

No. 833,874.

PATENTED OCT. 23, 1906.

J. E. COCHRAN & H. B. McCABE.

WEIGHING SCALE.

APPLICATION FILED SEPT. 20, 1905.

FIG. 2

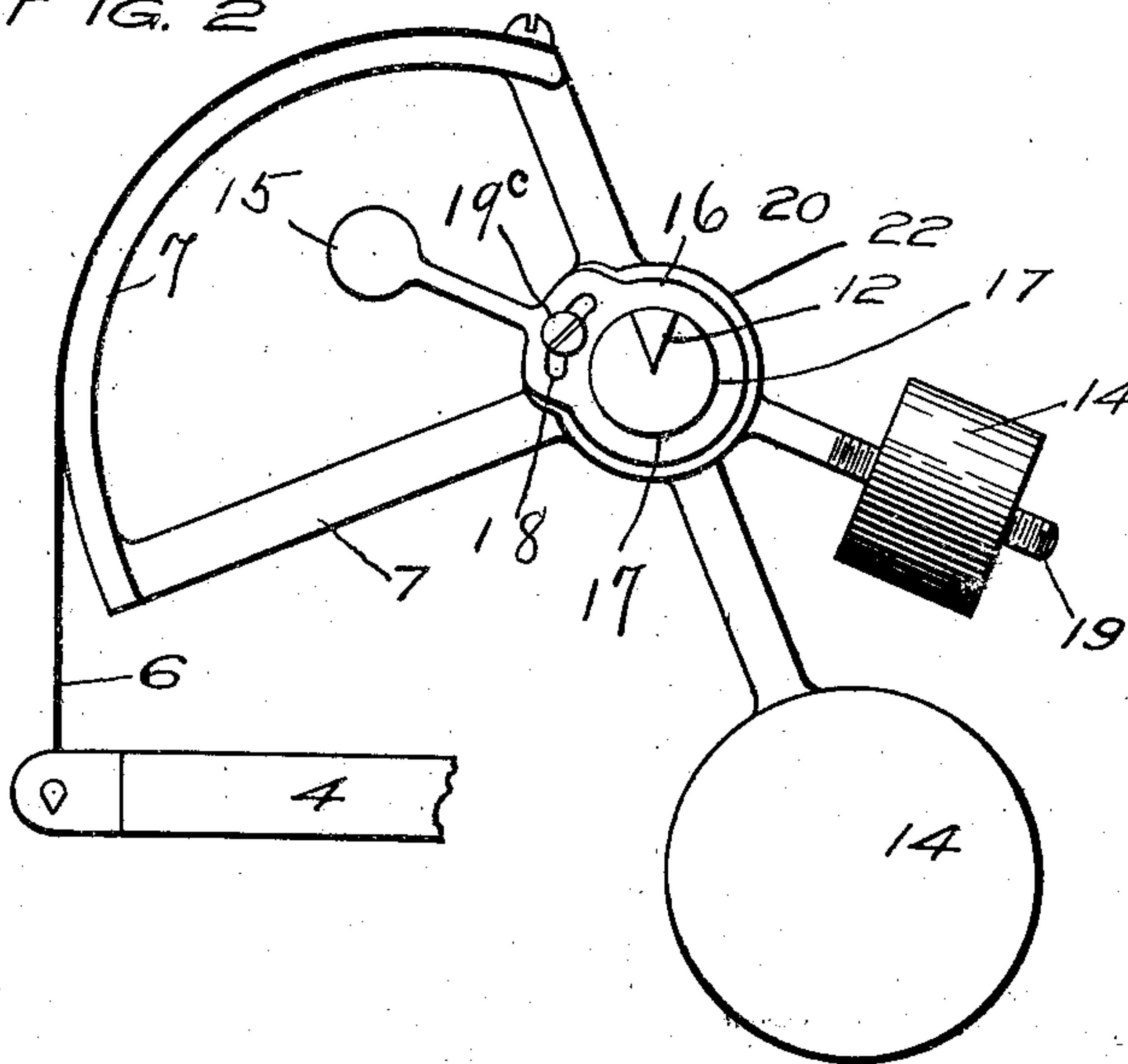


