H. PADDOCK.
Pendulum Scales.

No. 107,286.   Patented Sept. 13, 1870.
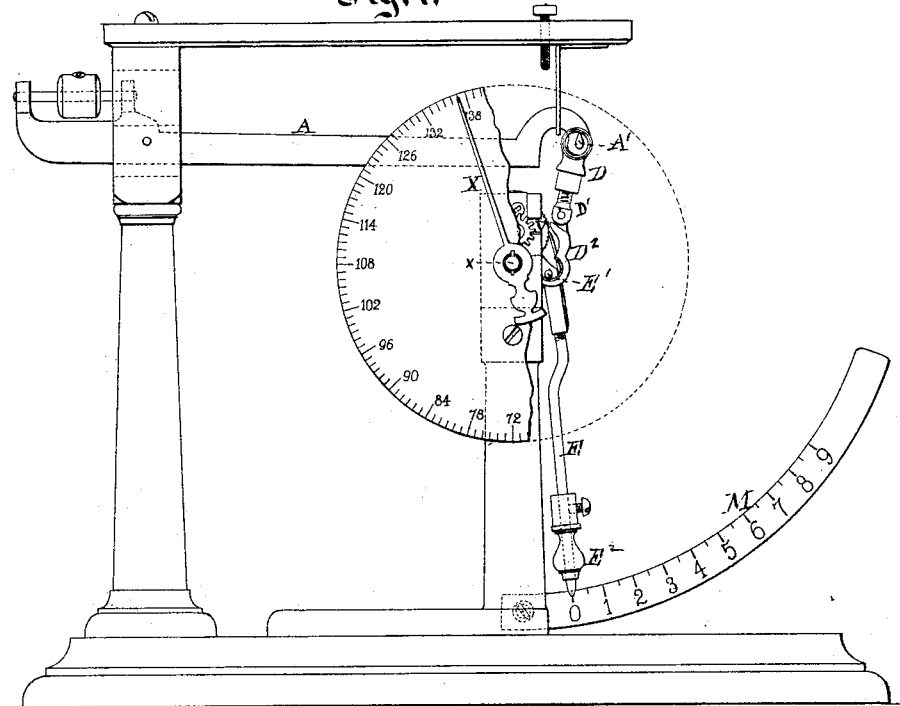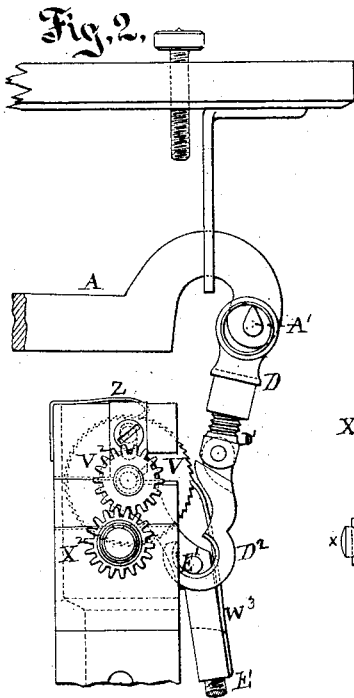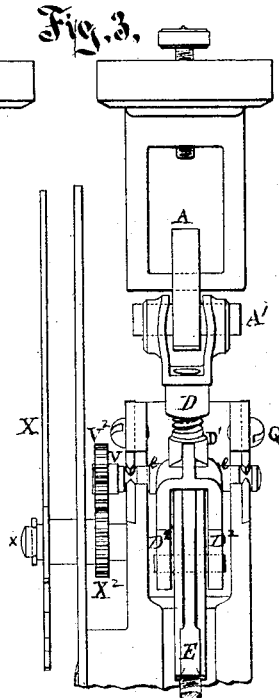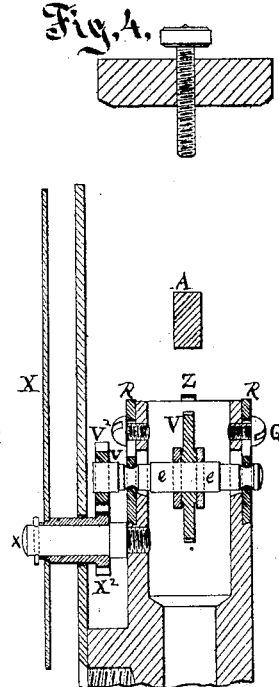
Fig. 1.

Fig. 2.   Fig. 3.   Fig. 4.

Witnesses,   Inventor,
C. C. Livings   Hamlin Paddock
H. E. Price   by his atty. J. B. Stetson

HARVLIN PADDOCK, OF ST. JOHNSBURY, VERMONT, ASSIGNOR TO HIM-SELF AND FRANKLIN FAIRBANKS, OF SAME PLACE.

IMPROVEMENT IN REGISTERING WEIGHING-SCALES.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern :

Be it known that I, HARVLIN PADDOCK, of St. Johnsbury, in the county of Caledonia in the State of Vermont, have invented certain new and useful Improvements in Weighing-Scales; and I do hereby declare that the following is a full and exact description thereof.

My invention relates to registering the amount of the weight and adding together the several amounts or the amounts of the surplus over and above that indicated by a poise on a beam. It is entirely automatic in its action, and is cheaply constructed and very simple.

I will describe a mode of carrying out my invention which I have put in practice successfully, and will afterward designate the points which I believe to be new therein.

The accompanying drawing forms a part of this specification.

Figure 1 is a front elevation, with a portion of the dial broken away to show the mechanism in the rear.

The additional figures represent some of the details.

Figure 2 is an end view, and

Figure 3 is a vertical section.

Similar letters of reference indicate like parts in all the figures.

