R. D. H. ANDERSON.

COMPUTING SCALE.

APPLICATION FILED JAN. 31, 1907.

980,898.

Patented Jan. 10, 1911.

3 SHEETS—SHEET 1.

Fig. 1.

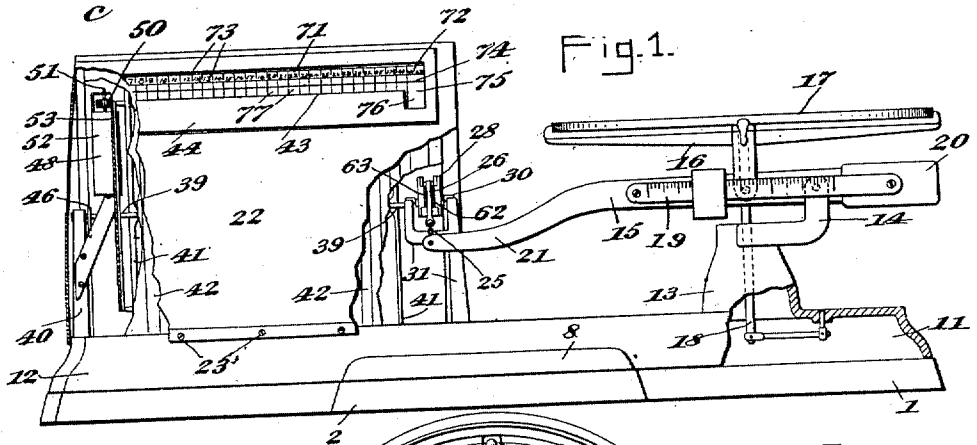


Fig. 2.

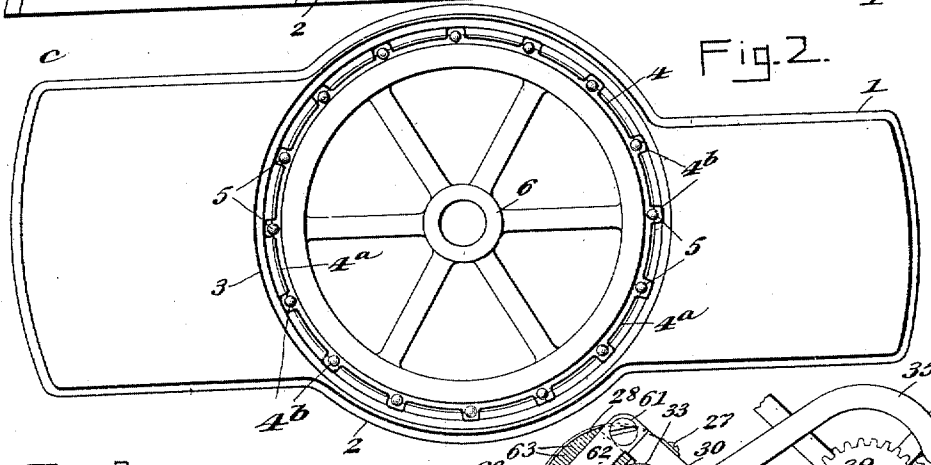


Fig. 3.

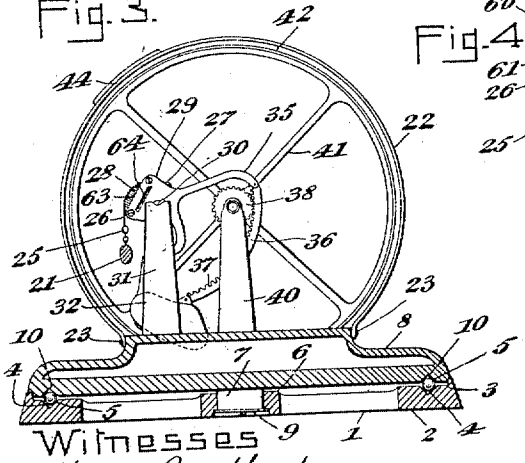
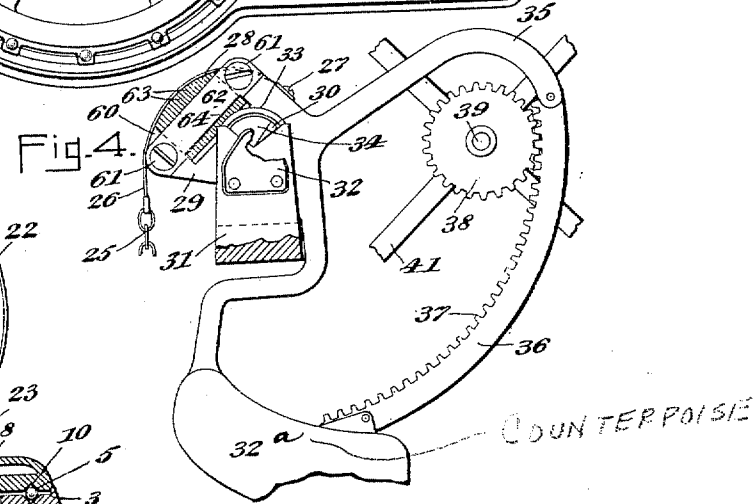


Fig. 4.



