H. W. CATLIN.

Balance Scales.

No. 40,906. Patented Dec. 15, 1863.

Fig. 1

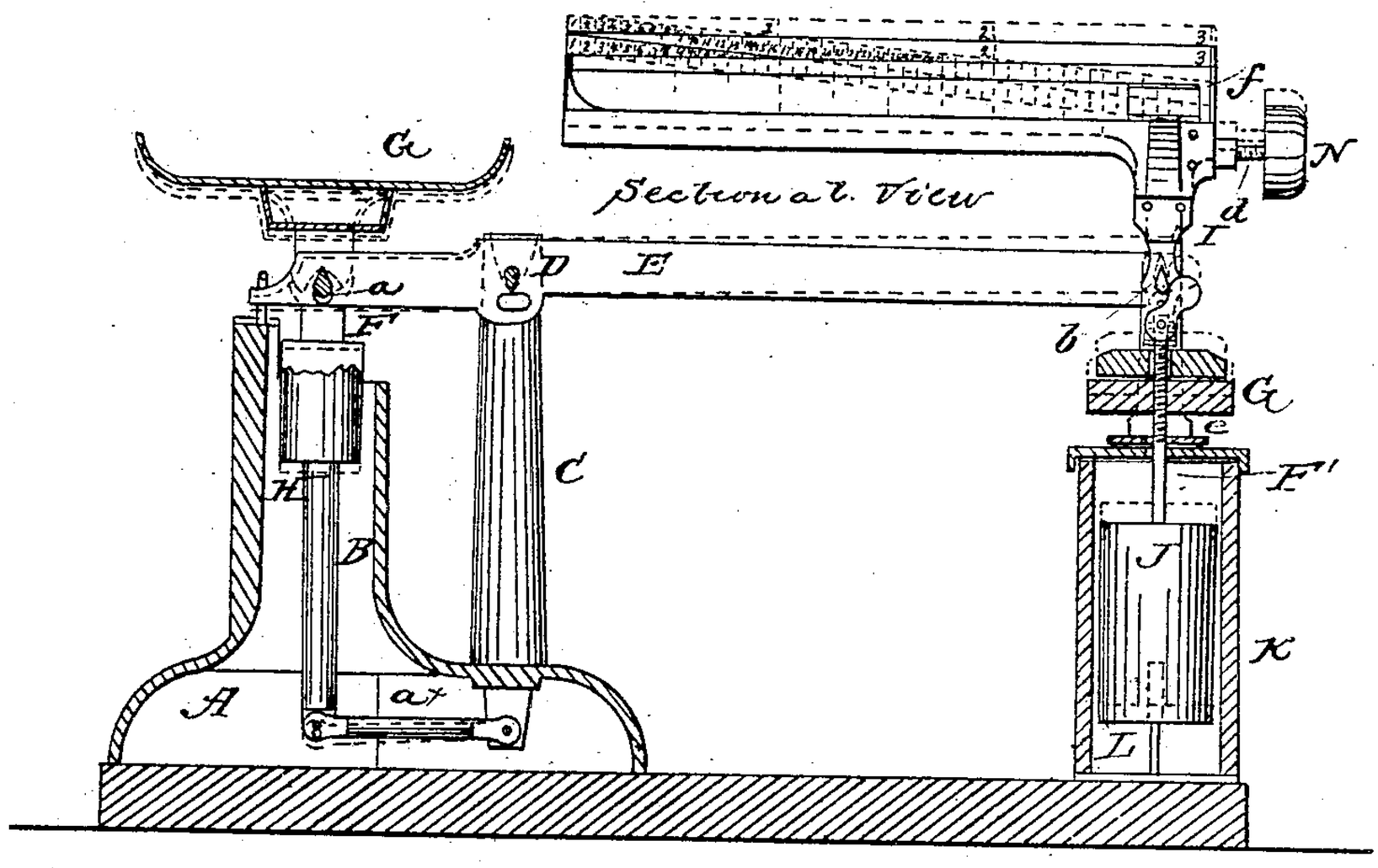
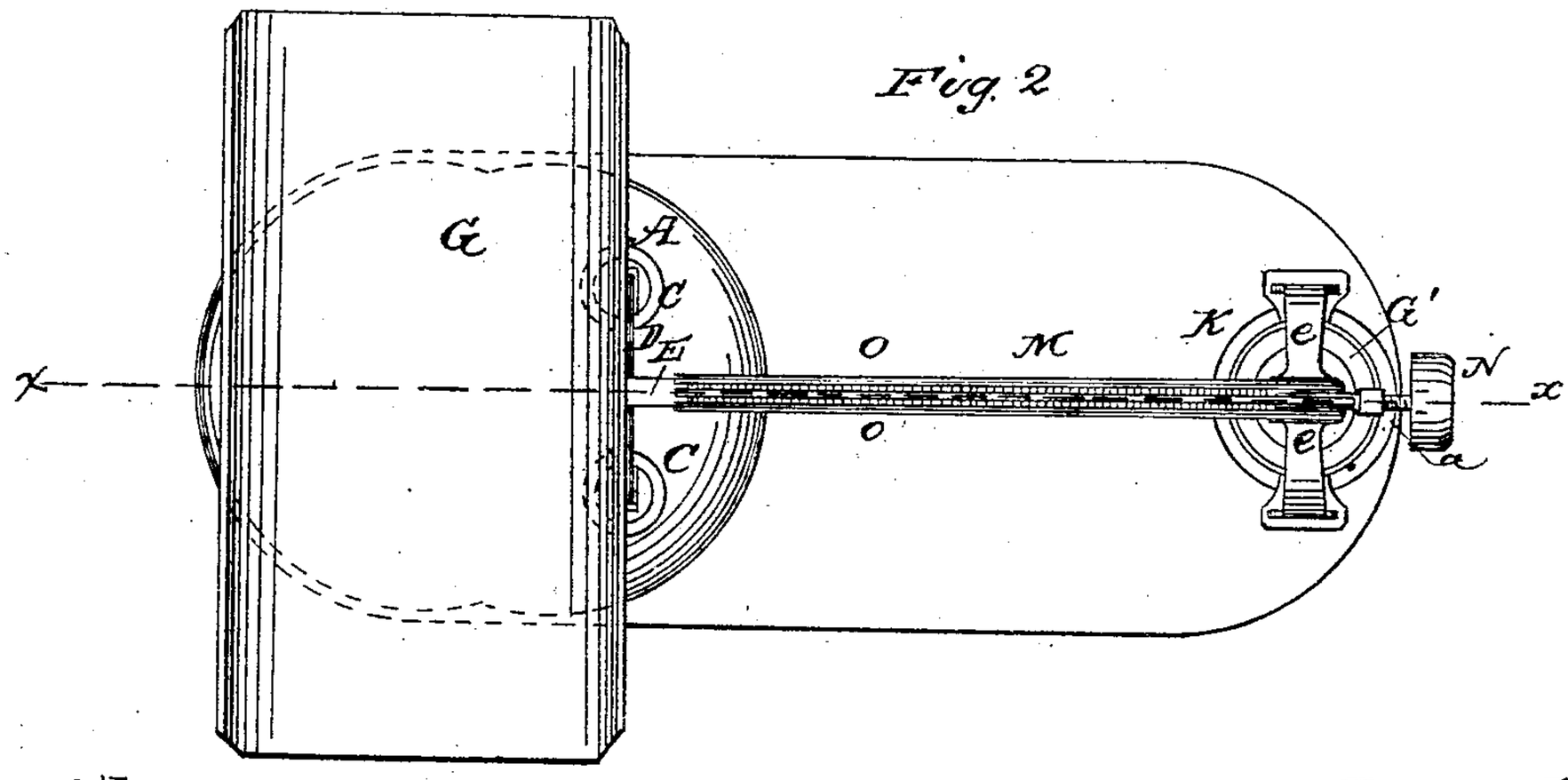


