No. 702,927. Patented June 24, 1902.

J. W. CULMER.

SPRING BALANCE COMPUTING SCALE.

(Application filed June 26, 1900.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1.

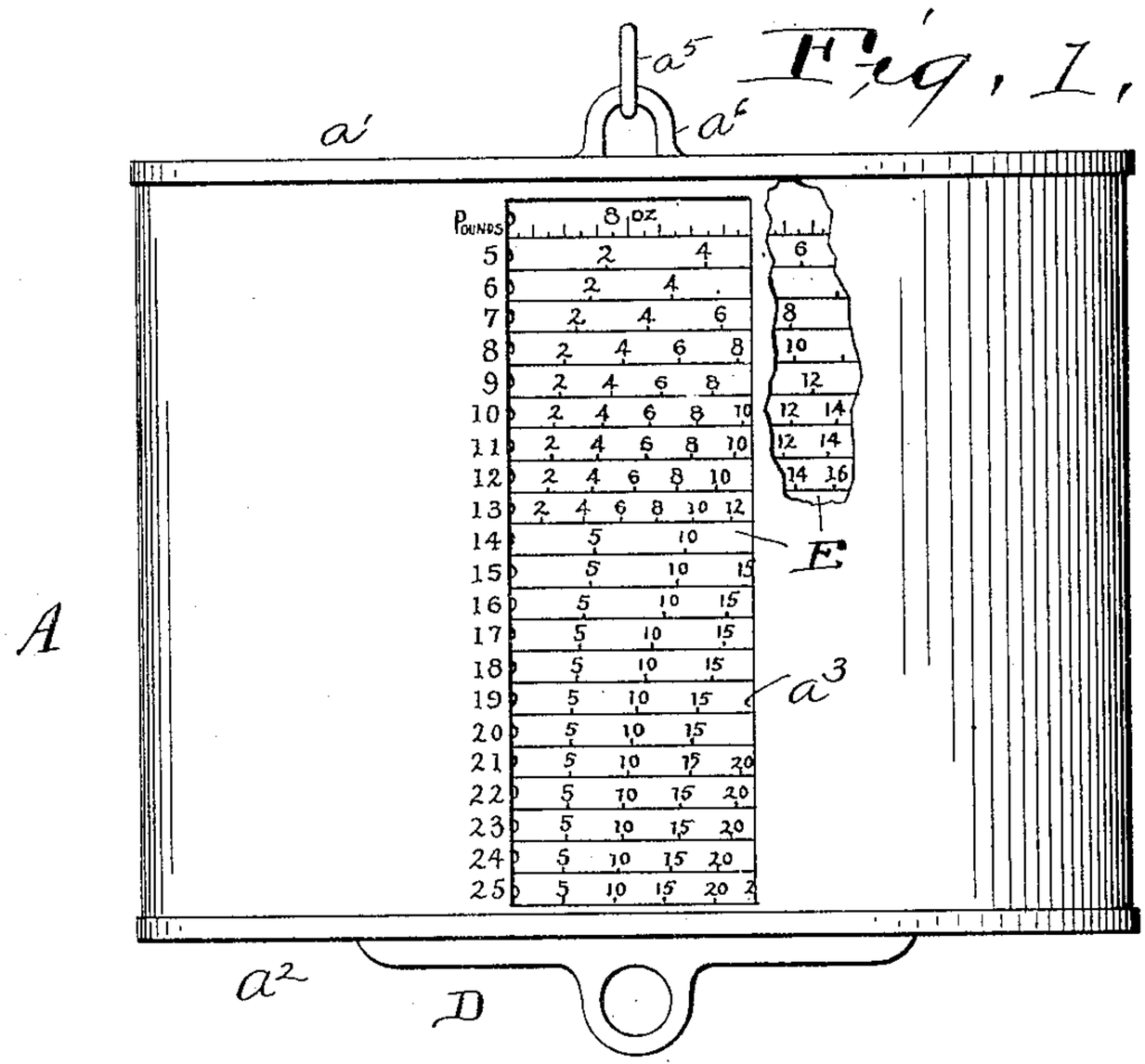
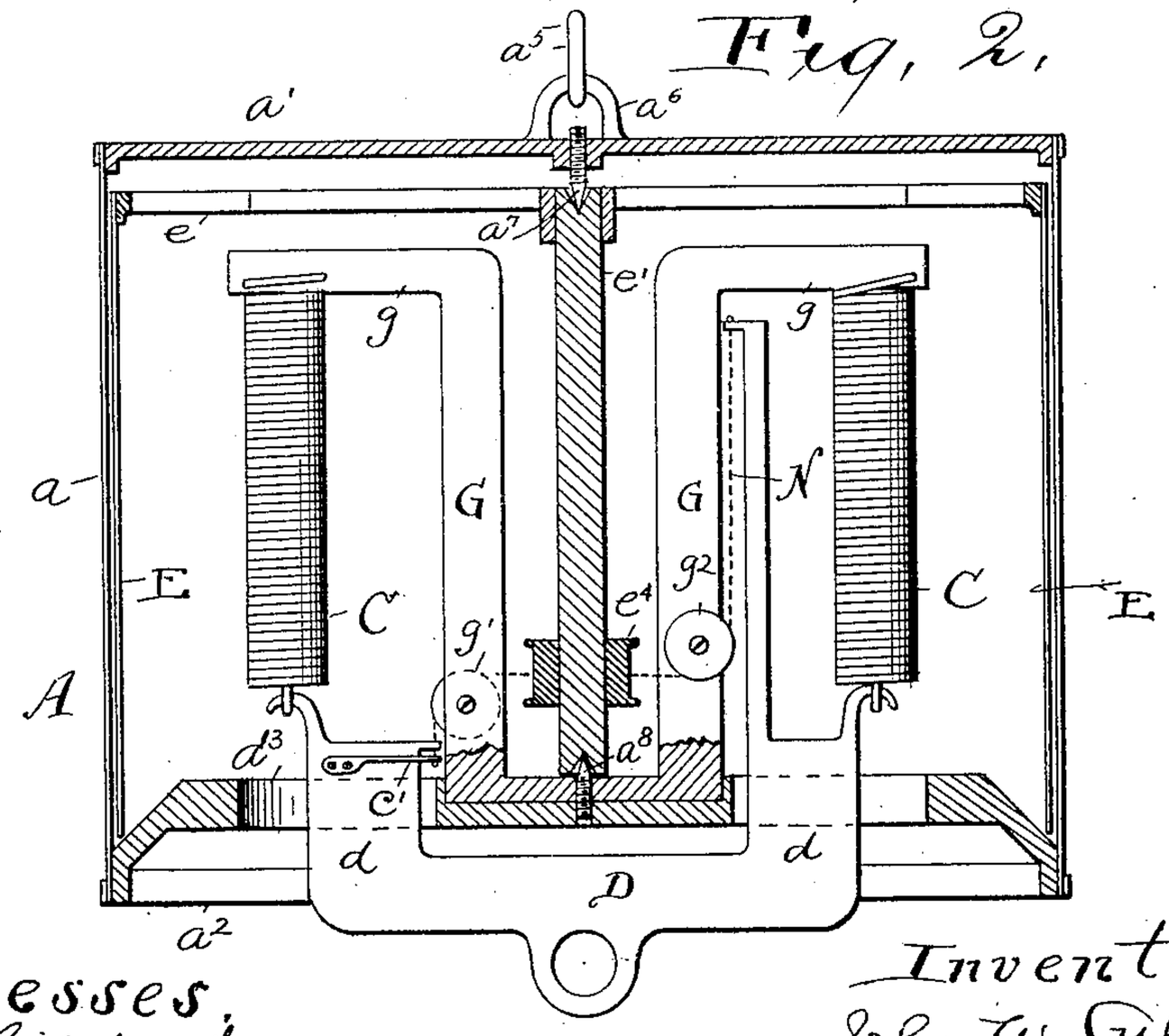