Witnesses

Homer Bradford.

Norma Keiser

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his attorney.

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3 SHEETS—SHEET 2.

Fig. 5.

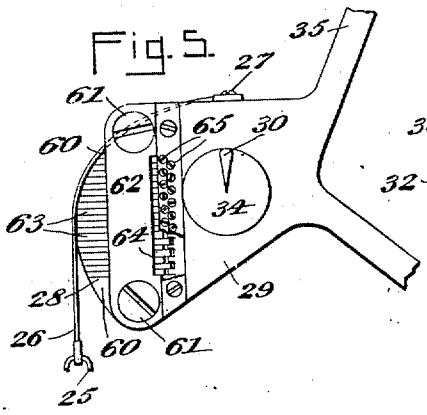


Fig. 6.

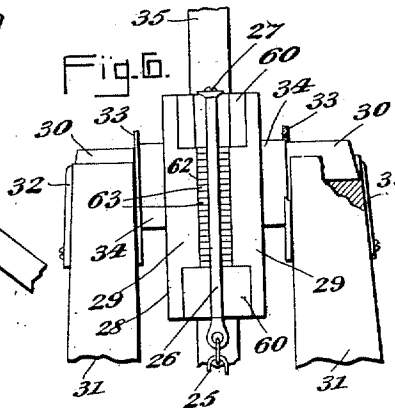


Fig. 7.

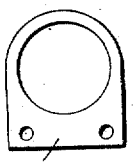


Fig. 10.

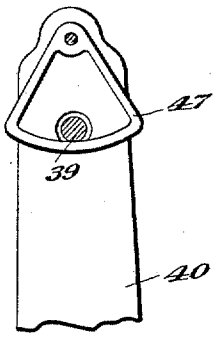


Fig. 8.

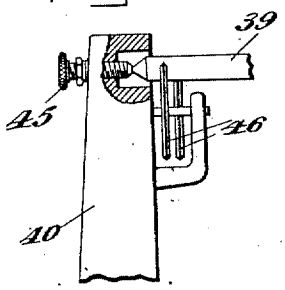
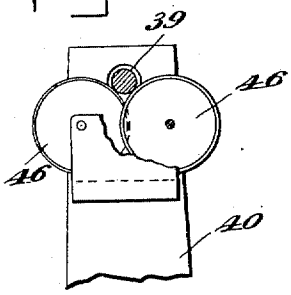


Fig. 9.



a

Fig. 11.

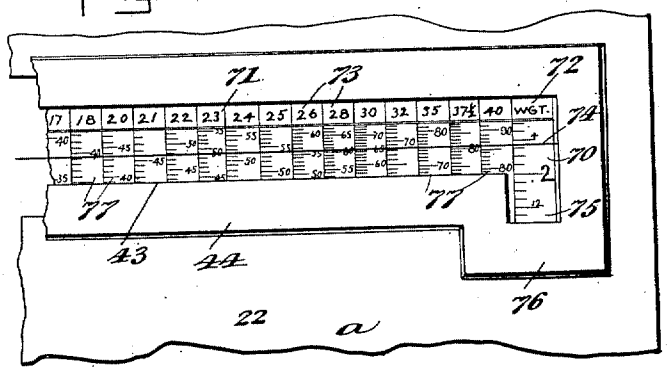
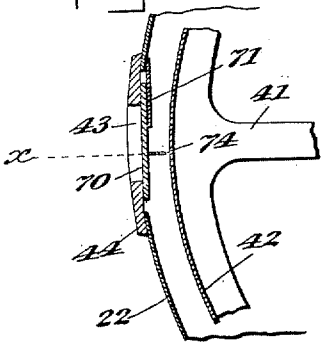


Fig. 12.



Witnesses.

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COMPUTING SCALE.

APPLICATION FILED JAN. 31, 1907.

980,898.

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3 SHEETS—SHEET 3.

Fig. 13.

