Oct. 9, 1923. 1,470,010

J. HOPKINSON ET AL

PORTABLE SCALE

Filed Sept. 1, 1920 2 Sheets-Sheet 1

Fig. 1

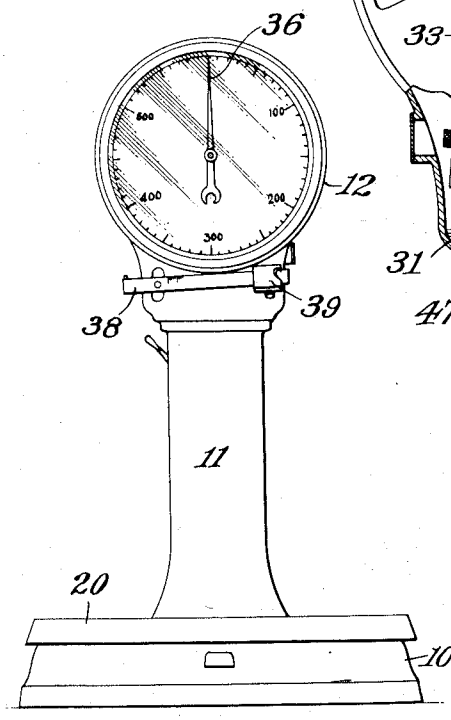


Fig. 2

INVENTORS
Joseph Hopkinson
and Edward G. Freed
BY
Kerr, Page, Cooper & Hayward
ATTORNEYS

