(No Model.)

E. S. CHASE & C. E. SMOCK.

PENDULUM SCALE.

No. 475,295. Patented May 24, 1892.

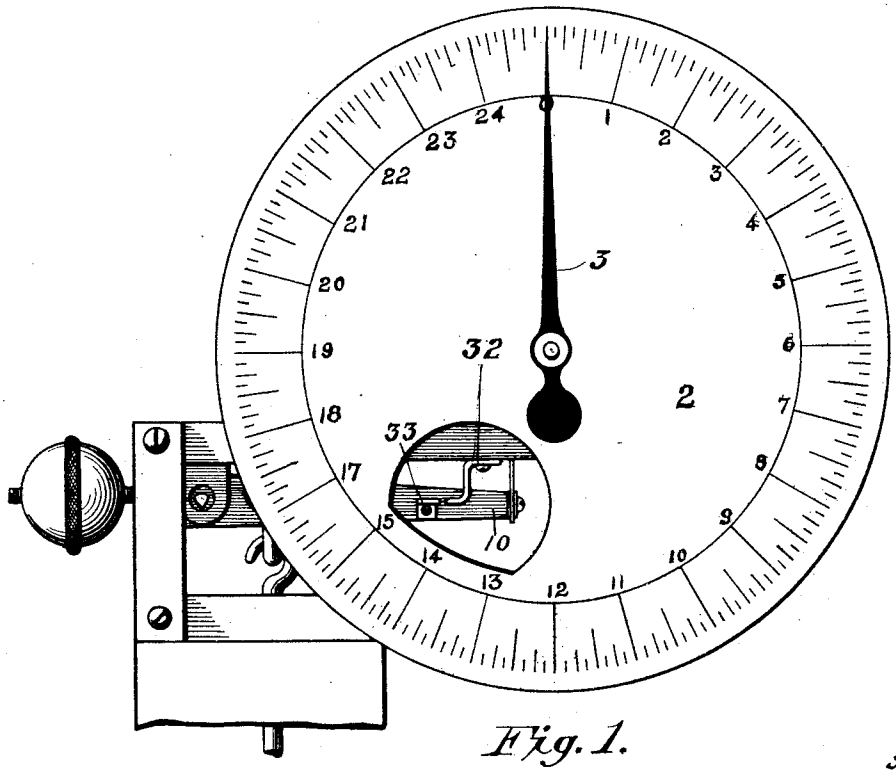

Fig. 1.