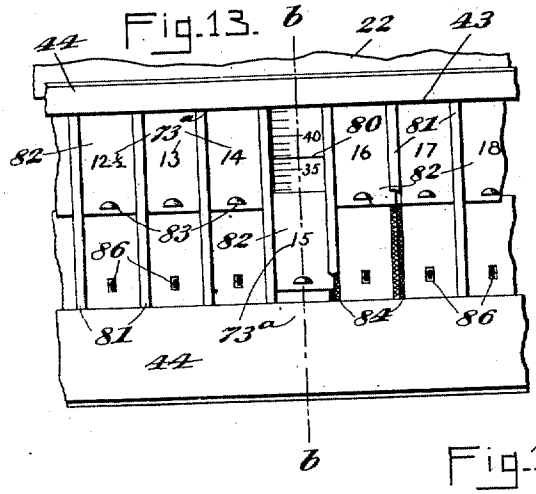


Fig. 14.

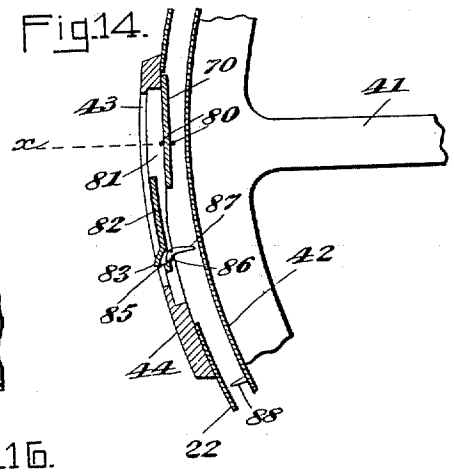


Fig. 16.

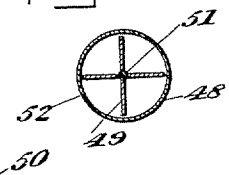


Fig. 15.

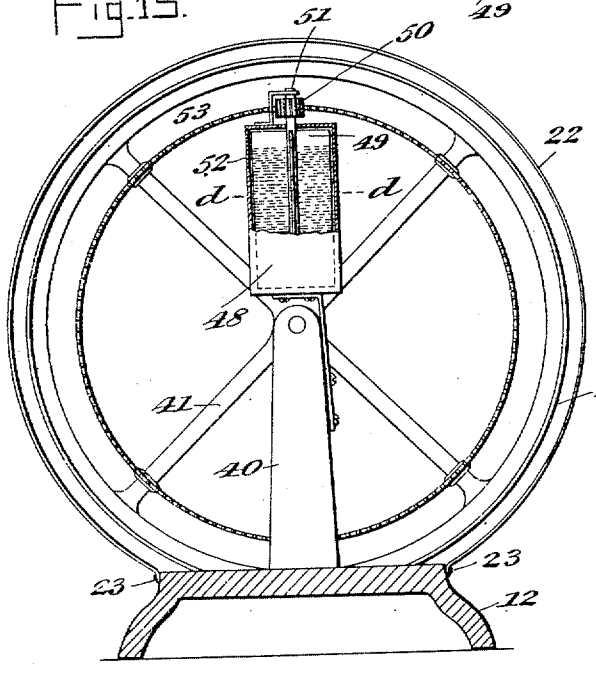
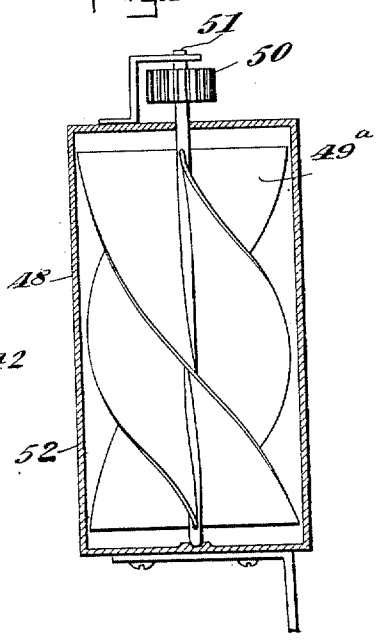


Fig. 17.



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UNITED STATES PATENT OFFICE.

ROBERT D. H. ANDERSON, OF CINCINNATI, OHIO.

COMPUTING-SCALE.

980,898. Specification of Letters Patent. **Patented Jan. 10, 1911.**

Application filed January 31, 1907. Serial No. 355,013.

To all whom it may concern:

Be it known that I, ROBERT D. H. ANDERSON, a citizen of the United States of America, and a resident of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Computing-Scales, of which the following is a specification.

