No. 650,231. Patented May 22, 1900.

J. W. CULMER.

COMPUTING SCALE.

(Application filed Nov. 30, 1898.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

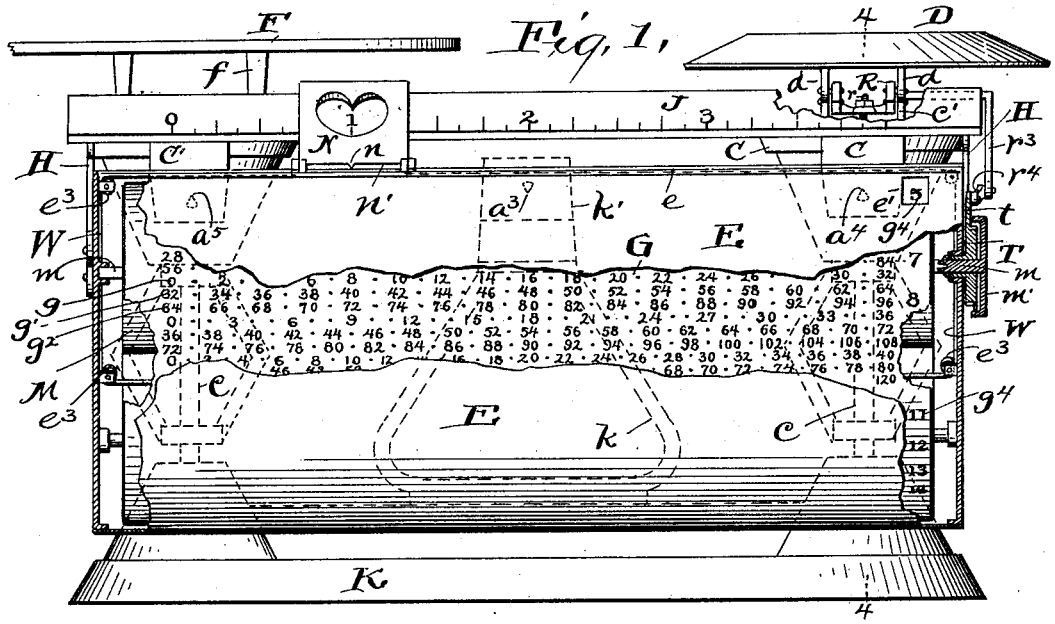
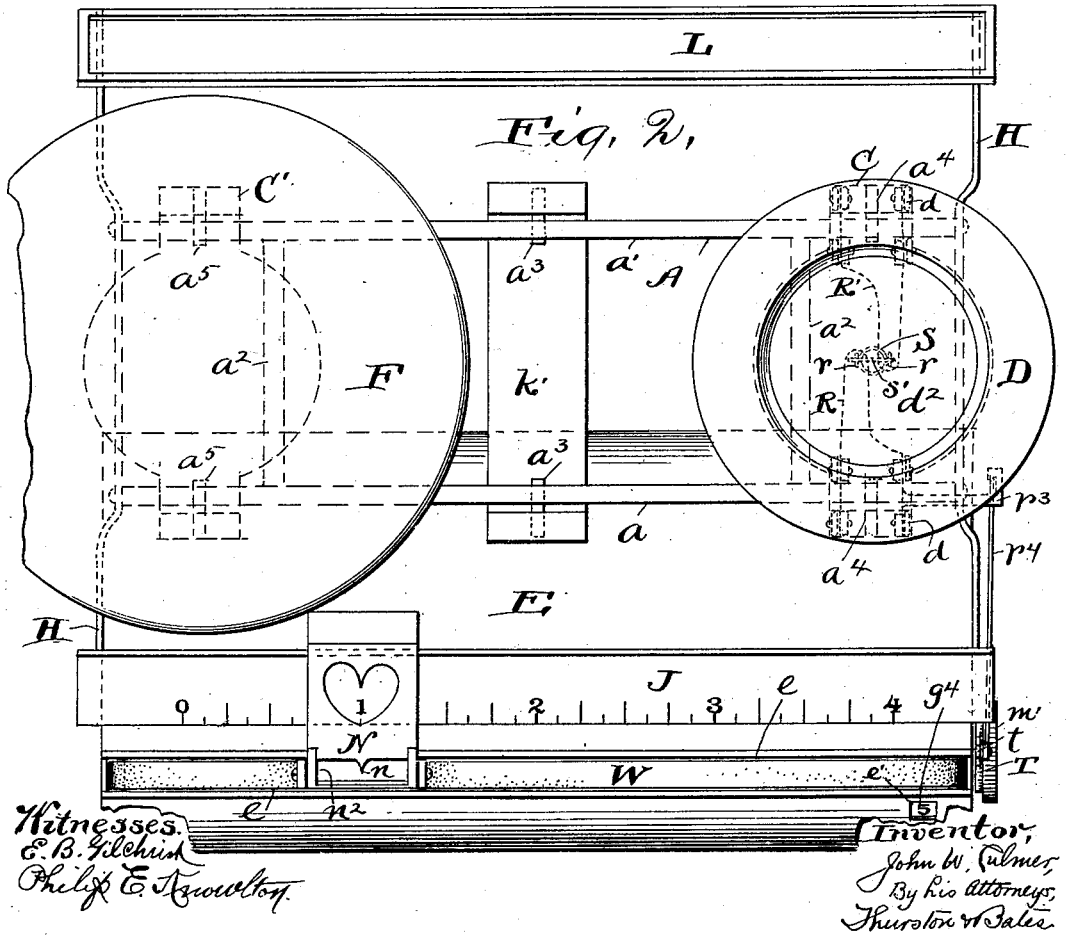