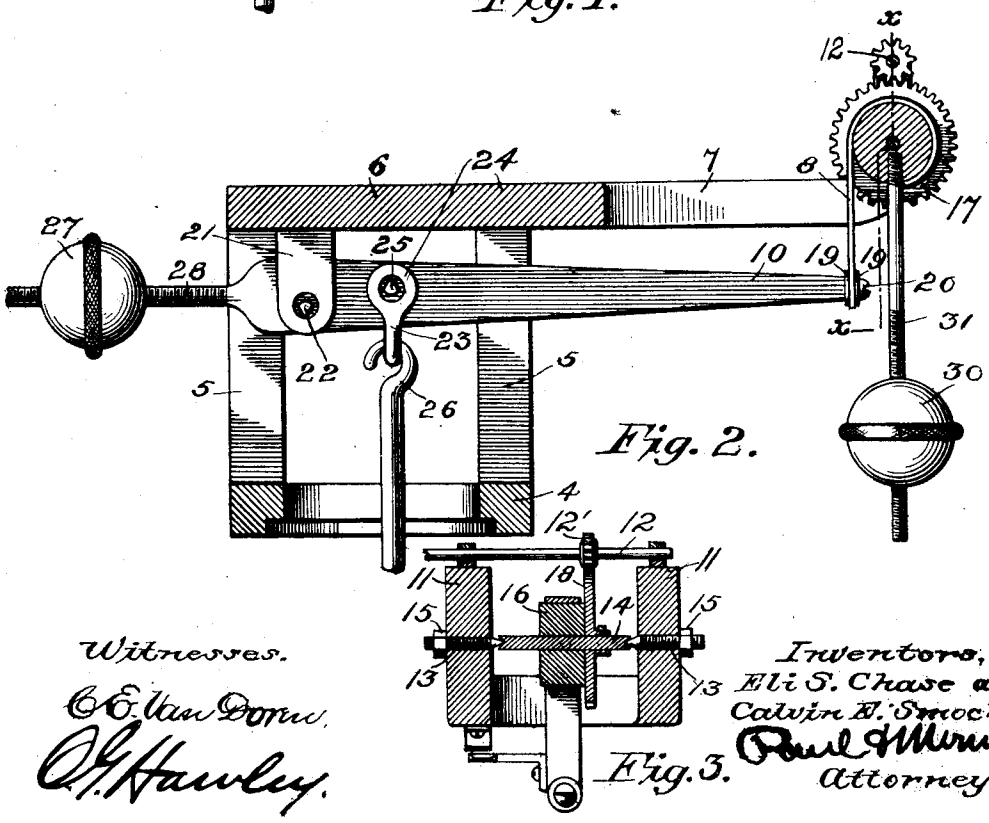

Fig. 2.

Fig. 3.

Witnesses.
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UNITED STATES PATENT OFFICE.

ELI S. CHASE AND CALVIN E. SMOCK, OF MINNEAPOLIS, MINNESOTA.

PENDULUM SCALE.

SPECIFICATION forming part of Letters Patent No. 475,295, dated May 24, 1892.

Application filed October 15, 1891. Serial No. 408,779. (No model.)

To all whom it may concern:

Be it known that we, ELI S. CHASE and CALVIN E. SMOCK, both of Minneapolis, in the county of Hennepin and State of Minnesota, have invented a certain Improved Automatic Weighing-Scale, of which the following is a specification.

Our invention relates to a new and improved dial-scale device adapted for attachment to the platform or standard of any ordinary scale in place of the usual scale-beams; and its object is to provide a perfectly-automatic weighing-scale, to simplify and cheapen the construction of the same, and make it more accurate and sensitive in action.

Our invention consists, in general, in the construction and combinations hereinafter described, and particularly pointed out in the claims.

Our invention will be more readily understood by reference to the accompanying drawings, in which—

Figure 1 is a front view of a weighing-scale embodying our invention, the connection, with the usual draw-rod, being indicated. Fig. 2 is an enlarged longitudinal section thereof, showing more clearly the main lever of the device and the strap and drum in connection therewith. Fig. 3 is a transverse sectional view on the line *x x* of Fig. 2, the pendulum rod and weight being removed.

As shown in the drawings, 2 represents the stationary dial, and 3 the moving balanced pointer. Behind this dial and supporting the same is arranged the strong metal framework, in which the levers and other parts of the scale are hung. The base 4 of this framework is adapted to rest upon the top of the standard of any ordinary weighing-scale body. The posts 5, formed therewith, extend upward to support the top 6, which has the extended arms or brackets 7, separated by a U-shaped slot, through which passes the strap extending from the extreme end of the main lever 10. As shown in Fig. 2, these arms are provided with the upturned ends or lugs 11, provided with bearings for the pinion-shaft 12, and with threaded openings to receive the pin-bearing screws 13, entering the journaled ends of the drum-shaft 14. (See Fig. 3.) These cone-pointed screws are locked tightly by the nuts 15. In connection with the wide drum 16 we provide the large gear-wheel 18, meshing with the pinion 12′ upon the same shaft with the dial-hands. The strap is securely fastened to the drum 16 by the screw 17, and its lower end is firmly secured to the lever 10 by the washers 19 and the screw 20, extending into the end of the main lever 10. This lever is suspended in the depending lugs 21 by the knife-bearings 22, provided at the rear end of the lever. The downward pull is exerted on the lever at a point inside of these knife-edges between the same and the strap end by means of the U-link 23, having eyes 24, embracing the knife-edge bearings 25 on the lever, and into which the hooked upper end of the draw-rod 26 is fastened. The weight of the lever and of the parts hanging therefrom is counterbalanced by the adjustable ball 27, arranged on the threaded extension 28, provided on the end of the lever outside of the pivot-point 22. When a force is exerted on the rod 26, the outer end 9 of the main lever is drawn down, thereby unwinding the strap from the drum and rotating the same a short distance. The pull on the rod 26 will be counterbalanced by the weight of the weight-arm 31 and the ball 30 thereon as the arm which is secured in the drum or on the shaft is raised to increase the leverage upon the drum or quadrant. It will be seen that the leverage exerted through the pendulum rod or arm upon the drum to counteract the downward pull on the main lever increases as the pendulum swings out of the perpendicular and approaches a horizontal position, at which point the counterbalancing influence thereof reaches the maximum. The range of the weight-arm is therefor ninety degrees, but in practice rarely exceeds sixty degrees. Hence, if desired, two-thirds of the large gear-wheel may be cut away, something over a quadrant being all that is required. The pointer 3 is secured firmly on the shaft 12, and the dial is laid off or graduated in accordance to the swing of the pendulum as equal increments of weight are applied to the platform of the scale. A dial of any size may be placed on any one of the machines and the parts of the scale adjusted thereto by moving the pendulum-ball 30 up or down on its rod to increase or decrease the leverage, and thereby the distance through which the pendulum will move

