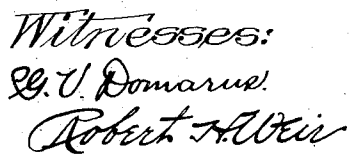


APPLICATION FILED FEB. 19, 1906. RENEWED MAR. 1, 1909.

Patented Oct. 26, 1909.

2 SHEETS--SHEET 1.



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Inventor:
Jas. E. Cochran
by Brown & Eschig, Attorneys

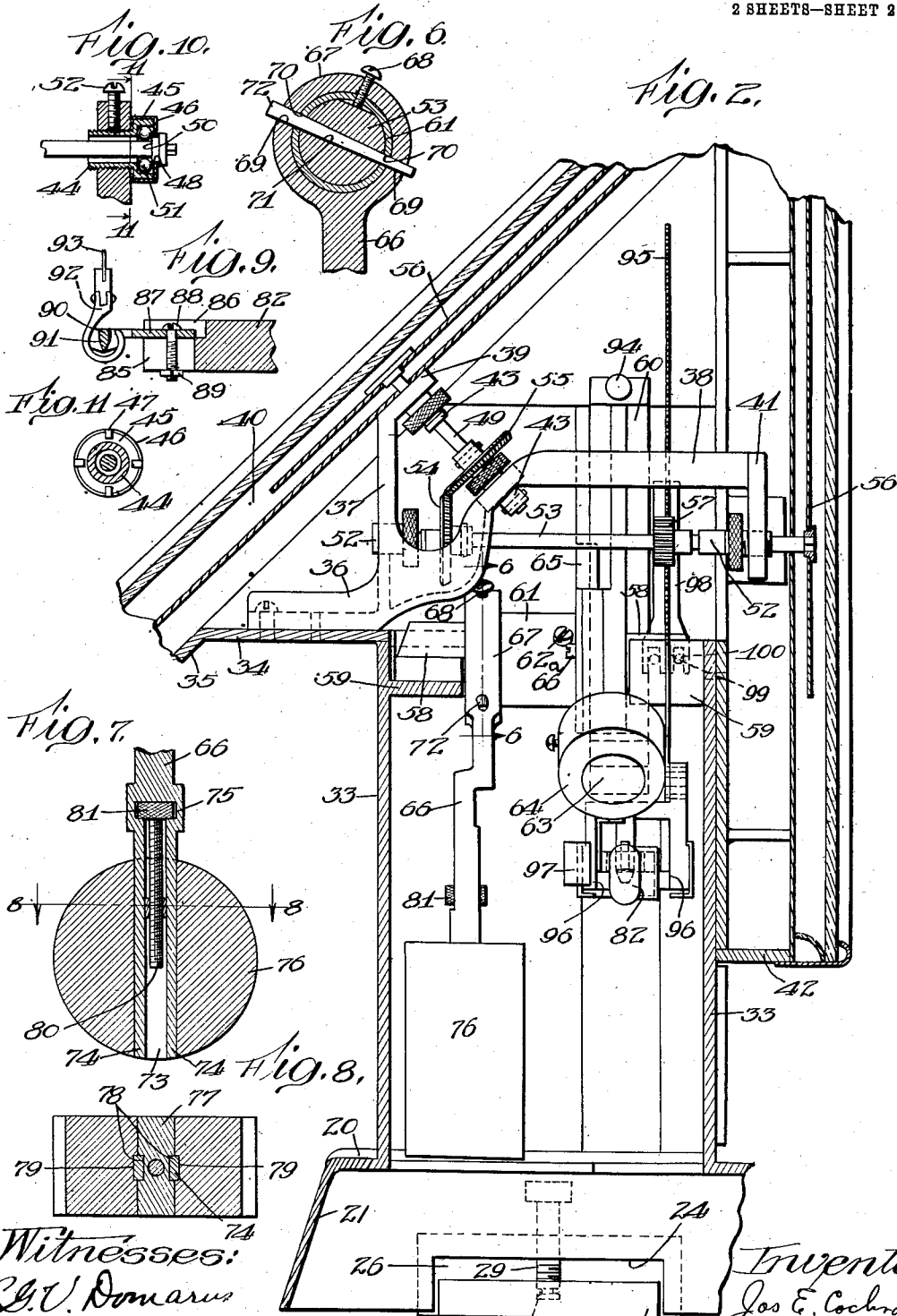
J. E. COCHRAN.
WEIGHING SCALE.