Fig. 2.



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F. D. Amnicu

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(No Model.) 4 Sheets—Sheet 2.

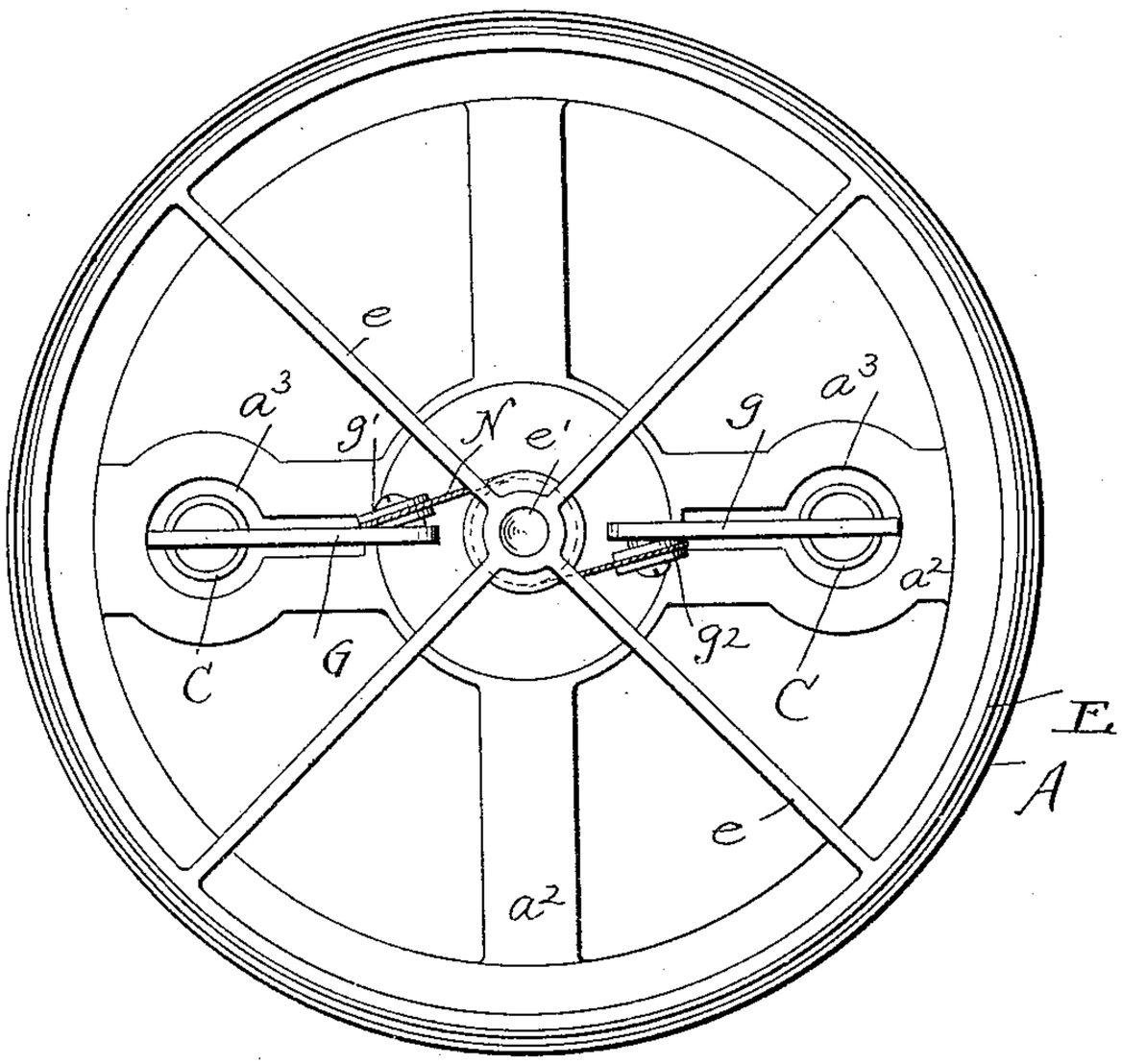

Fig. 3.

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(No Model.) 4 Sheets—Sheet 3.

