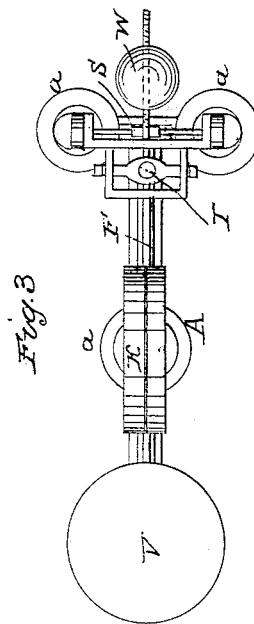
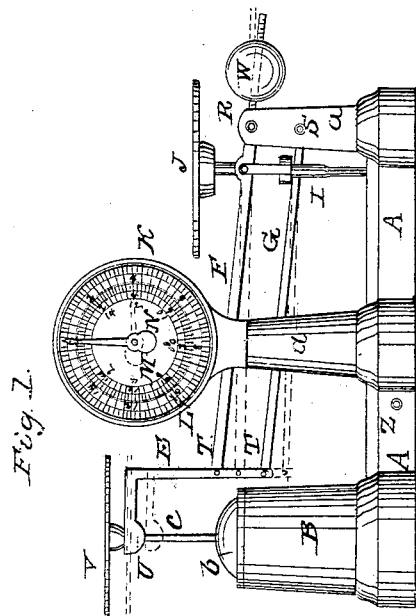
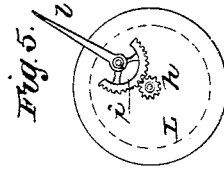
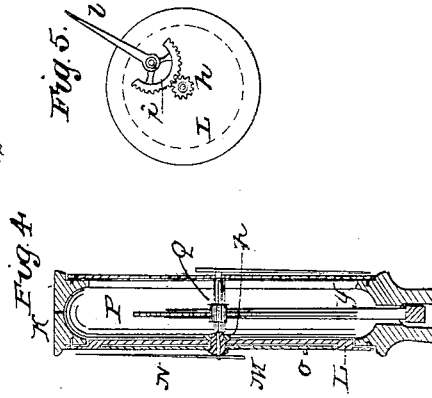
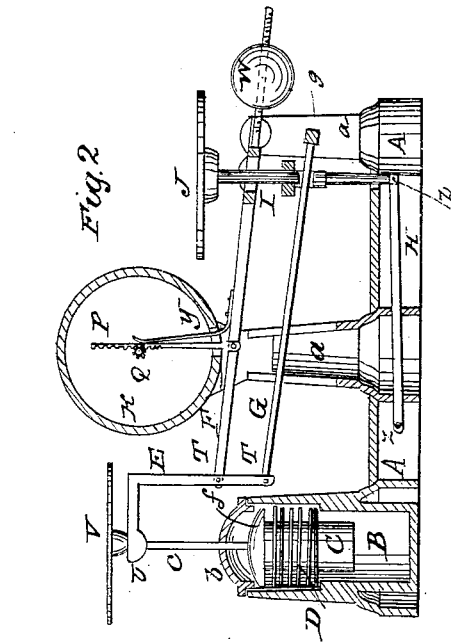


H. A. CLUM.

Spring Scales.

No. 46,992.

Patented March 28, 1865.



Witnesses
 Tho. Moulson
 Philip J. Clum

Inventor
 Henry A. Clum

UNITED STATES PATENT OFFICE.

HENRY A. CLUM, OF ROCHESTER, NEW YORK.

IMPROVEMENT IN BALANCES.

Specification forming part of Letters Patent No. 46,992, dated March 28, 1865.