Fig. 2.



Witnesses.
E. B. Gilchrist
Philip E. Knowlton.

Inventor,
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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(No Model.) 2 Sheets—Sheet 2.

Fig. 3.

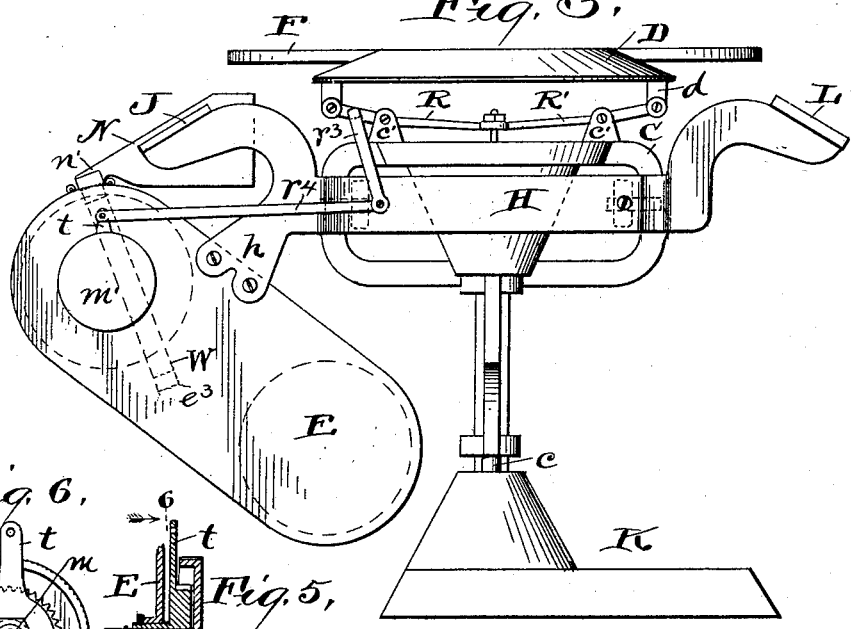


Fig. 6.

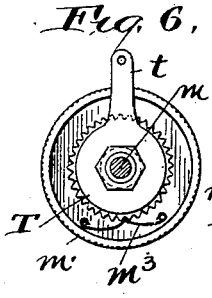


Fig. 5.