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2 SHEETS—SHEET 2.



Witnesses:

C. V. Donatus

Robert H. Weir

Inventor:

Jos E. Cochran

Atty by F. J. Brown & Sons

UNITED STATES PATENT OFFICE.

JOSEPH E. COCHRAN, OF DUNDEE, ILLINOIS.

WEIGHING-SCALE.

937,768.

Specification of Letters Patent.

Patented Oct. 26, 1909.

Application filed February 19, 1906, Serial No. 301,719. Renewed March 1, 1909. Serial No. 480,754.

To all whom it may concern:

Be it known that I, JOSEPH E. COCHRAN, a citizen of the United States, residing at Dundee, in the county of Kane and State of Illinois, have invented certain new and useful Improvements in Weighing-Scales, of which the following is a full, clear, and exact specification.

This invention relates to improvements in weighing scales, and more particularly to that class of scales in which the depression of the pan or platform is resisted by a weighted pendulum.

A further object is to provide an improved manner of securing the pendulum or weight to its supporting shaft, and for readily and properly positioning the same in relation thereto.

A further object is to provide an improved connection between the scale beam and the pendulum.

A further object is to provide an improved arrangement of bearings, and manner of mounting the various parts.

A further object is to provide improved means for leveling the supporting frame.

A still further object is to construct an improved scale of this character which will be simple in construction, cheap to manufacture, and effective in operation.

To the attainment of these ends, and the accomplishment of other new and useful objects, as will appear, the invention consists in the features of novelty in the construction, combination, and arrangement of the various parts, as will be hereinafter more fully described and claimed, and shown in the accompanying drawings illustrating an exemplification of this invention, and in which—

Figure 1 is an elevation, partly in section, of a scale constructed in accordance with the principles of this invention. Fig. 2 is a sectional view on line 2—2 of Fig. 1, looking in the direction of the arrows. Fig. 3 is a front elevation of the bearing of the connecting bar or link between the standard and the scale pan support or standard. Fig. 4 is a side elevation thereof. Fig. 5 is a sectional view on line 5—5 of Fig. 4, looking in the direction of the arrows. Fig. 6 is a sectional view on line 6—6 of Fig. 2. Fig. 7 is a longitudinal sectional view of the pendulum weight and a portion of the pendulum, illustrating the preferred manner of adjusting the weight. Fig. 8 is a sectional view on

line 8—8 of Fig. 7. Fig. 9 is a view, partly in section, of the end of the scale beam, and the means for connecting the beam with the pendulum. Fig. 10 is a sectional view of one of the shaft bearings, and protection cap. Fig. 11 is a sectional view on line 11—11 of Fig. 10.

Referring more particularly to the drawings, the same reference characters designate similar parts throughout the several views.

The numeral 20 designates a base or support, of any suitable shape and material, and is preferably provided with a circumferential depending flange 21, the edge of which, adjacent one end of the base and on both sides thereof, is provided with rounded projecting bosses or feet 22. The flange at the other end of the base is provided with a recess or depression 23 and a cut-away portion 24 adjacent the recess or depression 23. The base of the recess or depression is provided with a screw-threaded aperture 25.

A shoe or foot 26 is provided with a rearwardly-extending portion 27 of a size to enter and move within the cut-away portion 24. The rearwardly extending portion is provided with a cavity or recess 28 in its upper face, which is adapted to loosely receive the end of a screw 29 which passes through the aperture 25 in the base of the recess 23. This end of the screw is swiveled in the cavity 28, in any suitable manner, preferably by means of a pin 30 passing through the shoe or foot 26 and standing within a circumferential groove 31. The other end of the screw being arranged to form a head 32, which is preferably milled around its periphery. The base being supported by the rounded bosses or feet 22 at one end, and by the shoe 26 at its opposite end, may be leveled or adjusted to any desired angle, by simply operating the screw 29. This operation will cause the shoe to be raised or lowered, thus elevating or depressing that end of the base, while the other end moves or rocks upon the rounded bosses or feet 22, thereby rendering it possible to level the base, for any desired purpose, as will be understood.