for a given force exerted on the main lever, the figures being thereafter marked on the dial. Owing to this construction our weighing-scales admit of a very accurate and sensitive adjustment. To aid the operator to quickly adjust the scale, we preferably provide the points 32 and 33 on the stationary part of the frame and the main lever 10, respectively, the arrangement being such that when these points are brought exactly opposite one another the scale is in condition for use.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. The combination, in a weighing-scale, of a drum, with a pendulum-rod rigidly connected therewith, a weight thereon, a dial and a pointer adapted to be operated by the movement of said drum, a strap wound upon and secured to said drum, a lever having one end secured thereto and the other end pivoted, a counter-balance for the same, and a draw-rod connected with said lever between said pivot-point and the strap end thereof, substantially as described.

2. The combination, in a weighing-scale, of a drum having a shaft, with supports for said shaft, a pendulum-rod having its upper end secured in said drum, an adjustable weight on said pendulum-rod, a flexible strap wound upon and secured to said drum, a lever having one end secured to the free end of said strap and its other end pivotally fixed, a draw-rod connected between the ends of the lever, and gear fixed on said drum-shaft and dial, a pointer-shaft and pointer thereon to move with respect to the dial, and a pinion arranged on the pointer-shaft and meshing with said gear, whereby as a downward pull is exerted upon the draw-rod connected with said lever said pointer is advanced upon the dial.

3. The combination, with the frame having the bifurcated arms, of a shaft supported on said arms, a drum fixed on said shaft, a pendulum-rod depending from said drum, a weight arranged on the lower end of said rod, a flexible strap wound upon said drum, means for applying the weight to the free end of said strap, a dial and pointer, a pointer-shaft, and means for communicating the rotary movement of the drum to said pointer-shaft to advance the pointer upon the dial as the pull upon the flexible strap is exerted and increased.

4. The combination, with the plate 6, provided with the arms 7 and with the standards 5, of the base 4, provided with the central opening, depending lugs 21, the lever 10, pivoted in said lugs, bearings 25 and loop 23, the draw-rod 26, extending down through the opening in the base 4, a counter-balance for the lever, the shaft pivoted in the outer ends of the arms 7, the drum arranged on said shaft, the flexible strap 8, wound upon the drum and having its lower end secured on the end of the lever 10, a pendulum-rod depending from said drum and weighted thereon, a dial and pointer, and means for communicating and reducing the movement of the drum and drum-shaft and said pointer and advancing the same on the dial when the pull is exerted upon the draw-rod.

5. The combination, with the frame having the arms 7, of the lever 10, the counter-balance in connection with the lever 10, pivoted in said frame, a draw-rod connected with said lever at an intermediate point between its ends, a drum and drum-shaft adapted to revolve, bearings therefor on said arms, a weighted pendulum-rod depending therefrom, a flexible strap wound on the drum and fixed on the end of the lever 10, and fixed pins arranged upon the frame and one of the movable parts of the device, respectively, and whereby a correct adjustment of the parts may be attained.

In testimony whereof we have hereunto set our hands this 8th day of October, 1891.

ELI S. CHASE.
CALVIN E. SMOCK.

In presence of—
C. G. HAWLEY,
FREDERICK T. LYON.