FIG. 3

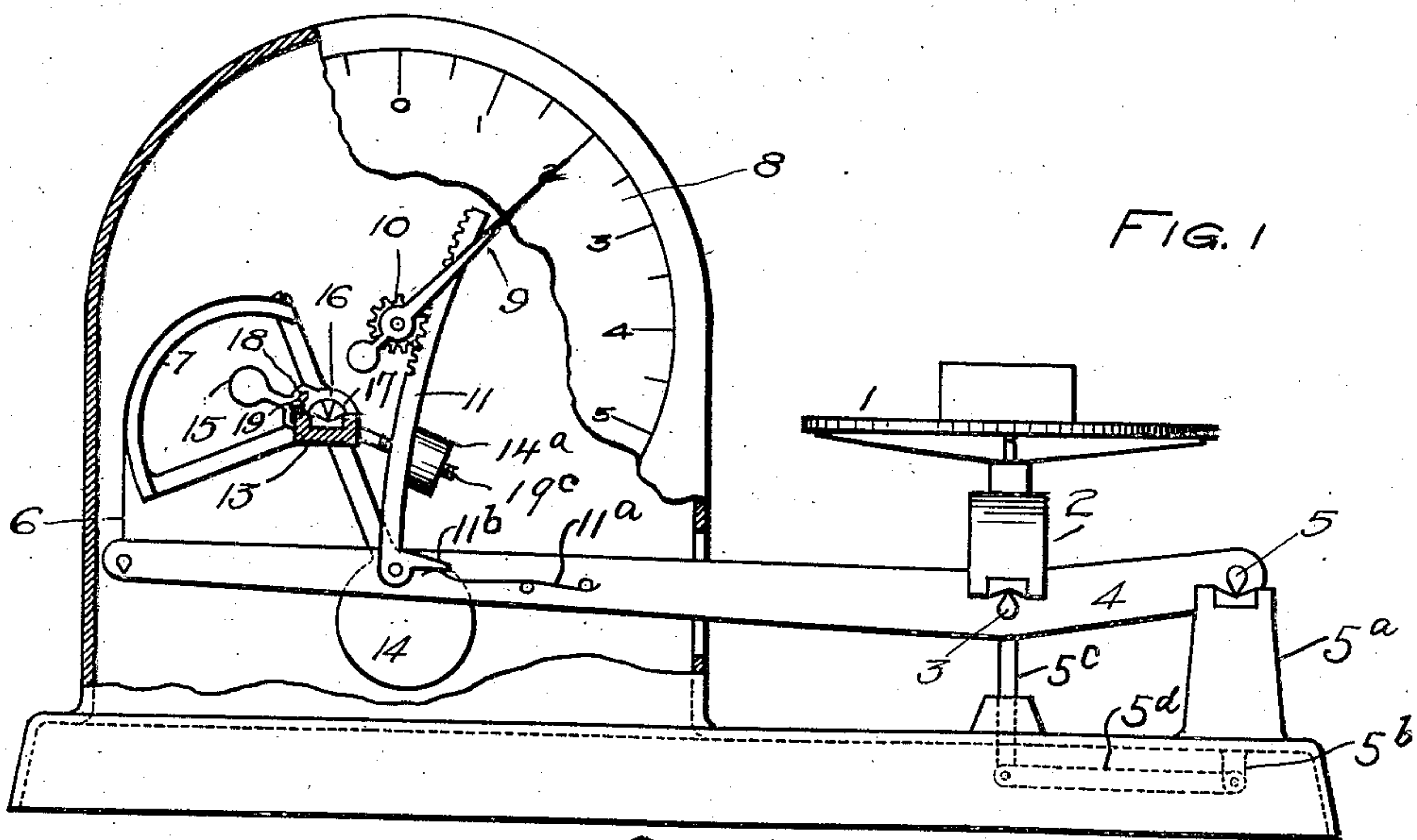