Projecting above the base, near one end, preferably the end provided with the adjustable shoe 26, is a hollow support or casing 33. One of the walls of the casing or support is preferably somewhat shorter than the other wall, and projecting from this short wall is a flange or projecting portion

34, provided with an inclined extremity or periphery 35. The other wall is provided with an aperture or opening, preferably at a point above the projecting flange or arm 34 of the first wall.

A bracket 36 is secured to the flange or projecting portion 34, and said bracket is provided with arms 37, 38. The arm 37 is provided with an inclined or angular portion 39, the face of which stands in a plane parallel with the plane of the face of the peripheral flange 35 of the projecting portion 34. A dial 40 is secured to this wall of the housing or support 30 in such a manner that the frame thereof will rest against the peripheral flange 35, and with its back resting upon the inclined face 39 of the arm 37 of the bracket 36, thereby causing said dial to assume an oblique position. The arm 38 extends above the body of the bracket and projects across the housing and extends through the opening formed in the other wall thereof. The extremity of the arm is provided with a depending portion 41, parallel with the body of the bracket 36 and the other wall of the support or casing. A second dial 42 is secured to this other wall of the housing or support adjacent the aperture therein, and in a vertical position, with the depending portion 41 of the arm 38 adjacent the center thereof. This arrangement causes the two dials to be arranged obliquely to each other, one of which preferably stands upright or in a vertical position.

Secured in the inclined portion 39 of the arm 37, and the arm 38, are alined bearings 43, each of which comprises an exteriorly threaded tubular body portion 44 (see Fig. 10) and a cup-shaped extremity 45, the threaded portion 44 engaging threaded apertures in the arms. A cap 46, provided with ears 47 and a central aperture 48, is placed against the edge of the cup-shaped portion of the bearings, and the ears 47 may be bent over against the back thereof and serve as a means to retain the cap in position. A shaft 49 passes through the bearings and caps, and is provided with shoulders 50, against which the balls 51 within the cups rest, and which surround the shaft 49. This cap serves as a protection for the balls 51, to prevent the entrance of dust or other material. These bearings may be adjusted, if desired, and may be held from accidental displacement by any suitable means, but preferably by means of a screw or bolt 52 passing through the bracket arm and engaging the threaded body portion 44 thereof. Secured also in the depending portion 41 of the arm 38, and in the arm 37 of the bracket 36, are similar alined bearings 52, in which is journaled a shaft 53, and said shaft extends transversely across the housing or casing 33. A bevel-gear wheel 54 is carried by the shaft 53, which meshes with a bevel-gear wheel 55

carried by the shaft 49. The extremities of these shafts adjacent the dial extend beyond the bearing and project through the respective dials, and secured to these projecting extremities are hands or pointers 56, which stand adjacent and move over the outer faces of the dials. The shaft 53 has also secured thereto a pinion wheel 57, which is located at any suitable point, but preferably at a point within the casing or housing 33.

A rocker-shaft provided with knife-edge bearings 58, and supported by means of suitable bearings 59, extends across the casing or housing 33, parallel with, and preferably in proximity to, the shaft 53. Carried by the shaft 53, is a cam 60, which is provided with a laterally projecting hub 61, and said cam is secured to the shaft by means of a screw or bolt 62 passing therethrough and engaging the shaft. Projecting rearwardly from the cam is an arm 63, to the extremity of which is adjustably secured a weight 64, which acts as a counterbalance for the cam. A supplemental weight 65 is adjustably secured to one face of the hub of the cam 60 by means of screws or bolts 66^a passing therethrough and into the said face. This supplemental weight is disposed substantially parallel with the cam, and in an opposite direction to the weighted arm 63.

A pendulum arm 66 is provided with an eye or sleeve 67, which surrounds the hub 61 of the cam 60, and is secured to the hub, preferably by means of a bolt or screw 68. The sleeve or eye 67 and the hub 61 are provided with diametrically opposite apertures 69, 70, which are adapted to register with an aperture 71 passing through the shaft 53. A tapering pin 72 is adapted to be driven through the alined apertures in the various members, and serves as a means for finding and correctly adjusting the apertures to secure these parts in proper position, thereby obviating the necessity of holding the apertures in exact register for the insertion of a screw or pin of even diameter. These apertures may also be slightly tapering to conform to the contour of the pin. The other end of the arm 66 is preferably bifurcated, as at 73, to form two arms or tines 74, and is provided with an aperture 75 communicating therewith. A pendulum weight 76 is provided with an aperture therethrough, and secured within and extending across said aperture is a bar 77, provided with a threaded aperture. This bar is also provided with recessed or cut-away portions 78, which stand against, and correspond to, similar but oppositely disposed recesses or grooves 79 in the walls of the weight, thereby forming two guides or ways. A screw 80 stands within the bifurcated portion of the arm 66, with its head 81 resting in the aperture 75, and said head is of a size to project beyond the sides of the arm 66, and

to prevent the screw from dropping out of position.