Fig. 5,

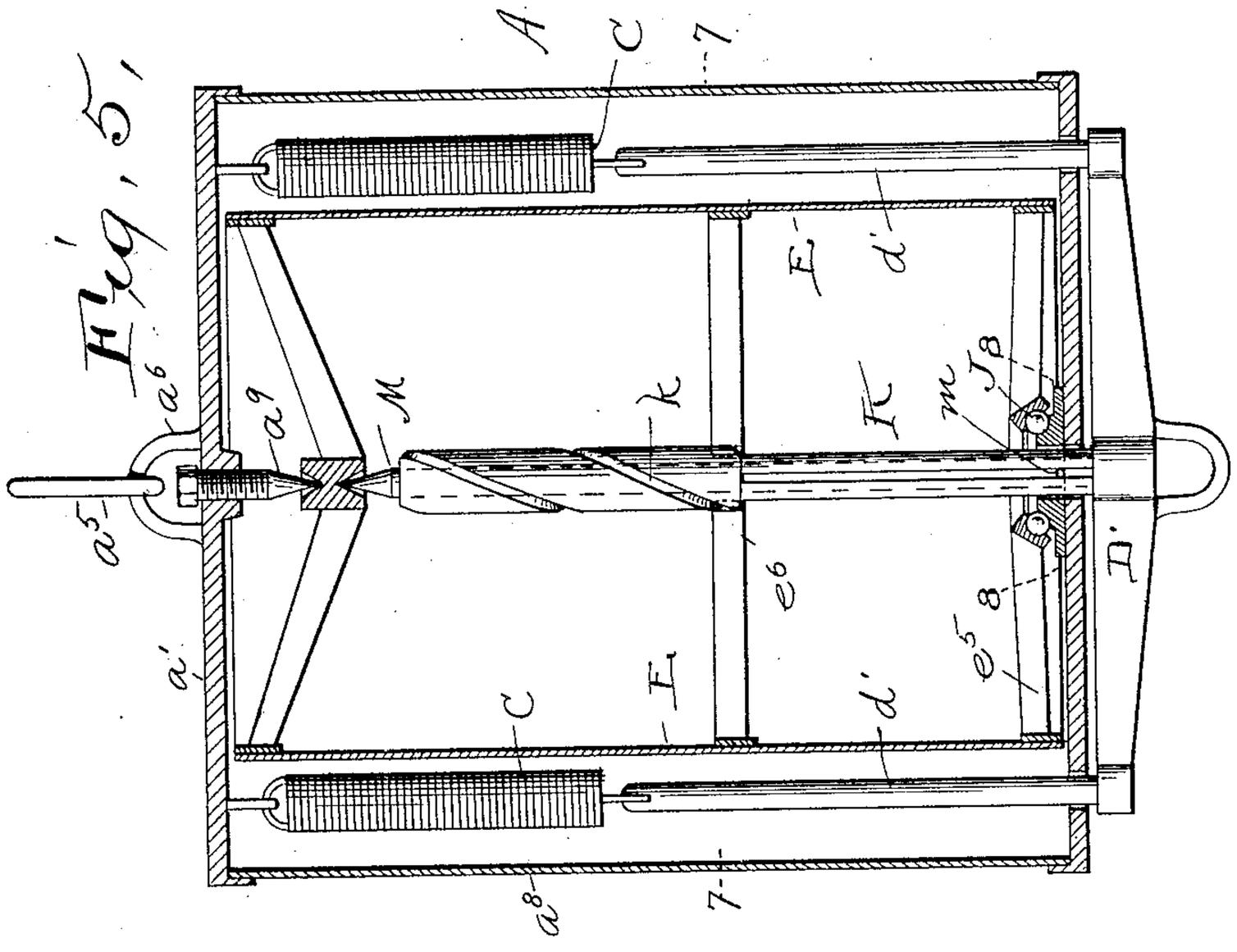
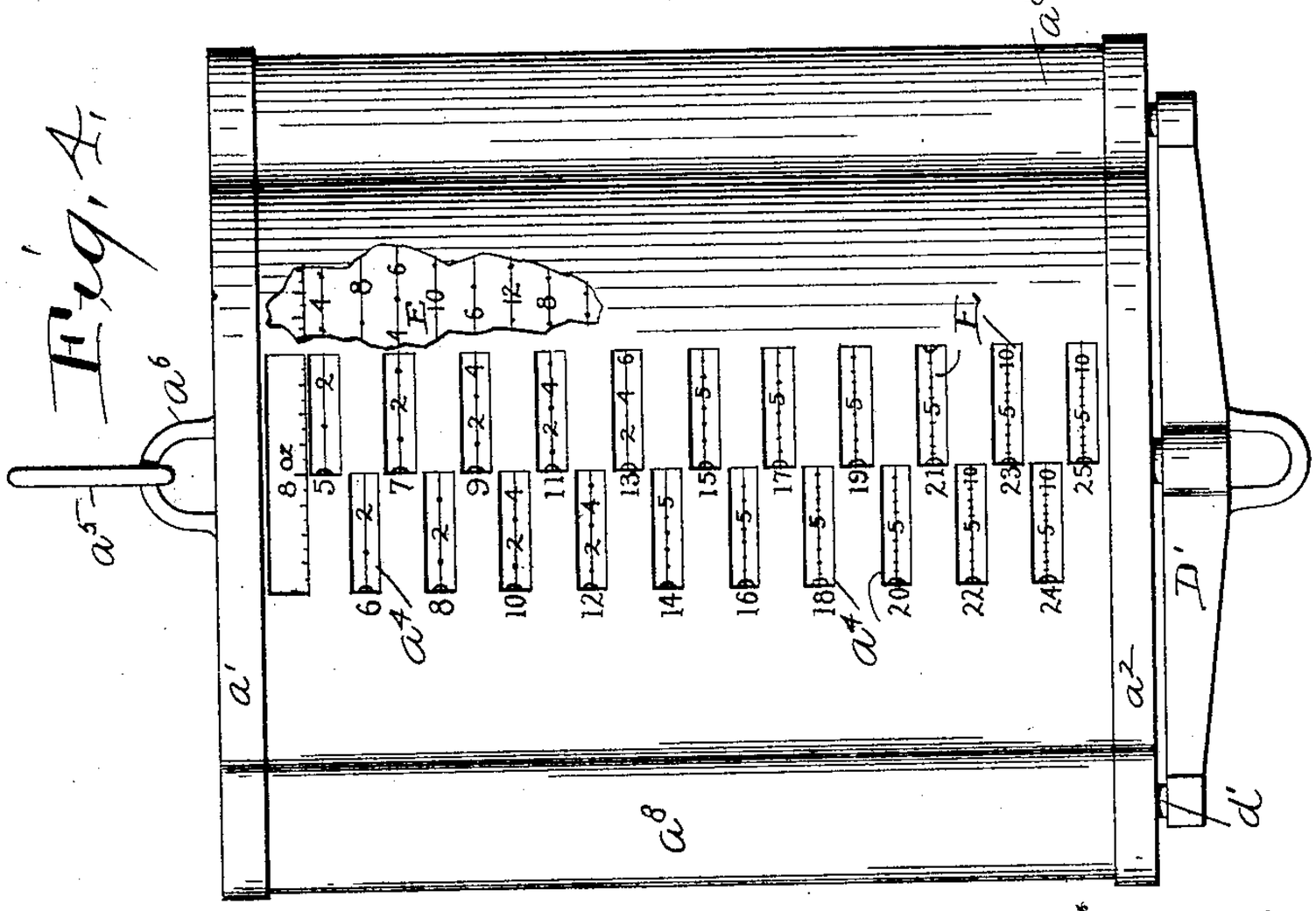


