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D. OLMSTED.
PENDULUM SCALE.

No. 482,831.

Patented Sept. 20, 1892.

Fig. 1.

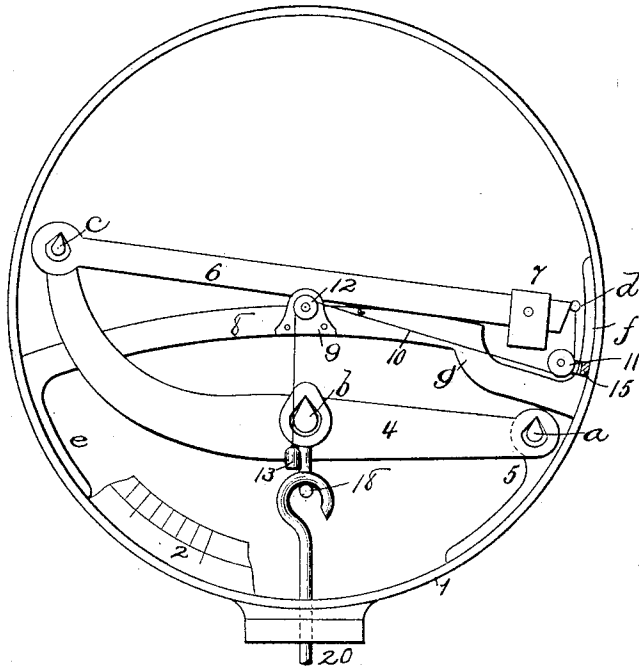


Fig. 2.

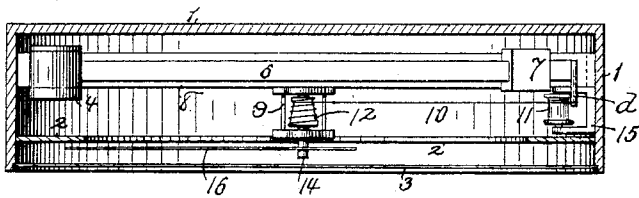
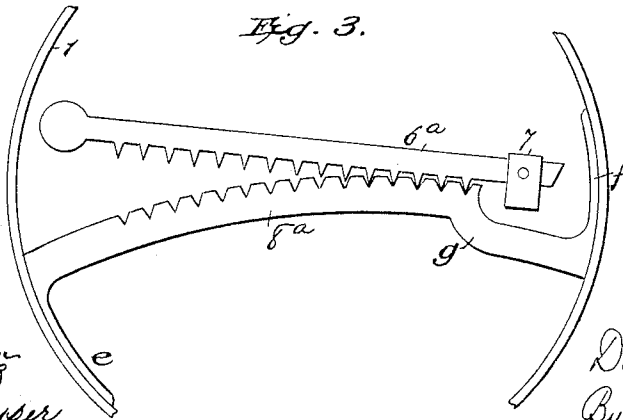


Fig. 3.



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PENDULUM-SCALE.

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Application filed January 29, 1892. Serial No. 419,679. (No model.)

To all whom it may concern:

Be it known that I, DAVID OLMSTED, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvemet in Automatic Weighing-Scales; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to automatic weighing-scales of the class generally known as "pendulum-scales."

The object of my invention is to provide weighing-scales which are simple in construction and accurate and automatic in operation, by means of which one may at once determine the weight of any article placed upon the platform without the necessity of adjusting any weights.

The matter constituting my invention will be defined in the claims.

I will now describe the details of construction of my improved scales by reference to the accompanying drawings, in which—

Figure 1 represents a front elevation with part of the annular dial-plate broken away. Fig. 2 represents a horizontal section through the casing, showing the mechanism of the scales in top plan view. Fig. 3 represents an elevation of a modified form of part of the mechanism.

I preferably provide a circular casing 1, having a solid back. An annular dial-plate 2 is secured near the front edge of the casing and inclosed at the front by a glass plate 3. A curved lever 4 is pivotally connected at one end by means of a pin or stud *a*, having a knife-edge to the bracket 5, secured to one side of the case 1, and is provided near its middle portion with a knife-edged stud or pin *b* and at its upper curved end with a pivotal knife-edged stud or pin *c*, to which is pivotally connected the straight lever 6, having at or near its opposite end the weight 7, and resting in its normal condition near its weighted end upon the curved or arched fulcrum-beam 8. This fulcrum-beam 8 is provided at its opposite ends with flanges *e* and

f, adapted to fit the curved wall of case 1, to which they are attached, so as to support the beam 8 transversely in the case, as shown, and said beam is preferably provided near its right-hand end with a downward offset *g*, so as to provide a recess for the weight 7, as shown in Fig. 1. At about the middle of beam 8 there is secured to its front side a bracket 9 for supporting shaft 14 and its connections. The straight lever 6 is provided at its free end with a short arm *d*, projecting forward at right angles to the lever and having attached to its outer end a cord 10, which passes over a pulley 11 just below arm *d*, and thence over the spirally-grooved cone-pulley 12, fixed on shaft 14 in bracket 9, and has attached to its free end the weight 13.