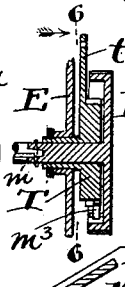
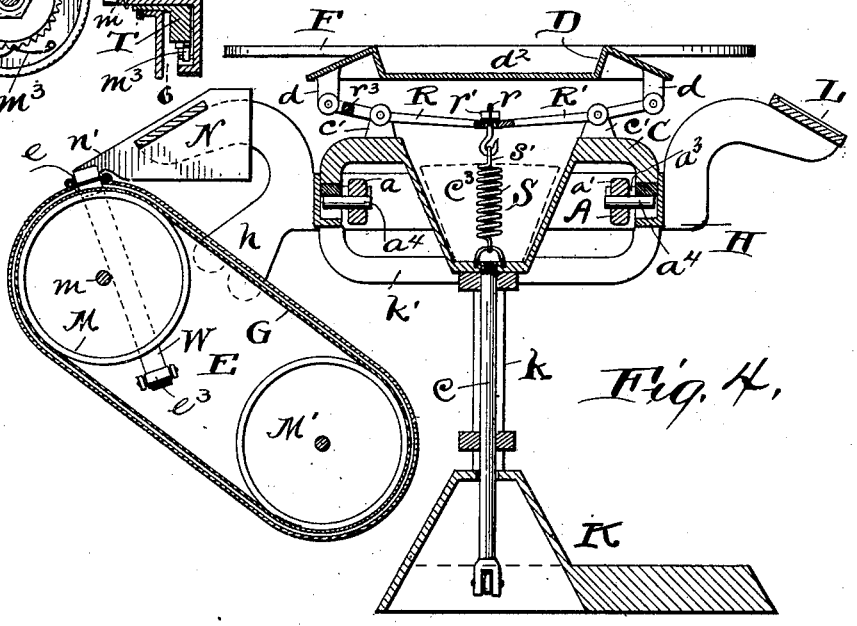


Fig. 4.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN W. CULMER, OF CLEVELAND, OHIO, ASSIGNOR TO THE NATIONAL COMPUTING SCALE COMPANY, OF SAME PLACE.

COMPUTING-SCALE.

SPECIFICATION forming part of Letters Patent No. 650,231, dated May 22, 1900.

Application filed November 30, 1898. Serial No. 697,832. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. CULMER, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Computing-Scales, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

My invention relates to a computing-scale, and it is particularly applicable to the class known to the art as "even balances."

The invention has for its objects the organization of a structure which will support its several elements squarely upon its pivots, and thus avoid torsion of the beam and undue load upon the working side, which will automatically move the computing-chart to bring into view after the scale has been set for the selected rate figures which indicate values of articles balanced by the sliding poise and an added counterweight and will when the counterweight is removed automatically return the computing-chart to the position wherein it will indicate values of articles balanced by the sliding poise alone, which will furnish a larger number of computations based upon a greater range of prices than like scales now in use, and which will be simple, durable, and easily operatable.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter set forth and claimed.

In the drawings, Figure 1 is a front elevation of a scale embodying my invention, a part of the computing-chart case being broken away to show the chart. Fig. 2 is a plan view of said scale. Fig. 3 is an end view. Fig. 4 is a sectional end view, the section being on line 4 4 of Fig. 1. Fig. 5 is a longitudinal sectional view of the projecting end of the shaft of roller M and the mechanism carried thereby, and Fig. 6 is a sectional view on line 6 6 of Fig. 5 looking in the direction indicated by the arrow.

Referring to the parts by letters, K represents the hollow base of the scale, which may have any convenient form. Midway between its ends is a vertical standard k, (indicated by dotted lines in Fig. 1,) which carries at its upper end a crotch-bar k', in the ends of which the beam A is fulcrumed. The beam, as shown, is an open frame, having the parallel front and rear sides a a' and the connecting cross-bars a^2 a^2. (Shown in dotted lines in Fig. 2.) The knife-edges a^3 a^3, which serve as the fulcrum of the beam, are secured to said side bars a a' and rest upon the bearings provided for them in the ends of the crotch-bar k'. Two pairs of alined knife-edges a^4 a^5 (shown in dotted lines in Fig. 2) are secured to the side bars of the beam at equal distances from its fulcrum. The crotch-bars C C' are supported on these knife-edges, and each crotch-bar has a stem c, which extends vertically down into the base, where the small check-rods or other mechanism may be provided for maintaining these stems in the vertical position as the beam vibrates on its fulcrum. The crotch-bar C' has the load-supporting platform F secured to its upper side by means of the feet f. A counterweight-holder, which is shown in the form of a platform D, is movably supported on the crotch-bar C by means which will be presently explained.