Fig. 4,



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(No Model.) 4 Sheets—Sheet 4.

Fig. 6.

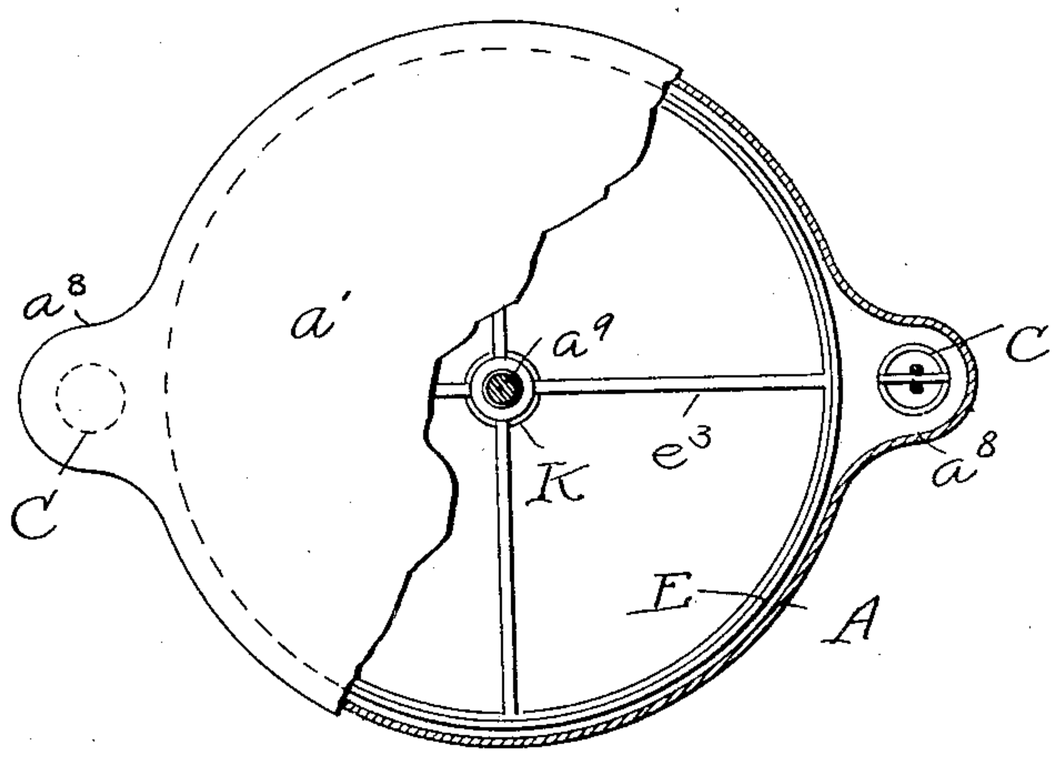


Fig. 7.