The weight is slipped over the free extremity of the arm 66, with the tines 74 thereof standing within the guides or ways formed by the grooves 78, 79, and with the screw passing through the threaded aperture in the bar 77. Thus it will be seen that by turning the screw-head 81 (which, if desired, may be milled to insure sufficient purchase thereof) the weight 76 may be adjusted upon the arm 66 to change the position of equilibrium thereof. A scale beam 82 is preferably pivoted adjacent one end by means of knife-edges 83 engaging a suitable support 84. The forward end of the beam projects into the casing 33, and the extremity thereof terminates adjacent the periphery of, and preferably in line with, the cam 60. The extremity of the beam 82 (see Fig. 9) is preferably bifurcated as at 85, and is provided with a recessed or cut-away portion 86 adjacent the upper face thereof, which communicates with the bifurcation 85. A plate 87 is secured by one end within the recessed or cut-away portion 86 by means of a bolt 88 passing therethrough and through the bifurcation 85. A nut 89 engages the bolt 88 and rests against the lower face of the beam 82, and extends across the bifurcation. This plate 87 is preferably provided with an aperture adjacent its free end to form a transverse bar 90, the lower face of which is beveled or tapered as at 91, to form a knife-edge bearing. A hook 92 removably engages the knife-edge bearing 91 of the bar 90 and is pivotally connected to one end of the flexible member 93, preferably on an axis transverse to the movement of the engaging end of the scale beam. The flexible member 93 passes over and rests upon the periphery or face of the cam 60, and its free end is adjustably and removably secured to the upper extremity of the cam in any suitable manner, preferably by means of a screw or bolt 94. It will thus be seen that the position of the hook 92 may be readily adjusted to any desired position, by loosening the nut 89 and sliding the plate 87 in or out with reference to the extremity of the scale beam 82, and that by so adjusting these parts, a proper and direct pull will be exerted upon the flexible member 93, thereby insuring accuracy, and obviating the danger of straining or otherwise injuring these parts.

A rack-bar 95 may be pivoted to the scale-beam 82, and said rack is adapted to engage the pinion 57, which is carried by the shaft 53. Said rack is provided with suitable bearings 96, and a weighted arm 97, adapted to hold the same in engagement with the pinion. A bar or member 98, provided with bifurcated portions 99, is adjustably secured to one of the bearings 59 in any suitable manner, such as by screws 100, or the like,

passing through the bifurcations and into the bearing. The free end of this bar or member is so disposed as to rest against the back of the rack to cause the rack to always maintain its proper position, as clearly shown in Fig. 1 of the drawing.

Carried by the scale-beam 82 is a tare-beam 101, provided with the usual weight 102. A scale pan or platform 103 is pivotally mounted upon the beam 82 in any desired manner, and depending from said pan or pivoted support is a rod or bar 104, which may be secured thereto in any suitable and convenient manner. A rod or bar 105 is secured to and depends from the fulcrum or support 84, and these two rods 104, 105, are arranged parallel to and preferably adjacent each other. The extremities of each of these rods are reduced to form oppositely disposed shoulders 106, each of which is provided with a transverse groove 107. A link 108 is provided with an aperture 109 adjacent each extremity thereof, and the outer edges of the link are reduced as at 110, and beveled as at 111, to form a central projecting portion 112, with knife-edge bearings disposed on each side thereof.

A plate 113, of a width greater than the width of the bars or rods 104, 105, is provided with an aperture 114, also of a length greater than the width of the said rods. This link is connected and secured to the rods in the following manner: The extremities of the rods are first passed through the apertures 109. The plate 113 is then placed in a position so that one edge thereof will enter the groove 107, and with the projecting portion 112 extending through the aperture 114 therein. A screw or bolt 115 is then passed through a suitable opening in the plate, and into the rod, for holding the plate in position and supporting the end of the link 108. When in this position the knife or beveled edges 111 of the link will be received and held in suitable notches or bearings 116 in the adjacent face of the plate 113. This link serves the purpose of maintaining the scale pan or platform in a horizontal position, and by this construction the friction of the bearing points will be greatly reduced.