The cross-bars H H are secured to the ends of the beam or frame A by any suitable means. These bars extend both in front and behind the beam. The bar J, which is graduated to indicate weights, is secured to the front ends of these cross-bars. A bar L is secured to their rear ends, and this bar serves to counterbalance in whole or in part the weight carried by the beam in front of its pivots, whereby both fulcrum knife-edges a^3 a^3 are held squarely on the bearings provided for them. These cross-bars H are also extended forward and downward, and to these extensions h is secured the case E, which supports and incloses the computing-chart. This computing-chart may be the surface of a cylinder—as, for example, the cylindrical roller M shown in Fig. 4—and in such event the chart-case will be of suitable form to contain it. In the construction shown, however, which is believed to be the best, the computing-chart is in the form of an endless belt G, which encircles the two rollers M M', which are mounted in the ends of the case. The case is suitably shaped to hold these rollers and the endless

belt, having the substantially-straight front and rear sides and semicircular upper and lower ends. This case is secured in an inclined position to the cross-bars H H, whereby the lower rear end of said case extends back beyond the front beam-pivot. The weight of the case does not therefore so much tend to lift the rear fulcrum knife-edge from their bearings as it would if the weight of said case were supported wholly in front of both fulcrum-pivots. In the top of this case is a slot *e*, which extends from end to end and through which the indicating-figures on the endless-belt chart may be read.

The endless-belt chart has on its outer surface a plurality of horizontal rows of value-indicating figures adapted to indicate values at various rates per unit. The graduated beam J, as shown, is graduated for four pounds, and the poise N, which slides upon this beam, is of such weight as to balance on the load-plate the weight which the poise indicates upon the beam. This selection of four pounds as the capacity of the scale without counterweights is arbitrary, and the scale may be organized for any capacity. Being organized to weigh four pounds, the primary rows *g* of value-indicating figures on the chart are calculated to indicate the value of four pounds or fractions thereof at the various rates per pound. Take, for example, the value-indicating row *g*, associated with the rate of eight cents per pound, as shown. The poise N, or rather a pointer *n*, carried by the poise, when the poise indicates one pound on the graduated beam J points or registers with the figure "8" in this row, provided, of course, the row has been brought into view beneath the slot *e* in the case. Other rows *g* are calculated to show the values at other rates per pound of articles balanced by the poise alone, there being as many of such rows as are desired. Any row of value-indicating figures on this chart may be brought beneath the slot *e* by turning the upper roller or chart-carrier, the shaft of which projects through at one end of the case and has a small hand-wheel *m'* secured to its projecting end.

As before stated, the capacity of the scale may be increased by placing counterweights on the platform D. These weights may be of any size, but it is best to employ weights whose value is equal to the normal capacity of the scale (in the present case four pounds) or some multiple thereof. The actual weight of any article on the load-platform is ascertained by adding the weight value of the counterweight used to the weight indicated by the poise when the scale is in the balance. Thus if a four-pound counterweight is placed on the weight-platform D and the poise indicates one pound on the beam J when the beam is in balance the article being weighed weighs five pounds. If the counterweight of the platform D is eight pounds, the weight of the article under the circumstances assumed is nine pounds.

On the value-chart or endless belt G there are as many supplemental rows of value-indicating figures associated with each rate per pound as are desired, each of these additional rows being adapted to indicate the value at the selected rate of any article balanced by a selected counterweight plus the poise. The row of value-figures indicated by g' in Fig. 2 shows the value of four pounds plus the weight indicated by the poise on the beam J. Therefore the first figure in this row g', associated with the rate of eight cents per pound, will be "32," which is the value of four pounds at eight cents per pound. The value of five pounds in row g', "40," is in line below the value of one pound in row *g*, and the other figures are correspondingly arranged, being in all cases the value at the selected rate of the article balanced by the four-pound counterweight plus the poise. The row of figures indicated by g^2 shows the value of eight pounds plus the weight indicated by the poise when the scale is in the balance. Thus at the rate of eight cents per pound the first figure in this row is "64." There may be as many of these additional rows as desired corresponding with the number of additional weights which it is proposed to use. The row g' is directly below the row *g*, and the row g^2 is directly below it. Rows corresponding with g' and g^2 are placed in like relation to the rows *g*, associated with all of the other rates per pound.

Means are provided whereby after the value-chart has been set at the proper rate—that is to say, so set that the principal row *g*, associated with the selected rate, will be brought beneath the slot *e*—the addition of a counterweight to the holder D will cause the chart to move to carry beneath the slot *e* that one of the rows g' g^2 of value-figures which indicates the value of an article which would be counterbalanced by the added weight and the poise.