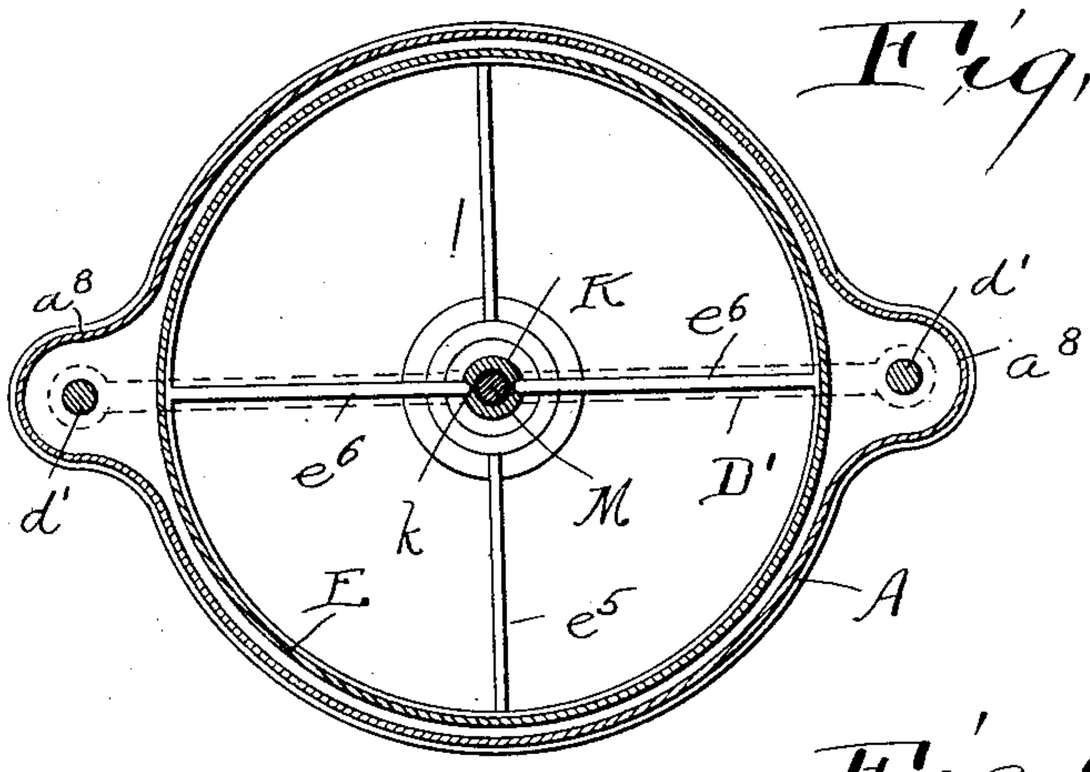
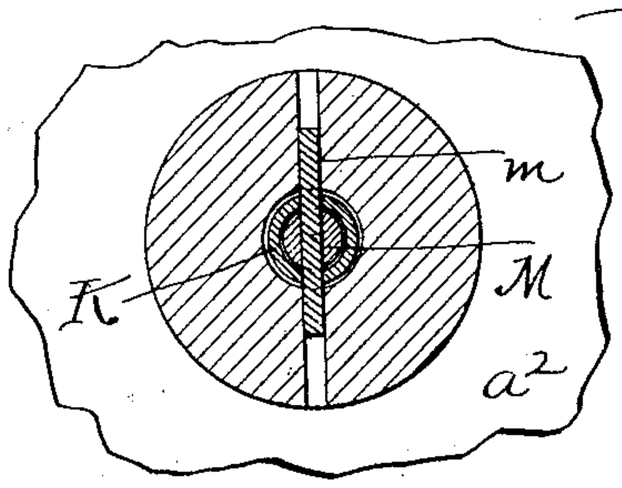


Fig. 8.