Fig. 2



Witnesses
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IMPROVEMENT IN BALANCES.

Specification forming part of Letters Patent No. **40,906**, dated December 15, 1863.

To all whom it may concern:

Be it known that I, H. W. CATLIN, of Burlington, in the county of Chittenden and State of Vermont, have invented certain new and useful Improvements in Scales for Weighing; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a side sectional view of my invention, taken in the line *x x*, Fig. 2; Fig. 2, a plan or top view of the same.

Similar letters of reference indicate corresponding parts in the two figures.

The object of this invention is to obtain a scale for weighing without the use of detachable weights, and one which will admit of being readily counterpoised or balanced at any time when not properly in a balanced state, so as to insure perfect accuracy.

To this end the invention consists in attaching, by means of a rod, a plunger to one end of the scale-beam, said plunger being immersed in quicksilver or other fluid or semi-fluid contained within a suitable vessel, said fluid or semi-fluid serving to buoy up the plunger, and causing the latter to serve as a counterpoise of varying capacity, according to the weight of the articles to be weighed, as hereinafter fully set forth.

The invention consists, further, in an improved index for denoting the weight of the articles being weighed, as hereinafter described.

To enable those skilled in the art to fully understand and construct my invention, I will proceed to describe it.

A represents a base, which has a vertical tube, B, attached to it, and two vertical posts or standards, C C, the latter serving as supports for the fulcrum-bar D of scale-beam E. The shorter arm of the scale-beam has a transverse bar, *a*, passing through it, the ends of which are fitted in a yoke, F, on which a basin or pan, G, is secured, said yoke also having a pendant, H, which is fitted in the tube B, and has its lower end connected to a swinging or jointed arm, $a^{\times}$, the latter serving as a guide for the pendant H. These parts are precisely the same as those in ordinary scales, and they, therefore, do not require a minute description.

To the end of the longer arm of the beam E there is connected a loop, I. This loop rests on knife-edges *b*, at each side of the beam E, and into the center of the lower end of the loop I the upper end of a rod, F′, is screwed. This rod F′ has a circular plate, G′, attached, for the convenience of screwing the rod F′ up or down, the object of which will be presently seen. To the lower end of the rod F′ there is attached a plunger, J, of cylindrical form—that, at least, would be the preferable shape. This plunger is fitted within a vessel, K, containing quicksilver, L, or other fluid or semi-fluid, which serves to buoy up the plunger and cause it to vary in weight as it is raised and lowered therein.

To the upper part of the loop I there is attached a plate, M, which has a horizontal or nearly horizontal position and is graduated into divisions indicating pounds and the fractional parts thereof, said graduations being on an oblique line, *c*, which extends from the upper corner at the inner end of the plate M to the lower corner at the outer end of the plate, as shown clearly in Fig. 1. This plate M has a screw, *d*, attached to its outer end, on which a nut, N, is fitted, said nut serving as a counterpoise, as will be presently seen. The plate M works between two horizontal plates, O O, which are supported by arms *e e*, attached to the top of the vessel K, and said plate M has a horizontal line, *f*, marked on it, which line, when the unloaded beam E is balanced or in a state of equipoise, is on a level with the upper edges of plates O O. The beam E with the basin or pan G and other parts which are attached, are balanced by the plunger J, the upper surface of which should be about on a level with the surface of the quicksilver or fluid in the vessel K, as shown in black in Fig. 1.

From the above description it will be seen that when the article to be weighed is placed on the basin or pan G the plunger J will be elevated in the quicksilver L, and will increase in weight as it rises, owing to the gradually-decreasing buoyant power of the quicksilver, and the plunger will rise until the article on the basin or pan is equipoised, when the beam E will of course be stationary. The plate M, it will be seen, rises with the rod F′ and plunger J, and the weight of the article on the basin or pan G is indicated by the grad-

uation-mark on the line *c*, which is in line with the upper edge of the plate O.

The beam E, when unloaded—that is to say, when no weight is on the basin or pan G—may always be kept in a perfectly balanced state by adjusting the plunger J higher or lower, which is done by turning the rod F′, through the medium of the circular plate G′, and the graduated plate M may always be kept adjusted in proper relation with the plates O O by turning the nut N. I would remark that the plate M may be graduated at both sides, if desired.

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

1. The plunger J, connected to the scale-beam E and immersed in quicksilver or other fluid or semi-fluid contained in a proper vessel, K, to operate as and for the purpose specified.

2. The weight-indicator, formed of the diagonally-graduated plate M, connected to the beam E, as shown, in connection with one or two stationary index-plates, O O, arranged substantially as set forth.

Witnesses: H. W. CATLIN.

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