In order to prevent the scale from being jarred or strained by the sudden movement of the pan or platform when an article is placed thereon or removed therefrom, there is provided a dash-pot 117, which is suitably secured to the base. A piston rod 118 is adapted to move therein, and is pivotally connected to the scale pan support, as at 119.

It is thought that from the above description the operation will be understood, but briefly stated it is as follows: When the pan or platform 103 is depressed, the end of the scale beam 82, through the medium of the flexible member 93, will rock the cam 60 upon its support and against the resistance

of the weight 64 and the pendulum 66. As the end of the beam descends, the rack 95 will rotate the pinion 57, thereby rotating the shaft 53, which will cause the hand 56, carried thereby, to move over its dial face, and also transmit motion to the shaft 49 through the medium of the bevel gears 54, 55, which in turn moves the hand or pointer 56, carried thereby, over its respective dial.

The pan or support, during its descending and ascending movement, will be maintained in a horizontal position by means of the link or connection 108. The jar caused by suddenly placing an article upon the pan or removing the same, is overcome by means of the dash-pot, as will be understood.

It is to be understood that numerous changes may be made in the construction and arrangement of the various parts without departing from the spirit of this invention, and that where the construction of the parts will permit, ball-bearings may be employed.

What is claimed as new is:

1. In a scale, the combination of a base provided with diametrically opposite depending portions disposed adjacent one end thereof, a shoe arranged at the opposite end of the base, a guide for the shoe, a screw swiveled in the shoe and engaging the base for adjusting the shoe with relation to the base to cause said base to rock upon the depending portions for leveling the same, a scale-beam mounted on the base, a platform, an indicator, and a connection between the beam and indicator.

2. In a scale, the combination of a base provided with a circumferential depending flange, the side flanges adjacent one end being provided with diametrically opposite rounded projections extending from the edge thereof, the flange at the opposite end being recessed, a shoe, said shoe being provided with a rearwardly-projecting portion extending into and movable within the recess, an adjusting screw passing through the base, with its extremity swiveled to the projecting portion of the shoe, for adjusting the shoe to cause the base to rock upon the rounded projections, an indicator mounted on the base, a platform also mounted on the base, and operative connections between the platform and indicator.

3. In a scale, the combination of a scale beam, an article-support operatively related to the beam, a pendulum, a cam operatively related to the pendulum, the extremity of the beam being bifurcated and disposed adjacent the cam, a plate engaging one face of the beam and extending across the bifurcation, a bolt passing through the plate and bifurcation, a nut carried by the bolt and engaging the opposite face of the beam, a flexible member, one end of which is secured to the cam, a hook pivotally secured to the other end and engaging the plate, an indicator,

and means for operating the indicator when the beam is moved.

4. In a scale, the combination of a beam, a support operatively related to the beam, a pendulum, a cam operatively related to the pendulum, the extremity of the beam being bifurcated and disposed adjacent the cam, one face of the beam being provided with a recess communicating with the bifurcation, a plate, one end of which stands across the bifurcation and within the recess, a bolt passing through the plate and bifurcation, a nut carried by the bolt and engaging the other face of the beam, said plate being provided with a knife-edge bearing adjacent its free end, a flexible member engaging the cam, a hook carried by the member and engaging the knife-edge bearing on the plate, an indicator, and means for moving the indicator when the beam is operated.

5. In a scale, the combination of a scale beam, an article-support operatively related to the beam, a rock shaft, the end of the beam being bifurcated and disposed adjacent the shaft, one face of the beam being recessed adjacent the bifurcation, a plate, one extremity of which stands within the recess and extends across the bifurcation, a bolt passing through the plate and bifurcation, a nut carried by the bolt and engaging the opposite face of the beam, said plate being provided at its other end with an aperture to form a cross-bar adjacent the extremity thereof, the lower face of said bar being reduced to form a knife-edge, a flexible member, one end of which is connected to the shaft, the other end being hooked-shaped, and adapted to engage the knife edge, an indicator, and means for operating the indicator when the beam is oscillated.