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UNITED STATES PATENT OFFICE.

JOHN W. CULMER, OF CLEVELAND, OHIO, ASSIGNOR TO THE NATIONAL COMPUTING SCALE COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

SPRING-BALANCE COMPUTING-SCALE.

SPECIFICATION forming part of Letters Patent No. 702,927, dated June 24, 1902.

Application filed June 26, 1900. Serial No. 21,590. (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 Spring-Balance Computing-Scales, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

My invention is an improvement in spring-balance computing-scales—that is to say, in spring-balance scales which are designed for the primary purpose of indicating the money values at various rates per unit of weight of articles loaded onto them.

The invention consists in the combination of computing mechanism consisting of a value-chart bearing horizontal rows of value-indicating figures calculated at different rates and a frame carrying rate-indicating figures arranged in proper relation to the said rows of value-indicating figures, one of said parts being rotatable relative to the other on a vertical axis, combined with a vertically-movable spring-suspended runner and mechanism for translating the vertical movements of the runner into rotary movements of the movable member of the computing mechanism.

It also consists in the more specific combinations of parts hereinafter described, as pointed out definitely in the claims.

In the drawings, Figure 1 is a front elevation of one embodiment of my invention. Fig. 2 is a central vertical section of the same. Fig. 3 is a plan view with the top plate removed. Fig. 4 is a front elevation of a modified form of the invention. Fig. 5 is a central vertical section of the same. Fig. 6 is a top plan view with a portion of the top plate broken away. Fig. 7 is a horizontal section on line 7 7 of Fig. 5. Fig. 8 is a horizontal sectional view on line 8 8 of Fig. 5.

Referring to the parts by letters, A represents the frame of the scale which is to be supported and is preferably suspended by a ring a^5, which passes through a loop a^6. This frame, as shown, consists of a drum a and top and bottom end plates a' a^2, respectively, secured to said drum. Within this frame A are two spring-hangers G G, having at their upper ends the laterally-extended arms g g, which hangers are rigid with the bottom plate a^2. In this bottom plate are openings a^3, through which the arms d of the runner D move freely. This runner is suspended from the lower ends of the two weighing-springs C C, whose upper ends are attached to the lateral arms g g of the spring-hangers G. Within this frame A is a value-chart E, preferably in the form of a light sheet-metal drum. In the upper end of this drum a spider e is secured, and to this spider an axial arbor e' is fastened. This arbor, and consequently the chart-drum E, is mounted so as to be capable of rotation about their vertical axis between the conical points a^7 a^8, which are screwed through the top and bottom plates a' a^2 and enter the cupped ends of said arbor.

In the drum a is either one sight-opening a^3, through which a portion of the surface of the chart-drum E may be seen, as shown in Fig. 1, or a plurality of sight-openings a^4, which are associated one with each row of value-figures on the drum, as shown in Fig. 4. Along the vertical reading edge of this sight-opening or these sight-openings, as the case may be, are placed rate-figures, which indicate the rate at which the values indicated by the figures on the associated rows on the chart are calculated. On the chart-drum are a plurality of graduated horizontal rows. In the upper row may be placed figures indicating weight, which figures are so arranged around the drum that when the drum is turned by a load hung from the runner the graduation in this row nearest the reading edge of the sight-opening in drum a will indicate the weight of said load. In the other rows are figures indicating the money values of the corresponding weight at the rate per unit which is found on the drum a adjacent to said row. When, therefore, the drum is turned, the value-indicating figures in any row adjacent to the reading edge of its sight-opening will indicate the value at the associated rate of any commodity whose weight is at the same time indicated by the weight-indicating figures in the top row.

One familiar with this art will understand that when a load is hung from the runner said runner will move downward a distance proportionate to such load. The means preferably employed for translating the vertical movement of the runner into a rotary movement of the chart-drum consists of a spool e^4 of proper size secured to the arbor e'. A cord N, which is secured to and wound upon said spool, has its ends attached to opposite arms $d\ d$ of the runner and two sheaves $g'\ g^2$, secured to the spring-hangers G G, over which sheaves said cord runs. The ends of this cord may be connected with the runner-arms through the spring c', which will take up the stretch of the cord and will keep it taut.