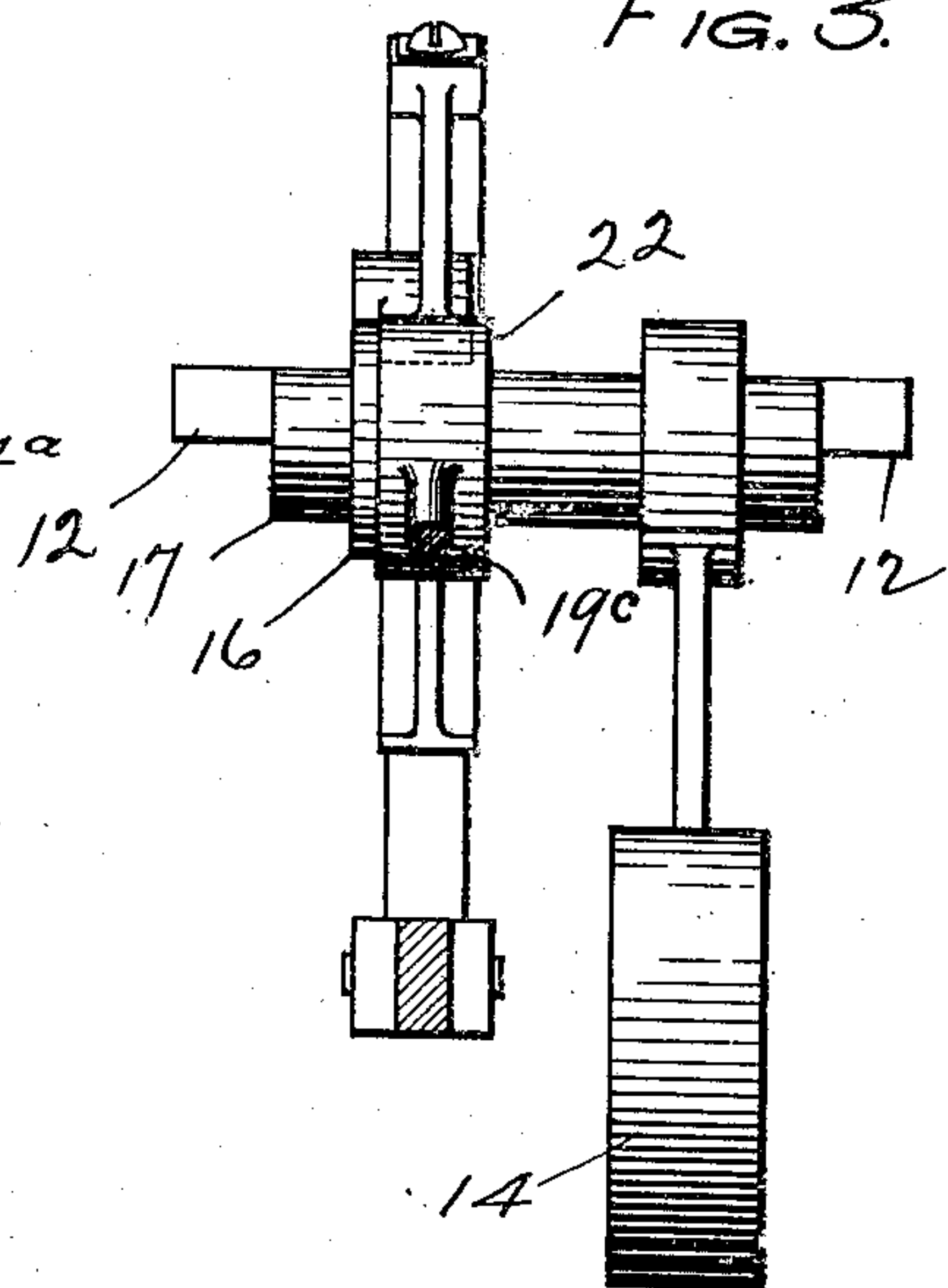
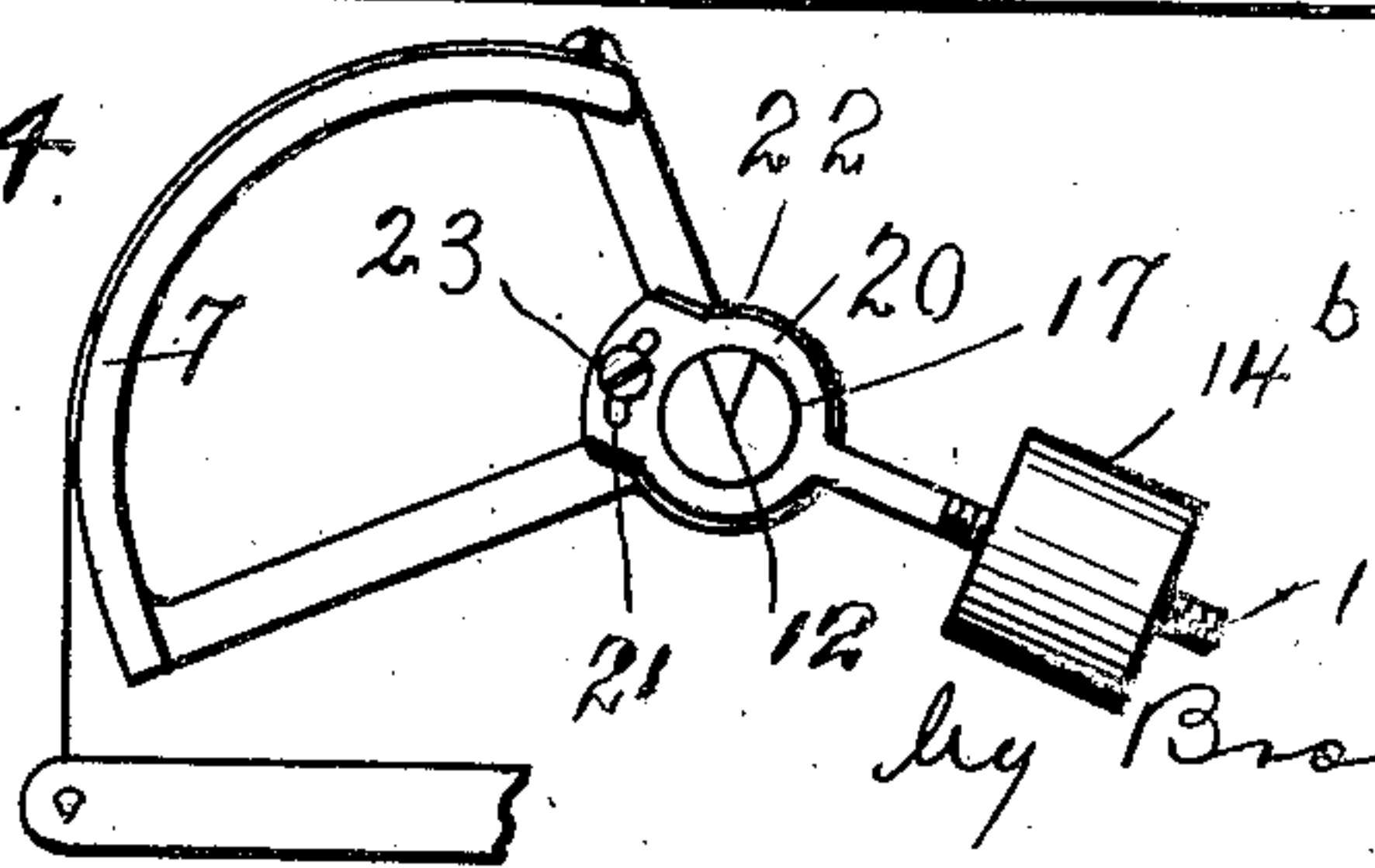