This invention relates to certain improvements in computing scales or balances and more particularly in that class of such devices which are adapted for substantially automatic operation for indicating both weight and price,—the latter calculated upon an arbitrary price per pound,—of the article or commodity weighed, and the object of the invention is to provide a scale or balance of this general character of a comparatively simple and inexpensive nature and of a compact, strong and durable construction, and which shall present certain features of novelty whereby accuracy of indication may be conveniently attained.

The invention consists in certain novel features of the construction and combinations and arrangements of the several parts of the improved computing scale or balance, whereby certain important advantages are attained and the device is rendered simpler, cheaper and otherwise better adapted and more convenient for use, all as will be hereinafter fully set forth.

The novel features of the invention will be carefully defined in the claims.

In the accompanying drawings which serve to illustrate my improvements Figure 1 is a side elevation of a scale or balance constructed according to my invention, portions at opposite ends thereof being broken away to show certain details of construction of the inclosed parts as will be hereinafter explained; Fig. 2 is a plan view of the preferred construction of base-support embodied in the improved scale or balance when the device is applied for use as a counter-scale; Fig. 3 is a sectional view taken vertically and transversely through the central portion of the scale and its base-support and illustrating certain details of construction to be hereinafter referred to; Fig. 4 is an enlarged fragmentary detail view showing certain features of construction of the adjustable-connection between the scale-beam and the chart or indicator of the computing mechanism; Fig. 5 is an enlarged fragmentary view showing certain details of said adjustable-connection in end elevation; Fig. 6 is a face view of the mechanism shown in Fig. 5; Fig. 7 is an enlarged detail view showing a preferred form of retaining means for preventing displacement of the driving cam or pulley of the improved scale or balance; Fig. 8 is an enlarged fragmentary detail view showing in sectional side elevation, the preferred form of end-bearing for the indicator or chart of the computing mechanism; Fig. 9 is a sectional detail view taken at right-angles to the plane of the section in Fig. 8, and illustrating further features of said end-bearing; Fig. 10 is a detail view similar to Fig. 9, but showing a modified formation of the end-bearing for the indicator or chart of the computing mechanism; Fig. 11 is an enlarged fragmentary view showing the indicator slit or opening of the casing of the device, together with certain features of the indicator or chart within the same; Fig. 12 is a sectional detail view taken in the plane indicated by the line *a*—*a* in Fig. 11, and showing certain features of the indicating mechanism in section; Fig. 13 is a view somewhat similar to Fig. 11, but illustrating a modified formation of the indicating mechanism; Fig. 14 is a sectional view, similar to Fig. 12, but taken, as indicated by line *b*—*b* in Fig. 13, through the modified form of indicating mechanism illustrated in the latter figure; Fig. 15 is a vertical section enlarged and taken through the casing of the computing mechanism of the improved scale or balance in the plane indicated by the line *c*—*c* in Fig. 1; Fig. 16 is a sectional view taken transversely and horizontally through the barrel of the retarding device of the improved scale, the plane of the section being indicated by the line *d*—*d* in Fig. 15, and Fig. 17 is an enlarged sectional detail view showing a modified formation of retarding device as will be hereinafter described.

As herein illustrated, the improved scale or balance is constructed in the form of a counter scale, being mounted upon a base-support presenting certain features of novelty and advantage for use upon counters and in similar situations, but it will be evident that the employment of said base-support is inessential to the present invention, and I do not, therefore, desire to be under-

stood as limiting myself to the employment of my improvements in counter scales alone, since it is obvious that, with slight modification and without material departure from its principles and spirit, the invention may be applied with advantage to various other forms of scales and balances.

1 indicates the base-support, herein shown as constructed in elongated form with an enlarged and rounded or circular central portion 2, the top surface of which is made with a depressed bearing portion 3 also of circular form, and having at its base a groove or ball-race 4, wherein are seated balls 5, the upper sides of which protrude above the groove 4 and are engaged in a corresponding groove or ball race 10, produced in the under-surface of a central circular bearing portion 8 integrally produced at the lower part of the metallic frame of the improved scale or balance and adapted to turn within the recessed bearing portion 3 of the base-support 1, so that the operative devices of the scale or balance are adapted to be readily turned or rotated upon said base-support so as to permit of being more conveniently used without requiring the device to be lifted from the counter or other supporting surface.

In order to permit of using a minimum number of the balls 5, 5, in the race-ways 4 and 10 of the bearing portions 3 and 8 of the base-support and frame, I employ means for spacing said balls apart. As herein illustrated, said spacing means comprises a metal strip or wire 4^a, extended in annular form within the lower groove or race-way 4 and having bent portions 4^b, 4^b, at suitable intervals, within which the said balls 5 are held and by means of which said balls are held against displacement without, however, interfering with their free movement in unison along the grooves or race-ways when the frame of the scale or balance is turned or rotated upon the base-support 1.