Any suitable translating mechanism may be employed, although that shown in Fig. 1 and hereinbefore described is preferred. In Figs. 4 to 8, inclusive, one alternative construction is shown. The chart-drum E has a spider e^3 secured in its upper end, which is cupped axially on both its top and bottom sides. It rests upon the conical upper end of a vertical post M, which is secured to the bottom plate a^2 of the frame A. A conical-pointed screw a^9, which passes through the top plate a' of said frame, engages with the cup in the top surface of said spider. The lower end of this chart-drum contains a spider e^5, which is mounted by ball-bearings J on the bottom plate of the frame. The weighing-springs C C in this case are supported directly from the top plate a' of the frame A and the runner D' is suspended from their lower ends. The weighing-springs and the vertical arms $d'\ d'$ of the runner are located in lateral enlargements a^8 of the frame A. A tube K is secured to the runner and is passed through an axial hole in the bottom plate and it embraces the post M. This post is fastened to the bottom plate by means of a pin m, which pin also passes through vertical slots in the tube K, and thereby prevents the rotation of said tube relative to the frame A. The upper part of this tube has external spiral grooves k, and into these grooves project the inner ends of arms e^6, which are secured to the chart-drum E. When a load is suspended from the runner, it is drawn downward proportionately and it draws the tube K downward. This tube cannot rotate, but can only move vertically, and therefore the chart-drum is compelled to revolve because of the engagement of the arms secured to it with the spiral grooves in the tubular member.

In the constructions shown and described the so-called "frame" A may be properly called a "case," since it entirely incloses all of the scale mechanism excepting so much of the runner as is below it, and therefore all of the said mechanism is protected from injury and from dust and dirt. This specific construction is not necessary to the broad invention, nor is it necessary that the chart shall be a complete drum capable of complete rotations.

Having described my invention, I claim—

1. In a spring-balance, the combination of an external case capable of being supported and having in its bottom guides for the runner, weighing-springs suspended by their upper ends within the case and from rigid parts thereof, a vertically-movable runner secured on the lower ends of said springs, and movable in the guides in the lower part of the case, with a chart-drum rotatably mounted on a vertical axis within said case and having external horizontal rows of value-indicating figures calculated at different rates, said external case being apertured whereby portions of said value-indicating rows may be seen, and corresponding weight-indicating figures adjacent to said aperturing and in the same plane with the corresponding value-indicating rows of figures, and mechanism for translating the vertical movements of the runner into rotary movements of the chart-drum, substantially as specified.

2. In a spring-balance, the combination of a case consisting of a drum and top and bottom end plates, means attached to the top plate for suspending said case, spring-supports within the case rigid with the bottom plate thereof, a runner movable vertically through said bottom plate, and weighing-springs which are connected at their upper ends with said spring-supports and at their lower ends with the runner, with a chart-drum which lies between said spring-supports and the vertical walls of the case which drum is mounted upon its vertical axis in said case, said chart-drum having its external surface divided into horizontal rows which are graduated and marked with computed values, said case-drum being apertured whereby said horizontal rows of graduations may be seen, rate-indicating figures adjacent to the value-indicating rows of the chart-drum, and mechanism for translating the vertical movements of the runner into rotary movements of the chart-drum, substantially as described.

3. In a spring-balance, the combination of a case, consisting of a drum and top and bottom end plates, spring-supports within the case rigid with the bottom plate thereof, a runner movable vertically through said bottom plate, and weighing-springs which are connected at their upper ends with said spring-supports and at their lower ends with the runner, with a chart-drum which lies between said spring-supports and the vertical walls of the case, an axial vertical arbor rigidly fastened to said chart-drum, which arbor is rotatably mounted in the case, a spool attached to the said arbor, a cord attached to and wound about said spool, and having its ends connected respectively with arms of the runner, and sheaves mounted on said spring-supports over which said cord runs, substantially as described.

4. In a spring-balance, the combination of a case, consisting of a drum and top and bottom end plates, spring-supports within the

case rigid with the bottom plate thereof, a runner movable vertically through said bottom plate, and weighing-springs which are connected at their upper ends with said spring-supports and at their lower ends with the runner, with a chart-drum which lies between said spring-supports and the vertical walls of the case, an axial vertical arbor rigidly fastened to said chart-drum, which arbor is rotatably mounted in the case, a spool attached to the said arbor, a cord attached to and wound about said spool and connected at its ends with the runner, and sheaves mounted on said spring-supports over which said cord runs, and a spring through which one end of said cord is connected with the runner, substantially as described.

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

JOHN W. CULMER.

Witnesses:
E. B. GILCHRIST,
E. L. THURSTON.