FIG. 1

attest: FIG. 4.

E. C. Sample
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UNITED STATES PATENT OFFICE.

JOSEPH E. COCHRAN, OF ELGIN, AND HORACE B. McCABE, OF CHICAGO,
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WEIGHING-SCALE.

No. 833,874.

Specification of Letters Patent.

Patented Oct. 23, 1908.

Application filed September 20, 1905. Serial No. 279,370.

To all whom it may concern:

Be it known that we, JOSEPH E. COCHRAN, residing at Elgin, Kane county, and HORACE B. McCABE, residing at Chicago, Cook county, Illinois, citizens of the United States, have invented certain new and useful Improvements in Weighing-Scales, of which the following is a full, clear, and exact description.

This invention relates especially to that type of weighing-scales depending for their operation upon the action of a pendulum-weight which transmits its gravitating force to the scale pan or platform through the agency of a flexible connection bearing upon the working face of an involute cam, theoretically serving to alter the effect of such force in direct ratio to the degree to which the weight may swing from the vertical or its position of equilibrium, so that the same increment of weight imposed upon the platform will produce the same distance of travel of the pointer at any point in the range of action of the pendulum. In practice, however, it is found to be practically impossible to accomplish this result with an involute cam without filing or reducing its working face at different points. This results in changing the center of gravity of the cam, and consequently changing the initial position or position of equilibrium of the weight, with a consequent change in the zero position of the pointer.

This invention is designed to overcome these difficulties, and has for its primary object to provide improved and efficient means whereby the center of gravity of the cam may be readily shifted or changed to agree with any change effected therein by subtracting from or adding to the working face thereof.

With a view to the attainment of these ends and the accomplishment of certain other objects, which will hereinafter appear, the invention consists in the features of novelty in the construction, combination, and arrangement of parts, which will now be described with reference to the accompanying drawings, and more particularly pointed out in the claims.

In the said drawings, Figure 1 is a side elevation, partly in section, of a weighing-scale embodying this invention. Fig. 2 is an enlarged detail side elevation of the cam and a portion of the scale-beam and connected

parts. Fig. 3 is an edge view thereof; and Fig. 4 is a view similar to Fig. 2, showing a modification.

The invention is shown as applied to a common form of scale comprising a platform or scale-pan 1, a supporting-standard 2, suspended on knife-edges 3 from a beam 4, which, is pivoted at one end by knife-edge 5 and is connected at its other end by flexible connection 6 with the upper end of the working face of an involute cam 7. A depending projection 5^b is secured to the fulcrum or support 5^a, and a rod or bar 5^c depends from the supporting-standard 2 and is parallel with and adjacent to the projection 5^b. The free end of the projection 5^b and the rod or bar 5^c are preferably connected by a link 5^d, which serves to maintain the scale pan or platform in a horizontal position.

The numeral 8 designates the dial of the scale; 9, the pointer or index, having its arbor provided with a pinion 10, and 11 a rack-bar or other suitable means connecting the beam with the pinion, as well understood in this art, and is held in contact with the pinion by means of a spring 11^a, secured to the beam 4, which engages an arm or projection 11^b on the rack-bar.

The cam 7 is supported by knife-edges 12 from any suitable support 13 and is provided with a pendulum-weight 14, which through the agency of the strap 6 and involute cam serves to resist the downward movement of the platform 1 when merchandise or other weight is placed thereon.

Inasmuch as the graduations on the dial 8 are desirably spaced equal distances apart, it follows that for each increment of weight imposed upon the platform 1 at any point in the range of oscillation of the weight 14 the pointer or index 9 must move an equal distance. In other words, if one pound be placed upon the platform 1 the weight 14 will be elevated a certain distance and the pointer 9 moved a certain distance. If now an additional pound be imposed upon the platform, the pointer should move for the second pound the same distance it moved for the first, so that the indication of the hand or pointer will agree with the dial; but in practice, as before stated, it is impossible to so accurately construct the working face of the cam with relation to the proportions and weights of the other operating parts as to bring about this

desirable result. Consequently it becomes necessary to file or reduce the working face of the cam here and there until each increment of weight imposed upon the pan 1
5 throughout the range or capacity of the scale will accurately agree with each corresponding graduation on the dial; but this alteration in the working face of the cam results in changing its center of gravity, and consequently
10 changing the position of equilibrium of the weight 14, with a corresponding change in the zero position of the pointer or index. Hence if the filing method alone be resorted to for adjusting the scale it is necessary each
15 time one point is adjusted or changed to return and readjust every other point by filing or adding to the working face of the cam. In order to avoid this laborious and tedious task, this invention provides means for shifting the
20 center of gravity of the cam to agree with such reduction or addition. In the form shown in Figs. 1 and 2 this means consists of a supplemental weight 15, which is provided with a hub 16, journaled upon the rocker-
25 shaft 17, which supports the pendulum and its cam, and which hub is provided with a slot 18, whereby the weight 15 may be rotatively adjusted about the center of the shaft 17 for shifting the center of gravity of the cam 7
30 concentrically, and when the desired position is found the supplemental weight locked in position by means of a set-screw 19 or other suitable device.