The weight-holder is a plate D, which is vertically movable relative to the crotch-bar C and beam A. It is upheld by suitable means, whereby when a counterweight is placed upon the holder said holder will descend more or less relative to the crotch-bar C, and mechanism is provided whereby this relative downward movement of the platform is transmitted to the chart carrier or roller M in such manner that the roller is turned to bring below the slot *e* that row of value-indicating figures which is associated with the added weight. The precise construction of the mechanism for this purpose which the drawings show is the following: The crotch-bar C has between its ends a depression or cup c^3. On the opposite sides of this depression are the two pairs of ears c', to which the two levers R R' are pivoted. The feet *d*, which are secured to the under side of the plate D, are pivotally connected with the outer ends of these levers. The threaded stems of hooks *r* pass loosely through holes in the inner ends

of these levers and are adjustably upheld by the nuts r'. The lower ends of these hooks engage with the loop s' upon the upper end of an expansible coiled spring S, the lower end of which is secured to the bottom of the depression c^3. This spring is of such force as to normally uphold the holder D in substantially the position shown; but it will yield and permit the holder to move downward a distance proportionate to the weight placed upon it. Thus if a four-pound weight depresses the platform one-fourth of an inch an eight-pound weight will depress it one-half an inch, and so on. Mounted upon the projecting end of the roller-shaft m is a circular disk T, having a serrated edge and arm t. A crank-arm r^3 is attached to one of the levers R, and a link r^4 is pivotally connected at its ends with this crank-arm and with the arm t. On the inner side of the hand-wheel m' a spring-pawl m^3 is mounted, and it engages with the serrated edge of the disk. One may take hold of this hand-wheel and turn the roller without moving the serrated disk, because the pawl will slip over its serrated edge, and by this movement of the roller any one of the primary rows g of value-indicating figures on the chart may be brought beneath the slot. It might be here stated that in a column at the right of the horizontal rows of value-indicating figures are the figures g^4, (shown in Figs. 1 and 2,) indicating the various rates per pound, and these various figures are so arranged that they appear through the hole e' in the case E when the primary row of value-indicating figures at the rate indicated by said figures is beneath the slot e. When the chart has been adjusted, as above described, with the proper row of value-indicating figures beneath the slot e, a weight is placed upon the holder D in a central depression d^2 therein. This causes the holder to descend a distance proportionate to such weight, and this downward movement of the holder is transmitted through the described mechanism to the cylinder M, with the result that such cylinder is caused to turn a distance proportionate to the downward movement of said holder, whereby the proper row of value-indicating figures is brought beneath the slot e. For example, if a four-pound weight be placed upon holder D it results in moving the cylinder a small distance only, but far enough to bring the associated row g' beneath the slot e. If an eight-pound weight be added, the cylinder is moved farther, so as to bring the associated row g^2 beneath the slot. In any event when the poise is moved along bar J, so as to bring the scale to balance, the pointer which said poise carries points to a figure on the chart, which indicates the value in cents at the selected rate of the article on the load-platform.

The poise N is provided with a foot n', through which a hole n^2 is formed, the pointer n being extended partly across this hole. This foot fits in the slot e. To opposite sides of this foot are secured the ends of an endless ribbon W, which extends in the slot to both ends thereof and around the four rollers e^3 e^3, mounted on the ends of the case. This ribbon conceals from view all of the value-indicating figures excepting only those which may be seen through the hole in the foot, and it likewise prevents to a large degree the settling of dust on the computing-chart.

I have shown what I believe to be the best form of mechanism for securing the vertical movement of the counterweight-holder and for transmitting such movement to the value-indicating chart to cause its movement as described; but I have no desire or intention that the claims shall be limited to this specific mechanism, except when plainly so limited by their terms, for I believe that I am the first to employ with a value-indicating chart of this general character in a scale any means whereby the additions of a counterweight will automatically shift the value-indicating chart so as to bring into the reading-line a row of value-indicating figures which indicate the value of any article balanced by said weight and the poise.

As has been suggested at another point in this specification, a weight or weights may be used in place of the spring S as the means for supporting the weight-upholding platform. Such a weight is indicated in dotted lines in Fig. 4 as being suspended from the hooks r.

Having described my invention, I claim as new—

1. In a scale the combination of a pivoted beam, and movable poise, a movable value-indicating chart supported by said beam, said chart having for each rate per unit two rows of value indications, one for indicating the value of articles balanced by the poise alone and one for indicating the value of articles balanced by the poise and an added counterweight, with a counterweight-holder which is yieldingly supported on the beam and is movable relative thereto under the influence of the counterweight, and mechanism intermediate of said counterweight-holder and chart whereby the former moves the latter to bring a new row of indications on the chart into the reading-line, substantially as specified.