Within the bearing portion 3, the central circular portion 2 of the base-support 1 is provided with a spider 6, having a central opening in which is engaged for free turning movement a stud 7, centrally projecting from the underside of the bearing portion 8 of the scale frame and having at its lower end an enlargement or head 9, secured in any preferred way and engaged beneath the spider 6 in such a way as to form a secure connection between the scale frame and base-support 1, so that the entire device may be lifted from place to place when desired, without dislocation of the several parts.

The scale frame has end portions 11 and 12, oppositely extended from the circular bearing portion 8 and adapted for the support of the operative devices of the weighing and computing mechanisms, the end portion 11 of said frame having an integral standard 13, from the outer side of which is extended an arm 14, whereon is fulcrumed a scale beam 15, having connection in a well known way, with a stem 18, guided for vertical movement in the standard 13 and carrying at its upper end a suitable frame 16, whereon is held a platter, scoop or equivalent device, as shown at 17, for receiving the article to be weighed. The outer end of the scale-beam 15, beyond its fulcrum at the arm 14 is preferably counterbalanced as shown at 20, and when desired a tare-beam 19 may be connected with the said scale-beam 15 in a well known way, affording compensation for a container rested upon the platter 17 for holding the commodity to be weighed.

The end of the scale beam 15, opposite to the counterpoise 20 is depressed as shown at 21 and is extended within the adjacent end of a casing or housing 22, mounted upon the opposite extended end portion 12 of the scale frame and wherein is contained the connections between the scale-beam and the computing and indicating mechanism, as will be hereinafter explained. The casing or housing 22 may be conveniently formed from sheet metal or similar material, with lower edge portions lapped outside of the lateral and end surfaces of the frame extension 12 and detachably held thereto by screws 23 or the like. Within said casing or housing 22, the depressed extremity 21 of scale-beam 15 has connection with the lower end of a chain 25 or similar flexible connection, the upper end of which has connection with a band or tape 26, preferably of flexible metal, and which is extended upwardly across the curved face of a cam-like actuating member 28, to the upper part of which said tape 26 has connection, as shown at 27, by means of a screw or the like. The said actuating member 28 has a frame 29 at its rear part and from which are extended opposite and alined trunnions 34, 34, the extremities of which have knife-edges 30, 30, suitably engaged in seats at the upper ends of the forks of a supporting frame or lug 31, mounted on the frame extension 12, whereby the actuating member is supported for free pivotal or rocking movement. The forks of the frame or lug 31 carry retaining devices 33, 33, upon their adjacent sides, said retaining devices being in the form of thin metal washers perforated for the passage of the trunnions 34, 34, and serving to prevent dislocation of the knife-edges 30, 30, from their seats in case the scale or balance be jarred or moved about. Said forks of frame or lug 31 are also provided with end stops 32, 32 of resilient or other material, secured at their outer faces and adapted, by engagement with the knife-edges 30, 30, at their pivotal points to maintain the cam-like member 28 accurately centered between said forks of the supporting frame or lug 31.

The frame 29 of the actuating member 28 has a pendent arm 29ª the lower part of which carries a counterpoise 32ª and said frame 29 is also provided with a rearwardly and upwardly inclined arm 35, between which and the counterpoise 32 is extended a segment-rack 36 having a toothed rack surface 37 upon its inner side concentric with the pivotal support afforded by the knife-edges 30, 30 for the cam-like actuating member 28.

38 represents a pinion or spur-wheel of small diameter held upon one end portion of a shaft 39 horizontally extended between bearing studs 40, 40, adjacent to opposite ends of the casing or housing 22 and having spiders 41, 41, mounted near its ends for the support of a rounded or cylindrical indicator or chart 42, whose periphery is provided with suitable price and weight indicating graduations visible at a sight aperture 43 in one side of the casing or housing 22 and surrounded by an escutcheon-plate 44 in a well known way. By preference the location of the sight aperture or slit 43 in casing or housing 22 will be such as to permit the graduations upon chart 42 to be read with the greatest ease by a person standing before the scale, and in the case of a counter scale of the character to which my improvements are herein shown applied, the line of vision of a person so standing may be considered as approximating 55° and the sight aperture will therefore be preferably located at a correspoding situation in the casing or housing 22.