The center of gravity is shifted radially by
35 a supplemental weight 14^a, screw-threaded on an arm 19^a, carried rigidly by the hub 22 of cam 7.

It is of course understood that to be absolutely accurate the cam 7 and its pendulum-
40 weight 14 and parts rotatively connected therewith should be so proportioned that the weight 14 will always be in a certain position when the pointer is at zero; but if the working face of the cam be altered this position of
45 course changes. Consequently if the face of the cam 7 be reduced at any point the supplemental weights 14^a and 15 should be respectively radially and rotatively adjusted toward such point of reduction to compen-
50 sate therefor and to bring the center of gravity back to its original position.

In the form of the invention shown in Fig. 4 the weight 15 employed in Fig. 1 is omitted and in its stead a rotatively and radially
55 adjustable weight 14^b is employed and which serves at once as a means of shifting the center of gravity of the cam radially and concentrically. In this form the weight 14^b is screw-threaded upon a stem or arm 19^a, which is
60 provided with a hub 20, corresponding to the hub 16 and having a slot 21, whereby the hub may be secured with capability of rotative adjustment to hub 22 of cam 7, a set-screw 23 being employed for this connection. With
65 this form of the invention it will be under-

stood that when the center of gravity is altered by the alteration of the face of the cam the discrepancy may be compensated for by adjusting the weight 14^a toward or from the center of the shaft 17 and at the same time
70 adjusting it rotatively about the shaft 17 or in an upward or a downward direction, as may be required for bringing it diametrically opposite to the point of desired location of the center of gravity of the cam. 75

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

1. In a weighing-scale the combination of a scale-platform or merchandise-support, an
80 index or pointer, a connection between the platform and pointer including a scale-beam, a weighted involute cam, an operative connection between said beam and cam, and means concentric with the cam for shifting
85 the center of gravity of the cam and weight.

2. In a weighing-scale the combination of a scale-platform or merchandise-support, a
90 pointer or index, a weighted involute cam operatively connected with the platform and
95 index, and a supplemental weight concentrically secured to the cam and rotatable about its axis to shift the center of gravity of the cam and said weights.

3. In a weighing-scale the combination of
100 a platform or merchandise-support, a pointer or index, an involute cam operatively connected with said platform and index, means adjustable toward and from the center of os-
105 cillation of the cam and means concentric with and rotatable about the center of the cam, for shifting the center of gravity of the cam and the first said means.

4. In a weighing-scale the combination of a scale-platform or merchandise-support, a
110 pointer or index, an involute cam operatively connected with said platform and index, an independent arm pivoted at one end to the cam, and a weight mounted on said arm and adjustable toward and from the center of the
115 cam said arm being rotatable concentrically about its axis for shifting the center of gravity of the cam and the weight and arm.

5. In a weighing-scale, the combination of a platform or merchandise-support, a pointer
120 or index, an involute cam operatively connected with the platform, operative connections between the platform and pointer, a weight carried by the cam and adjustable toward and from the center of oscillation there-
125 of, and an arm rotatively secured to the cam and disposed opposite the weight.

6. In a weighing-scale, the combination of a platform or merchandise-support, a pointer
130 or index, an involute cam operatively connected with the platform and index, counterbalancing means carried by the cam and radially adjustable with relation thereto, and independent means carried by and concentrically adjustable about the center of the
135

cam and oppositely disposed to the counterbalancing means.

5 7. In a weighing-scale, the combination of a scale-platform or merchandise-support, an index or pointer, an involute cam, operatively connected with the platform; an index, a counterbalancing-weight carried by the cam and adjustable toward and from the center of oscillation thereof, and a supplemental weight oppositely disposed to the counterbalancing-weight and rotatively secured to the cam, said supplemental weight being disposed between the point of oscillation of the

cam and its point of operative connection with the scale-platform or merchandise-sup- 15 port.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, on this 14th day of September, A. D. 1905.

JOSEPH E. COCHRAN.
HORACE B. McCABE.

Witnesses:

CHAS. C. WOLAVER,
F. H. REESE.