6. In a scale, the combination of a rock shaft provided with a transverse aperture, a cam provided with a tubular hub mounted on the shaft and having diametrically opposite apertures, a weighted arm secured to the hub and disposed opposite to the cam, a pendulum provided with an eye surrounding the cam hub and having diametrically opposite apertures therein, a tapering pin adapted to align the apertures in the members and pass therethrough, for securing said members in their relative positions, a scale beam, a support operatively related to the beam, operative connection between the beam and cam, an indicator, and means for operating the indicator when the beam is oscillated.

7. In a scale, the combination of a rock shaft provided with a transverse aperture therethrough, a counterbalanced cam carried by the shaft, a pendulum provided with a transverse eye surrounding the shaft and having diametrically opposite apertures, a tapering pin adapted to align the apertures in the eye with the transverse aperture in the shaft and passing therethrough, to se-

cure said pendulum in its proper position with relation to the cam, a scale beam, an article-support operatively related to the beam, operative connections between the beam and cam, for causing the pendulum to resist the movement of the beam, an indicator, and means for operating the indicator when the beam is oscillated.

8. In a scale, the combination of a rock shaft, a pendulum secured to the shaft, the free extremity of the pendulum being bifurcated and provided with an aperture communicating with the bifurcation, a weight movably surrounding the bifurcated extremity and having a portion thereof passing through the bifurcation, said portion being provided with a threaded aperture, a screw within the bifurcation and passing through the threaded aperture, said screw being provided with a head standing within the aperture and projecting beyond the sides of the pendulum, for operating the screw and adjusting the weight, a scale beam, a support operatively related to the beam, connections between the beam and rock shaft, an indicator, and means for operating the indicator when the beam is oscillated.

9. In a scale, the combination of a rock shaft, a pendulum secured to the shaft, the free extremity of the pendulum being bifurcated to form two tines, and having an aperture communicating with the bifurcation, a weight provided with an aperture there-through, the walls of said aperture being provided with longitudinal grooves, a bar passing transversely through the aperture and provided with recesses adjacent the grooves in the walls of the aperture, and having a threaded aperture passing through its body, the tines of the pendulum being adapted to stand astride of the bar in the weight and within the space formed by the cooperating grooves in the walls of the aperture and the recessed portions of the bar, and a screw passing through the threaded aperture, said screw being provided with a head resting in the aperture and projecting beyond the sides of the pendulum for operating the screw to adjust the weight.

10. In a scale, the combination of a base, a casing mounted thereon, one wall of the casing being shorter than the other wall, a flange projecting beyond and adjacent the upper end of the short wall, the other wall being provided with an aperture, a bracket secured to the projecting flange, said bracket being provided with two arms, one of said

arms projecting vertically above the short wall, and provided with an inclined extremity, the other arm extending horizontally across the casing, through the aperture in the other wall, and provided with a depending portion, alined bearings in the depending portion and body of the bracket, alined bearings also in the horizontal arm, and the inclined portion of the vertical arm, shafts journaled in the alined bearings, gear wheels carried by the shafts and meshing with each other, dials secured to the casing adjacent the end of the arms, the extremities of the shafts projecting through the respective dials, pointers secured to the ends of the shafts and adapted to move over the dials, a scale beam, operative connections between the beam and one of the shafts for moving the pointers when the beam is oscillated, and an article-support operatively related to the beam.

11. In a scale, the combination of a scale beam, an article-support operatively related thereto, a standard, a dial secured to the standard, alined bearings mounted in the standard adjacent the dial, each of said bearings comprising an adjustable cup, means for securing said bearings against adjustment, a shaft journaled in the bearings, balls surrounding the shaft within the cup, the extremity of the shaft projecting through the dial, a pointer secured to the shaft and adapted to move over the face of the dial, and connections between the beam and shaft for rotating the latter to move the pointer when the beam is oscillated.

12. In a scale, the combination of a scale beam, an article support operatively related to the beam, a rock-shaft, a cam carried by the shaft and concentrically adjustable with relation thereto, one end of the beam being disposed adjacent the cam, a plate adjustably secured to said end, means for preventing lateral displacement of the plate with relation to the beam, a flexible member, one end of which is secured to the cam, a hook pivotally connected to the other end and engaging the plate, an indicator, and operative connections between the beam and indicator.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 16th day of February, A. D. 1906.

JOSEPH E. COCHRAN.

Witnesses:

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