To all whom it may concern:

Be it known that I, HENRY A. CLUM, of the city of Rochester, county of Monroe, and State of New York, have invented a new and Improved Scale for Weighing Purposes of every Description; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a side elevation of my improved scale; Fig. 2, a longitudinal central vertical section thereof, showing the structure of the cistern, the plunger, the spiral spring, the plunger-rod, the angular arm, the lever, the tie-bar, the rack and pinion, the spring, the platform-shaft, the platform, the steadying-lever, and the regulating-ball; Fig. 3, a plan or top view of the same with the platform removed, showing the arrangement of the fulcrum-link and its bearings; Fig. 4, a transverse central vertical section of the dial-frame, showing the rack, the pinion, with the bearings of the same, the structure of the dials, and hands or pointers.

Like letters of reference indicate corresponding parts in all the figures.

The nature of my invention consists in the use of mercury or quicksilver, by its progressive displacement, either alone or in combination with a spiral spring, for the weighing of commodities, as represented in drawings, in which—

A represents the frame; *a a a*, the upright portions or standards; B, the cistern portion of the same; *b*, the cistern-top screwed tight upon it; C, the plunger, with its rod *c* screwed tightly into its top; D, the spiral spring, resting upon a shoulder or jamb formed by the enlargement of the cistern in its middle portion; E, the upright angular arm by which the plunger is forced into the mercury; F, the lever; G, the tie-bar, by the use of which the angular arm E is made to move perpendicularly; H, the steadying-lever, by the use of which the platform-shaft I is kept in an upright position; J, the platform for heavy weights; K, the dial-frame; L, the permanent or annular dial; M, the index or movable dial; N, the hand; *o*, the knob by which the index-dial is turned; P, the rack; Q, the pinion, having upon its extreme bearings the hands;

R, the fulcrum of lever; S, the fulcrum of tie-bar; T T, knife-edge or pivot bearings at front end of lever and tie-bar into the upright angular arm; U, the point in angular arm through which the plunger-rod *c* is screwed; V, the disk or bowl for light weights; W, regulating-ball screwed upon an arm projecting from cross-bar of lever; X, joint of rack and lever; Y, spring by which the rack is pressed against the pinion; Z *z*, joints of steadying-lever with the frame and platform-shaft.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

I construct the scale stand or frame of any suitable metal, iron preferred, in any form that will admit of the necessary appliances, supplying the same with a cistern, B, into which I place a plunger, C, which can be made of any material that mercury will not corrode, wood preferred, having the plunger-rod *c* securely screwed into its upper end. The plunger is supplied with a flange, *f*, at its upper end, or any device that will serve the same end, which is designed to rest upon the spiral spring D. The object of this spring is to aid the mercury in resisting the downward movement of the plunger, as the weight upon the scale increases, imparting to the scale greater capacity and economy of mercury. It will be observed, however, that the plunger does not rest upon the spring when the scale is unoccupied, but is at rest a small space above it, as seen in Fig. 2. The object of this is to secure to the scales the capacity for determining light weights, up to a certain measure—say in a fifty-pound scale one pound—which by the simple displacement of the mercury in the cistern, which also poises the lever or beam, is readily accomplished. As the weight upon the scale increases, the plunger in its downward motion consumes the space for light weights, rests upon the spiral spring coiled in the upper portion of the cistern, and is resisted thereby, the mercury at the same time acting conjointly with it. By this means even a small scale can be made to serve for heavy weights without the inconvenience of changing weights or poises.

The upper end of plunger-rod *c* is screwed into the horizontal end of the upright angular arm E, at U, having fixed upon its upper

end a small disk or bowl, V, designed for letters or any other light weights. This second disk or bowl, however, is not an essential portion of the scale, and its application is discretionary.

The lever F, which is similar to ordinary scale-beams, has its fulcrum in standard *a*, as seen at R, Fig. 1, with its link-connections similar to ordinary counter-scales, and its front end fixed upon knife-edges or pivots in the angular arm at T. The tie-bar has its fulcrum directly below that of the lever, as seen at S S, Figs. 1 and 2, with its front end also upon pivots, pins, or knife-edges in the angular arm, as seen also at T, below the lever-connection. The lever and tie-bar, moving parallel to each other, together secure the perpendicular motion of the angular arm, the plunger-rod *c*, and plunger—an important element in the instrument.