In order to facilitate the turning movement of the cylindrical indicator or chart 42, I preferably mount the shaft 39 thereof in anti-friction bearings, the preferred formation of which is illustrated in Figs. 1, 8 and 9, the extremities of said shaft being made conical or tapered and received for free turning movement in sockets produced in the inner ends or tips of screws 45, passed through the end supports or lugs 40, 40, while anti-friction rollers or disks 46, 46, mounted to turn in brackets on said end supports 40, 40, are engaged beneath the end portions of said shaft 39 to effectively support the same with as little frictional resistance as possible. In certain cases, however, this form of end bearing may be replaced by the construction shown in Fig. 10 with good results. As shown in the latter view, the anti-friction rollers or disks 46 are dispensed with, and the end portions of shaft 39 rest in quadrant-shape yokes 47, mounted for free swinging movement upon the inner sides of the supports 40.

In order to prevent needless oscillation of the parts, and to cause the indicator or cylindrical chart 42 to quickly assume a position of rest when the device is operated in weighing, I provide a retarding mechanism, shown in Figs. 1, 15, 16 and 17, and comprising a paddle wheel or similar rotative part held upon a shaft 51 having bearings at opposite ends of a tight barrel or shell 52, supported upon one of the end supports 40 for the indicator shaft. The shaft 51 carries at its upper end and outside the barrel or shell 52, a gear pinion 50, meshing with a crown gear surface 53 carried by the adjacent spider 41 on indicator shaft 39, in such a manner that, as said chart or indicator 42 is rotated, its movement will be imparted to shaft 51, serving to rotate the paddle wheel within the tight shell or barrel 52. The said shell or barrel is adapted to contain a supply of some suitable fluid, as oil, glycerin, or the like, affording such a resistance to the rotation of the paddle wheel as will tend to retard the movement of the indicator or chart 42 and prevent oscillation thereof, so that in the weighing operation the said indicator or chart will quickly assume a position of rest. The paddle wheel within the barrel or shell 52 may have flat blades or wings, as shown at 49 in Figs. 15 and 16, or if desired, the wings or blades of said wheel may be given a spiral formation as shown at 49ª in Fig. 17.

By the construction so far described, it will be evident that when an article to be weighed is rested upon the platter 17, the scale-beam 15 will be depressed so that its extremity 21 will draw downwardly upon the flexible band or strap 26 and impart partial turning movement to the actuating member 28, and by reason of the gear connection of the segment 36 with the pinion 38, such rotative movement of the actuating member will be communicated to the shaft 39 to rotate the same in its bearings, whereby the cylindrical indicator or chart 42 is caused to turn within the casing or housing 22 so that the graduations upon the perimeter of said chart may be read at the sight aperture 43 of the casing.

In scales or balances of this general character, it has hitherto been extremely difficult to attain an accurate reading of the successive graduations around the perimeter of the indicator or chart, and one of the objects of the present invention is to provide means of a comparatively simple and inexpensive nature, consisting of an adjustable connection between the scale-beam and the indicator or chart, whereby the movement of the latter in unison with the scale-beam may be regulated in a convenient and effective manner for securing accuracy of indication of the graduations at the sight aperture of the casing. As herein shown, such adjusting or regulating means consists in a novel structure of the cam-like driving or actuating member 28, the body portion 29 of which has upper and lower cam segments 60, 60, spaced apart from each

other and connected at opposite sides by lateral plates or parts 62, 62, held to said segments 60 by screws 61 or the like in such manner as to produce between said plates 62, 62 and segments 60, 60, a space or chamber wherein is received a multiplicity of thin slides or segmental parts 63, 63, the forward ends of which are extended from said space or chamber to form the cam-like peripheral surface of the member 28 between the segments 60, 60, and are adapted, in the operation of the improved scale or balance, to be engaged by the flexible strap or band 26, the upper end of which is held by screw 27 to the upper segment 60, when said band or strap is drawn upward by the return of the cylindrical chart or indicator 42 to its zero position after the completion of the weighing operation.

The slides or segments 63, 63, have their respective rear parts engaged by screws 65, 65, suitably supported upon the body portion 29 of the member 28, in such manner as to permit each of said slides or segments to be independently adjusted on loosening of the corresponding screw 65, whereby the projecting forward edge portion of said slide or segment is caused to project at a greater or lesser distance from the pivotal axis of said member 28, the said screws serving, when tightened into engagement with the segments or slides, to hold the corresponding slides or segments securely in adjusted position. By this construction it will be evident that the slides or segments 63, 63, may be adjusted to secure any desirable configuration of the cam-like peripheral surface of the member 28, whereon the band or strap 27 is wound in the return of the parts to the zero-position after the weighing operation, and it will consequently be evident that the extent of movement, through a given arc, imparted to the member 28 upon depression of the scale-beam in the weighing operation, may be thereby effectively made to conform to the extent of movement through a similar arc desirable to be imparted to the cylindrical chart or indicator 42 to cause the graduations upon the perimetral surface thereof to appear in accurate succession at the sight aperture 43.