2. In a scale the combination of a pivoted beam, a bar pivotally supported on one end of said beam, levers pivoted to said bar, a counterweight-holder supported on said levers, and a yielding device which normally prevents the rocking of said levers and consequent depression of said holder but yields and permits such movement of the levers and holder when a counterweight is placed upon the latter, with a movable value-indicating chart having a plurality of rows of value-indicating figures associated with each rate per unit, and mechanism intermediate of one of said levers and chart whereby the movement of the former is transmitted to the chart, substantially as and for the purpose specified.

3. In a scale the combination of a pivoted

beam, a bar pivotally supported on one end of said beam, levers pivoted to said bar; and a counterweight-holder yieldingly supported on said lever and adapted to be depressed relative to the bar by the addition of a counterweight, with a rotating chart-carrier mounted on the beam, an oscillating clutching device mounted concentric with said chart-carrier, a crank-arm on one of the levers and a link connecting said crank-arm and clutching device, substantially as and for the purpose specified.

4. In a scale the combination of a pivoted beam, a bar pivotally supported on one end of said beam, a counterweight-holder yieldingly supported by said bar and adapted to be depressed relative thereto by the addition of a counterweight, with a rotatable chart-carrier mounted on the beam, a serrated disk and spring-pawl, one loosely mounted on the shaft of said carrier and one secured thereto, and mechanism connecting said loosely-mounted member and yielding counterweight-holder whereby the movement of the latter causes a movement of the former upon its axis, substantially as specified.

5. In a scale the combination of a pivoted beam, a bar pivotally supported on one end of said beam, levers mounted on said bar, a counterweight-holder pivotally supported on the outer ends of said levers, and a yielding device engaging with the inner ends of said levers with a rotatable chart-carrier, a mechanism whereby the downward movement of the holder relative to the beam turns said chart-carrier, substantially as specified.

6. In a scale the combination of a pivoted beam having two alined fulcrum-pivots, a computing-chart case of oblong cross-section secured to said beam and extending downwardly and rearwardly under one of the beam-pivots, said case having a longitudinal slot, with a movable computing-chart in said case, having a plurality of horizontal rows of value-indicating figures and adapted to be moved to bring a row beneath said slot, and a movable poise for registering with said value-indicating figures.

7. In a scale the combination of a pivoted beam, a computing-chart case secured to said beam having a longitudinal slot, and a movable computing-chart in said case, having a plurality of rows of value-indicating figures, with a movable poise having a foot extended over said slot, said foot having a hole through which the figures on the chart may be read, an endless ribbon secured at its ends to said poise and extending in both directions therefrom in said slot, and rollers at the end of the slot and in the case, around which said ribbon passes, substantially as specified.

8. In a scale the combination of a pivoted beam, a sliding poise, a rotatable chart-carrier secured to the beam, a counterweight-holder supported on one end of the beam and vertically movable relative thereto, means for resisting the downward movement of said holder, and mechanism intermediate of said holder and chart-carrier whereby the downward movement of the former causes the latter to turn upon its axis, substantially as specified.

9. In a scale the combination of a pivoted beam, a sliding poise, a bar pivoted on one end of said beam, levers pivoted to said bar and a counterweight-holder pivotally connected with the ends of said levers, with an expansible coil-spring connected at its upper end with the inner ends of said levers and at its lower end with said bar, a rotatable chart-carrier having associated with each rate per unit two rows of value-indicating figures, one adapted to indicate values of the load counterbalanced by the poise alone and one the value of the load counterbalanced by the poise and a counterweight on said holder, and mechanism intermediate of said levers and chart-carrier whereby the former moves the latter, substantially as specified.

10. In a scale the combination of a pivoted beam, a sliding poise, a bar pivoted on one end of said beam, levers pivoted to said bar and a counterweight-holder pivotally connected with the ends of said levers, with an expansible coil-spring connected at its upper end with the inner ends of said levers and at its lower end with said bar, a rotatable chart-carrier having associated with each rate per unit two rows of value-indicating figures, one adapted to indicate values of the load counterbalanced by the poise alone, and the other to indicate values of articles balanced by the poise and a counterweight on said holder, a serrated disk loosely mounted on the shaft of said rotatable chart-carrier, a hand-wheel secured to said shaft, a spring-pawl carried by said hand-wheel, a crank-arm on one of the levers which supports the counterweight-holder, and a link connecting said crank-arm with the serrated disk, substantially as specified.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

JOHN W. CULMER.

Witnesses:
ELLA SNYDER,
PHILIP E. KNOWLTON.