A is a beam corresponding to the ordinary weighing-beam of a platform or analogous style of scales. The provisions for attaching the weight thereto, counterpoising, &c., may be of the ordinary description, and need not be set forth in detail.

The drawing shows the novel parts, with so much of the ordinary parts as is necessary to indicate their relation thereto.

On the right-hand extremity of the beam A is a knife-edge, A', which receives a link, D, connected, as represented by the coupling $D^1 D^2$, to a pin, E^1, on a bent lever, E, turning on a fixed center, e, and carrying, at its other extremity, a weight. I term this loaded arm a gravity-lever.

It carries a point, E^2.

The material to be weighed being placed upon the platform or in the scale-pan, not represented, the strain due to its weight tends to lift the beam A, and, consequently, the knife-edges A', with a corresponding force.

This force being transmitted, through the connection $D D^1 D^2$, to the point E^2 on the gravity-lever E, swings this lever to the right, and, consequently, raises its center of gravity to a certain extent. The resistance due to the turning of the gravity-lever E in this manner increases as its motion increases. At the commencement it hangs in nearly a perpendicular position, and a slight lifting force received from the beam A will incline it out of its perpendicular position, or,

in other words, will cause it to swing or move a little to the right, and come to rest in a new position. Any increase in the load upon the platform (or in the scale-pan) will cause an increase in the deflection of the gravity-lever E. Thus, at each weighing operation, the beam A rises to a certain extent and causes a corresponding change of position of the loaded lever E. When the weight upon the platform is great, the beam A will rise higher and will lift the gravity-lever E higher than when the weight is light.

I provide a fixed arc of metal, M, and graduate it, as represented. This arc is fixed in a position parallel to the path of the point, but not touching it.

Now, by observing the position at which the point E^2 comes to rest, and observing the figures upon the graduation corresponding thereto, on the arc M, I can determine approximately the amount of the charge being weighed.

A poise may be used upon the beam A in addition to the means here provided for ascertaining the weight, if preferred. In such case my peculiar apparatus, operating by the force transmitted through the connection $D D^1 D^2$, will take note only of the surplus of weight over and above that corresponding to the position of the ordinary poise upon the beam A.

I have provided, also, means for permanently registering the sum of the several amounts weighed, or the sum of the several surpluses above that indicated by the poise, when one is employed. I attach great importance to this registering feature of my invention.

The center or axis e, on which the gravity lever E swings, is, in fact, a hollow tube or sleeve. It is divided into two parts.

A fine ratchet-wheel, V, is mounted between them, upon a shaft, v, which is supported in the sleeves $e e$, and projects out in front and carries a gear-wheel, V^2, which, by meshing into the wheel X^2, on the shaft x, turns the index X, which latter traverses over a properly-graduated disk, conveniently mounted for ready inspection.

A delicate spring-pawl, W^3, is fixed on the lever E, as represented, and its end takes in fine ratchet-teeth on the periphery of the wheel V. It follows that each outward movement of the arm E gives a corresponding angular motion to the wheel V.

At each return movement of the gravity-lever E the wheel V and the wheel X^2 and the index X are held stationary by a delicate pawl, Z, fixed upon the stationary part of the frame-work.

It will now be seen that at each weighing operation the movement of the point E^2 along the arc M indicates the weight of the charge, and the position of the index X on the dial indicates the sum of the weights of this and the preceding charges; or, in case a poise is used on the beam A, it indicates the sum of the

several surpluses above that corresponding to the position of the poise.

I can take out the gravity-lever E and its connections by simply slackening the screws Q and lifting the sliding pieces R, which fit down on the bearing, as indicated. This facilitates repairs and adjustment.

I make all the bearings very narrow. They are, in fact, knife-edges, but do not perform the function usually performed by what are thus designated in ordinary weighing-machines, to wit, that of forming an axis which will allow a small amount of angular motion without any rubbing or friction; but they reduce the bearing surface very greatly, and thus diminish the difficulties due to the adhesion of rancid oil, or the like, when the surfaces are lubricated. Such bearings would not be serviceable where much strain is involved, but I find them peculiarly applicable in delicate mechanism, where, as in this case, the amount of angular motion is very considerable, but the strain is light and the motions are not rapid or long continued.

The bearings of the coupling-hooks D² on the pin E¹ is similarly narrowed.

The hook-form of my coupling D², and the hinge by which this part is connected to the part D¹, allow of ready disconnection from the pin E¹, and, consequently, from the gravity-lever E and its connections, to allow the scale to be used in the ordinary manner by simply indicating the weight by a poise on the beam A.

I make the connection between the part D¹ and the link D by a screw-thread, as represented. This allows the connection to be lengthened and shortened at will by simply unhooking the part D² from the pin E¹, and turning the former one or more times round in either direction. It may be observed, however, that this will not allow of delicate adjustment.

I claim—

1. A self-acting registering mechanism adapted to register the weights of variable loads, in combination with a weighing-scale, when the action is automatic, additive, and self-returning, substantially as specified.

2. The gravity-lever, with pointer E² moving backward and forward on the graduation M, for indicating the weight of each separate load at the time while the weighing is being effected, in combination with a separate index and separate graduations or dial, serving to register the sum of the weights of the variable loads, all substantially as herein set forth.

3. The coupling D¹ D², made hook-formed and hinged to the part D, and adapted for convenient connection and disconnection between the knife-edges A¹ upon the beam A and the gravity-lever E and its connections, when the beam A is adapted to weigh by a poise thereon, and the parts are so proportioned that the balance shall be correctly weighed both in the hooked and unhooked condition, as herein shown and described.

In testimony whereof I have hereunto set my name in presence of two subscribing witnesses.

HARVLIN PADDOCK.

Witnesses:
    FRANKLIN FAIRBANKS,
    THOMAS SPOONER.