The escutcheon plate 44 preferably carries a glass or other transparent plate 70, extended across the sight aperture 43 to protect the graduated perimetral surface of the chart or indicator 42, and said surface has its graduations produced in circumferentially extended series, side by side, one of such series, as indicated at 75 at the right in Figs. 1 and 11, being designed to indicate weight, while the remaining series of graduations 77, 77, are designed to indicate prices computed at different rates per pound.

71 represents a plate extended along the upper part of the sight aperture 43 and having suitable index characters 72, and 73, 73 alined with the several series of weight and price indicating graduations 75 and 77, 77.

In scales or balances of this general character a correct reading of the indications at the sight aperture can only be attained by a person viewing the graduated surface in an arbitrary direction, and one of the objects of the present invention is to provide a more perfect index means whereby the location of said direction of view is facilitated so that a correct reading of the indications may be more quickly and conveniently accomplished and as shown in Figs. 1, 11, and 12, said means consists in a flat plate 74 of thin metal extended lengthwise along the central part of the sight aperture 43, with its inner edge closely adjacent to but not actually touching the graduated periphery of chart 42. Said plate 74 is so set as to be alined with the direction of vision of the person reading the chart, as represented by the line x in Fig. 12, and the inner and outer edge portions of said plate therefore form parts adapted when alined with said direction of vision to permit the correct reading to be known by the appearance of a thin line, representing merely the thickness of the strip 74, across the graduations. Should one attempt to read the indication at an improper angle, it is evident that the flattened top or bottom of plate 74 will be interposed at a greater or less angle in the line of vision, whereby a line of greater width will appear across the graduations, warning the person reading of his error.

In some cases it may be desirable to replace the flat index plate 74 above described, with inner or outer wires or threads 80, as shown in Figs. 13 and 14, these inner and outer threads or wires acting, similarly to the inner and outer edge portions of strip 74 to make known the correct reading when by their alinement with the line of vision, they present a narrow index line, and to give warning of an incorrect reading by the appearance of either a wider index line or of two separate lines when they are out of alinement with the direction of view.

In the use of scales or balances of this general character, confusion sometimes arises, due to the appearance of a multiplicity of graduations at the sight aperture, and in Figs. 13 and 14, I have illustrated means, forming part of the present invention, whereby this disadvantage may be overcome. As shown in said views, the sight aperture 43 is divided vertically by guides 81, 81, into a series of guide-ways each of which is alined in front of one of the series of graduations 72, 73, 73, upon the indicator or chart 42, and is adapted to be traversed by a slide or shutter 82, normally upheld by springs 84, in position to cover up the corresponding series of graduations

upon the chart or indicate so as to obscure and prevent the same from being read.

Each slide or shutter 82 has upon its outer face an index character 73ª corresponding to the price per pound upon which the graduations of the underlying series upon chart 42 are calculated, and the lower part of each such slide or shutter is punched or otherwise formed, as shown at 83, to produce a handle by means of which the person using the scales may conveniently depress said slide or shutter against the tension of its supporting springs 84, to uncover the graduations of the underlying series upon the chart or indicator 42. The punched out part of the slide or shutter at the handle 83 also affords a shoulder 85 adapted, when the slide or shutter is drawn downward as seen in Fig. 14, to be engaged beneath the outer end or arm of a detent 86 whereby the slide or shutter is effectively held in lowered position against the tension of its springs. Detent 86 has an inner arm 87 directed toward the periphery of chart 42 and in the path of a flange or projection 88 extended across the said chart and designed to engage and rock the detent when the chart is returned to its zero position after each weighing operation. By this arrangement when the weight and price of a commodity are to be ascertained, the operator draws down the proper slide or shutter 82, disclosing at escutcheon 44 only the series of graduations of the chart based upon the price per pound of the article to be weighed, and the detent 86, serves to retain said slide or shutter in lowered position until the weighing operation is completed and the article removed from the platter. When the article is so removed, however, and the chart 42 is returned to its zero position, its flange or projection 88 will contact with the inner arm 87 of detent 86, rocking the detent sufficiently to disengage its outer end from the shoulder 85 of the shutter, whereby said shutter is released and the springs 84 are permitted to lift the same to again hide the underlying graduations of the chart.