To the front end of shaft 14 is fixed the index-finger 16, extending radially outward over the annular dial-plate 2, as shown in Fig. 2. The pulley 11 is supported on a stud or pin in a bracket 15, secured to the wall of the casing near the end of curved beam 8. Instead of pulley 11 I may employ at this point simply a pin or stud as a guide over which cord 10 is passed to the cone-pulley.

By means of the cord and weight passing over grooved pulley 12 the motion of lever 6 is steadied and made more uniform, and at the same time shaft 14 and the pointer or index-finger 16 are given a positive motion and without the vibration and lost motion which occur when a rack and pinion are employed for moving the pointer. By means of the spirally-grooved cone-pulley variations in the spacing of the scale upon the annular dial-plate are compensated for, so as to secure greater accuracy in indicating the weight of various articles placed upon the scale.

Upon the knife-edge stud *b* on lever 4 is hung the hook 18, to which is connected rod 20, connecting at its lower end with the platform. (Not here shown.)

Instead of making the straight lever 6 and the curved fulcrum-beam 8 with plain bearing-surfaces, as shown in Fig. 1, they may be notched and pointed, as shown in Fig. 3, in which the curved beam 8^a is provided with a series of evenly-spaced notches and in which the straight lever 6^a is provided with a corre-

sponding series of evenly-spaced points or teeth fitting into the notches, as shown; but my invention is not confined to this construction.

5 As will be seen from the above description and the accompanying drawings, very few parts are used in my automatic weighing-scales and the arrangement of parts is very simple and effective. It will be understood
10 that as the weight is increased upon the scale-platform the lever 4 will be pulled down, carrying with it the straight lever 6, and the fulcrum on curved beam 8 will be shifted from right to left, so that the weight 7 and the free
15 end of lever 6 will exert a progressively-increasing leverage in proportion to the weight of the article upon the scale-platform. The scale being balanced, as shown in Fig. 1, and the article to be weighed being placed
20 upon the platform, the levers 4 and 6 will be depressed, and on account of the fulcrum-point being progressively changed or shifted to the left the weight 7 will act with increasing resistance until the article is balanced.
25 As the free end of lever 6 is raised the cord 10 is drawn over pulley 11 and the grooved cone-pulley 12, turning such pulley and the shaft to which it is attached, and thereby traversing the index-finger 16 over the annular
30 dial-plate 2, where the weight of the article is indicated. This movement of the index-finger is effected without any oscillation or vibration, since by means of the weighted cord and grooved pulley there is no lost motion be-
35 tween the parts, and the weight of the article is more accurately and quickly ascertained. In actual practice it is found that as the weight grows heavier upon the platform the indications upon the dial grow smaller. This
40 is illustrated in the making of dials for steam-gages. Each dial is marked separately and a division of the inequalities made to make them look uniform. This will not do for accurate weighing, and hence the introduction
45 of the cone-pulley. According to its shape or formation the needle or pointer may be governed in its action to gain or lose, as desired.

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

1. The lever 4, provided near its middle portion with a stud *b* and pivoted at one end to a fixed support and having the other end curved upward, and the straight lever 6, pivotally connected to such curved end of lever 4 and having at or near its free end a weight, in combination with the curved fulcrum-beam 8, fixed transversely in the casing, an index-finger and means for operating it connecting with lever 6, and the platform-rod hung upon stud *b*, substantially as described.

2. The curved lever 4 and the weighted straight lever 6, pivotally connected, as described, in combination with the curved fulcrum-beam 8, supporting-lever 6, said beam having supported thereon a shaft carrying a pulley and index-finger, a guide adjacent to the end of said beam, a cord attached to the end of lever 6 and passing over said guide and pulley, and a weight attached to the free end of the cord, substantially as described.

3. The curved lever 4 and weighted straight lever 6, pivotally connected, as described, in combination with the curved fulcrum-beam 8, the shaft 14, carrying grooved cone-pulley 12, and index-finger 16, supported on said beam 8, pulley 11, and a cord 10, attached to the end of lever 6, passing over pulleys 11 and 12 and having a weight attached to its free end, substantially as described.

4. In combination with lever 6, fulcrumed upon the curved beam 8, a suitably-supported rotary shaft carrying a cone-pulley and index-finger, a guide near the end of beam 8, and the weighted cord attached to the free end of lever 6 and passing over said guide and pulley, substantially as described.

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

DAVID OLMSTED.

Witnesses:

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