig. 1, the side elevation, in which the scales are removed from beneath the hopper, showing the electrical connections by means of which the feed from the hopper E to the scale-pan is controlled. One terminal of the electro-magnet *h'* is connected by the wire *i'* with the battery M. The remaining terminal is connected by the wire *j'* with a fixed contact-point, *k'*, secured near the scale J. The movable contact-spring *l'*, arranged normally out of contact with the point *k'*, is connected by a wire, *m'*, with the battery M. A spring-arm, *n'*, projects from the shaft *b'* under the scale-pan K, to prevent the momentum of the material being weighed from temporarily breaking the electric contact. Suppose hopper D to hold fifteen-sixteenths of a pound. As it discharges rapidly the weight of the material in the hopper D and its momentum equals, say, seventeen-sixteenths pound, which, if the scale be adjusted to tilt at one pound, would, if allowed, tilt the scale-beam, and thereby break the electric current. The scale-beam is, however, not permitted to tilt, since the same movement which opens the valve *m* raises the spring-arm *n'*. After the hopper D has discharged, the foot is removed from the pedal G, and the spring *f'* is allowed to act, lowering the arm *n'*. This permits the scale-beam to tilt after the other one-sixteenth of a pound necessary to complete the pound has been discharged from the hopper E.

In the hollow standard A is suspended a pendulum, N, on the rod O, and the rod O extends downward into the path of the longer arm, *o'*, of the lever P, pivoted on the rod *p'*, extending through the hollow standard A. The shorter arm, *q'*, of the lever P extends laterally underneath the foot-lever G, in position to be engaged by the foot-lever when it is depressed, so that when the foot-lever is pressed down to operate the valves (in the manner presently to be described) the lever P will be brought into engagement with the pendulum, setting the pendulum in vibration. Near the suspension-point of the pendulum an arm, *r'*, is attached to the pendulum-rod O, and extends forward between the valve *o* and the bottom of the hopper E, and serves to agitate the material contained by the hopper, so that it is discharged with certainty through the funnel L into the scale-pan.

The shorter arm of the lever P is pushed upward by a helical spring, *s'*, which retains its longer arm normally out of contact with the pendulum-rod O, and the foot-lever G is provided with a helical spring, *t'*, which is secured to the side of the hollow standard A and tends to return the foot-lever to its elevated position.

The operation of my improved scale is as follows: The scale J having been adjusted to weigh the required amount, and the size of the hopper D having been arranged to contain the larger portion of the amount, (say fifteen-sixteenths,) the material, which may be coffee, grain, hominy, seed, or other similar articles which require weighing and inclosing in packages, is allowed to flow forward through the chute C into the hopper D until the hopper is full, when the pressure of the foot on the foot-lever G first moves the valve *g* forward, so as to close the mouth of the hopper D and open the mouth of the hopper E. This operation being completed, it tilts the lever I, withdrawing the valve *m* from below the hopper D, allowing its contents to discharge into the scale-pan. The continued movement of the lever I brings the bar *n*, carrying the valve *m*, into engagement with the armature-lever F, pushing the lever backward and opening the valve *o*, connected therewith, at the same time bringing the armature *g'* within the influence of and into contact with the magnet *h'*, and the magnet *h'*, being already energized by the current from the battery M, holds the armature *g'* and lever F in this position so long as the current is unbroken. After the parts have been placed by the foot-lever in the condition indicated the foot-lever is released. The pendulum N having been set in motion, (in the manner already described,) the contents of the hopper E are stirred by the movement of the arm *r'*, connected with the pendulum-rod, so that the contents of the hopper are gradually discharged through the funnel L into the package carried by the scale, which had already received the contents of the hopper D. When enough of the material is discharged from the hopper E to cause the scale to tilt, the contact-spring *l'* is liberated from the contact-point *k'*, thus breaking the electric circuit and releasing the armature *g'*. The spring *w'*, surrounding the rod *p* and tending to close the valve *o*, now moves the valve-rod *p*, causing the valve *o* to close the hopper E and stop the flow of material to the scale-pan, when the pan or package contained thereby is removed and an empty pan or package replaced for another weighing. It is obvious that by reversing the electrical connections and the arrangement of the electro-magnet the scales may be made to operate the valve mechanism by closing an electric circuit.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with the weighing-scales, of an electrical contact maker and breaker, and electro-magnetic valve retaining and releasing mechanism controlled by the scales and contact maker and breaker, substantially as specified.

2. The combination, with the hoppers D E and valves *g m*, arranged to control the supply

and discharge of the hopper D and the supply of the hopper E, of the electrically-operated valve *o*, arranged to close the discharge-opening in the hopper E, substantially as herein shown and described.

3. The combination, with the hoppers D E, provided with valves *g m*, for controlling the supply and discharge of the hopper D and the supply of the hopper E, of the valve *o*, spring *u'*, arranged to close the valve, the armature-lever F, armature *g'*, electro-magnet *h'*, arranged to hold the valve open while the circuit, including the magnet *h'*, is complete, the scale J, and circuit-breaker connected therewith, substantially as herein shown and described.

4. The combination, with the hopper D, of the valve *g*, provided with a valve-rod, *h*, and spring *l*, the lever *i*, the valve *m*, provided with a rod, *n*, the three-armed lever I, the rod H, provided with the mortised block *q* and offset bar *r*, the foot-lever G, and spring *t'*, connected therewith, substantially as herein shown and described.

5. The combination, with the hopper D, of the valve *g*, provided with a valve-rod, *h*, and spring *l*, the lever *i*, the valve *m*, provided with a rod, *n*, the three-armed lever I, the rod H, provided with the mortised block *q* and offset bar *r*, the foot-lever G, spring *t'*, connected therewith, and the hopper E, the valve *o*, rod *p*, spring *u'*, armature-lever F, armature *g'*, carried thereby, electro-magnet *h'*, the scale J, contact-point *k'*, contact-spring *l'*, and battery M, substantially as herein shown and described.

6. The combination, with the hopper E, of the pendulum N, pendulum-rod O, and arm *r'*, carried by the pendulum-rod and extending into the discharge-opening of the hopper E, substantially as herein shown and described.

7. The combination, with the pendulum N, of the stirring-arm *r'*, curved lever P, and the foot-lever G, substantially as herein shown and described.

WILLIS M. HUNT.

Witnesses:
JOSEPH PETTY,
MILTON F. HUNT.