The platform J is fixed upon its shaft I and its link substantially like ordinary scales, as also is the steadying-lever H.

The lever F has a rack attached to it, as seen at X, Fig. 2, also a spring, Y, which together are carried upward and downward with the lever in the use of the scale, and serve to turn the pinion Q, having a hand at the extremity of each bearing, moving upon the dials, as seen at N, Fig. 1.

The dials, or one of them, are composed of two separate pieces. One is fixed and annular, as seen at L, Figs. 1 and 4, and the other, an index-disk, is smaller and moves upon the larger, as seen at M, Fig. 1. This dial moves freely upon an axis, *h*, as seen in center of compound dial, Fig. 4, and turns completely around, and is graduated, like the larger annular dial, upon which it moves, with the addition of backward readings, as will be seen in drawings.

The axis *h* of the movable index-dial M, being a hollow screw-bolt with nut *h*, or it may be a pinion, as seen in Fig. 5, at *h* on the inside, by which it is secured, forms also one of the boxes for the bearings of the hand-pinion Q, as plainly shown in drawings, Figs. 2 and 4, Q being the pinion. The object of this compound dial is to secure the readier determination of weights, requiring no particular exercise of memory or figuring, and is used as follows, *e. g.*: A person wishes to purchase a crock of butter. He places the empty crock upon the platform of the scales, which carries the hand forward to a certain point, where it will rest. Now turn the dial M, either by the knob *o*, or, in case the dial is covered with glass, by means of a semicircular rack, *i*, lever *l*, and pinion *h*, mounted upon the inside of the permanent dial. The pinion, being the nut of the bolt *g*, is in this case together secured rigidly to the movable dial M, and move together, as shown in Fig.

5, the arm of the lever passing through a slot in the dial-frame, admitting sufficient sweep to turn the index-dial quite around, until its 0 (zero) comes to the point indicated by the hand, as shown in red lines, Fig. 1. Now fill the crock and place it again upon the scale, and the hand which has gone back to its former position will again move forward, passing the 0 upon the small index-dial to a farther point. The entire weight will be indicated upon the large annular dial, and the weight of the butter upon the small index-dial.

Again, let the person wish to sell a crock of butter. Place the filled crock upon the scale. The hand will move forward, indicating the entire weight, read from 0 upon the large dial. Bring the 0 upon the small dial to the point indicated by the hand, let it remain, empty the crock, and place it again upon the scale. The position of the hand now read upon the large annular dial will indicate the weight of the empty crock, while at the same time it will indicate the weight of the butter upon the small index-dial, read from its 0 backward.

The hand N is carried by rack and pinion, having a light steel spring pressing against the rack to prevent vibration of the hand.

The dial can also be mounted directly above and upon the cistern, dispensing with the small disk for light weights, the rack attached to the upper end of the plunger-rod *c*, which would be carried upward and downward in the use of the scales, perpendicularly, carrying the pinion and hands, thus dispensing with the use of the spring Y altogether. Thus the erecting of the dial upon the standards *a* or cistern B is discretionary.

In order to secure safety in transportation, the cistern-top can be packed with leather or rubber. A piece of the same can also be fixed upon the top of the plunger, around the rod *c*, which, when keyed or screwed tightly up against the cistern-top, will prevent leakage.

Should the scale by some accident lose its equipoise, it can be again easily restored by the use of regulating-ball W, similar to other scales.

Now, I do not claim the use of mercury as a poise, nor as a dead-weight, the same having been used before, nor do I claim the spiral spring as such; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

The use of a spiral spring, in combination with the plunger and mercury, in order to impart increased capacity to scales capable of determining light weights, substantially as herein set forth.

HENRY A. CLUM.

Witnesses:

THOS. MOULSON,
PHILIP I. CLUM.