The improved scale or balance constructed according to my invention is of an extremely simple and comparatively inexpensive nature, and is especially well adapted for use by reason of the accuracy of indication afforded and also by reason of the convenience afforded and of the compact structure attained by the employment of the internal gear surface of the driving or actuating member, with which the pinion of the chart shaft is engaged and which permits of employing a chart and inclosing chart casing of much less diameter than would be required were another form of gear employed in lieu thereof, and it will be obvious from the above description that the improved scale or balance is capable of considerable modification without material departure from the principles and spirit of the invention and for this reason I do not desire to be understood as limiting myself to the precise form and arrangement of the several parts herein set forth in carrying out my invention in practice.

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

1. A scale having a movable pan or platter to receive an article to be weighed, indicating means comprising a movable part, an actuating member mounted to turn and connected to operate the movable part of the indicating means, a flexible part connected to and arranged to wind upon the perimeter of the actuating member and having operative connection with the pan or platter and a plurality of segments in close relation at the perimeter of the actuating member and adjustable for causing their outer parts to engage the flexible part at greater or less distances from the pivotal axis of the actuating member.

2. A scale having a movable pan or platter to receive an article to be weighed, indicating means comprising a movable part, an actuating member mounted to turn and connected to operate the movable part of the indicating means, a flexible part connected to and arranged to wind upon the perimeter of the actuating member and having operative connection with the pan or platter, devices mounted at the perimeter of the actuating member and adjustable toward and from the pivotal axis thereof for variable engagement with said flexible part and means for holding said respective devices in adjusted position.

3. A scale having a movable pan or platter to receive an article to be weighed, indicating means comprising a movable part, an actuating member mounted to turn and connected to operate the movable part of the indicating means and comprising a body portion having spaced upper and lower segments, a series of intermediate segments held between said spaced segments of the body portion and adjustable to vary the projection of their perimetral parts beyond the pivotal axis of the actuating member and a flexible part affording driving connection from the pan or platter to the actuating member and arranged to wind over said adjustable segments.

4. A scale having a movable pan or platter to receive an article to be weighed, an actuating member mounted to turn, a flexible part affording driving connection from the pan or platter to the actuating member and arranged to wind thereon, a cylindrical indicator rotatively mounted and inclosing the actuating member and gearing comprising an internal gear surface connected with the actuating member and a spur gear con-

nected with the indicator for operating the latter from said actuating member.

5. A computing-scale having a movable pan or platter adapted to receive articles to be weighed, an actuating-member mounted to turn, a flexible member affording driving-connection from the pan or platter to the actuating-member and arranged to wind on the latter, a horizontal, cylindrical indicator rotatively-mounted and inclosing its said actuating-member which is suitably engaged therewith, and an indicator retarding or cushioning device comprising a vertical cylinder carrying a supply of oil and a bladed-wheel mounted to turn therein and having driving gear-connection with the indicator to prevent undue oscillation thereof.

6. A computing-scale comprising therein a horizontal cylindrical casing having a longitudinal sight-aperture, a transparent filling in such aperture, an indicator-chart mounted to turn within said casing and having thereon peripheral graduations in annular series, a positive indicating means comprising inner and outer wires extended or stretched longitudinally along the inner and outer faces, respectively, of said filling in the sight-aperture, the inner wire being adjacent but not touching the graduated periphery of the indicator-chart and the outer wire being adapted for alinement with said inner wire to readily and positively permit a correct line of vision for reading said indicator-chart.

7. A scale comprising a casing having a sight aperture, an indicator chart mounted to turn therein and having circumferential series of graduations, side by side, upon its perimeter, slides movable in and out of position across the sight aperture and registering, respectively, with the several circumferential series of graduations upon the indicator chart, detents for holding the respective slides when moved in one direction across the sight aperture, means for disengaging the detents from the slides upon the return of the chart to normal position after each operation thereof, and means for moving the slides reversely across the aperture, when released by the detents.

8. In computing-scales of the character described, platform supporting means, rotatable indicator means including a shaft therein carrying a pinion indicator-actuating means, connections between said indicator-actuating means and said platform supporting means for operating the former from the latter and an open, skeleton frame carried by said indicator-actuating means and comprising therein a counterbalance-weight and an internally-toothed curved rack bar or segment meshing with said pinion.

Signed at Wheeling, W. Va., this 14th day of January 1907.

ROBERT D. H. ANDERSON.

Witnesses:
H. E. DUNLAP,
C. A. MATHENEY.

674,883 Price Scales S.C.H.
614,851 " " S.C.H.
727,299 " " P.P.
628,599 " " P.P.
808,048 " " P.P.
523,735 Pend "
800,748 " "
Reg (100) 5,264 Price Scales
801,558 " " S.C.H.
722,173 Pend. Scales
600,837 Price " S.C.H.