Oct. 9, 1923. 1,470,010

J. HOPKINSON ET AL

PORTABLE SCALE

Filed Sept. 1, 1920 2 Sheets-Sheet 2

Fig. 3

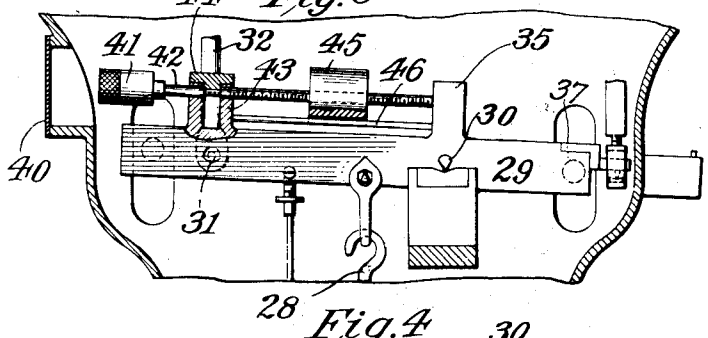


Fig. 4

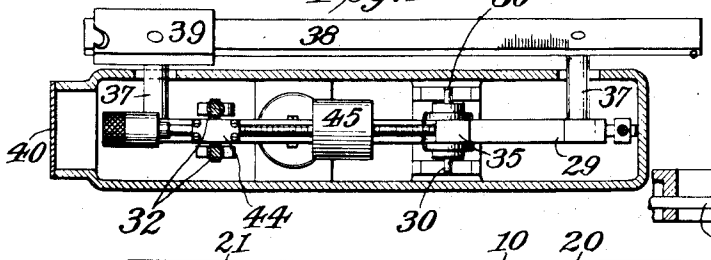


Fig. 5

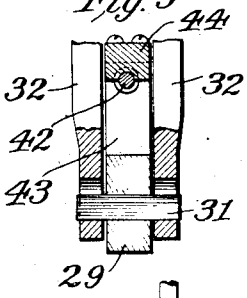


Fig. 9

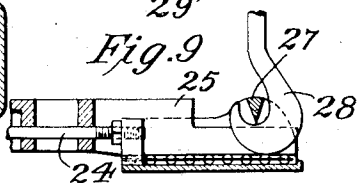


Fig. 10

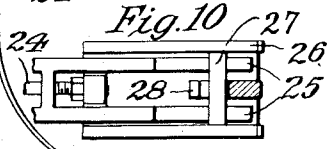


Fig. 11

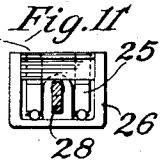


Fig. 6

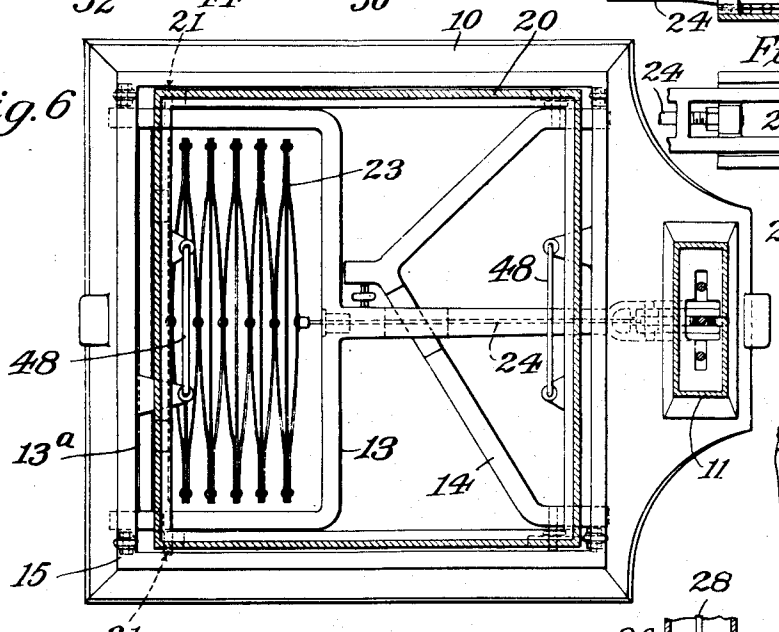


Fig. 8

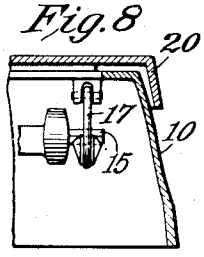
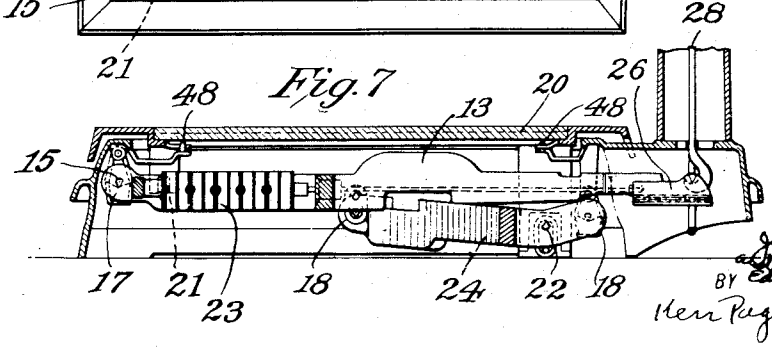


Fig. 7



INVENTORS
Joseph Hopkinson
and
BY Edward G. Freed
Kerr Page Cooper & Hayward
ATTORNEYS

Patented Oct. 9, 1923. 1,470,010

UNITED STATES PATENT OFFICE.

JOSEPH HOPKINSON AND EDWARD G. FREED, OF DAYTON, OHIO, ASSIGNORS TO INTERNATIONAL SCALE COMPANY, OF DAYTON, OHIO, A CORPORATION OF ILLINOIS.

PORTABLE SCALE.

Application filed September 1, 1920. Serial No. 407,327.

To all whom it may concern:

Be it known that we, JOSEPH HOPKINSON and EDWARD G. FREED, both citizens of the United States of America, both residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Portable Scales, of which the following is a full, clear, and exact description.

This invention relates to improvements in portable scales and more particularly to a portable scale which is provided with a spring for counterbalancing the applied load. The object of the invention resides in the provision of an improved lever system for supporting the platform and for connecting the base lever system to the indication mechanism load counterbalancing means. Other objects reside in the provision of a novel form of thermostat for compensating for both zero and load balance.

Other objects reside in certain improvements in construction, mode of operation, and disposition of the elements forming a part of said scales as will be more fully pointed out in the accompanying specification.

In the drawings:

Fig. 1 shows a front elevation view of the complete scale.

Fig. 2 shows a rear view with the casing broken away to show the interior.

Fig. 3 shows an enlarged detail view of the intermediate lever.

Fig. 4 shows a detail horizontal sectional view of the parts shown in elevation in Fig. 3.

Fig. 5 is a detail sectional view of the loop and knife edge pivots for connecting the intermediate lever with the spring.

Fig. 6 shows a plan view of the base lever system and thermostat with the platform removed.

Fig. 7 shows a sectional view of the platform lever system.

Fig. 8 shows a detail view of one of the hanging bearings.

Figs. 9, 10 and 11 are detail views showing the construction of the nose iron and the method of connecting the steelyard to the stirrup which slides in and out on the nose iron.

The scale shown is of the platform floor type but the invention is not limited to floor type scales. The housing comprises a base housing 10, a pedestal housing 11 and dial housing 12. Within the base housing is a suitable base lever system here shown as a pair of compound levers. Lever 13 is preferably a lever of the second order and is here shown as being fulcrumed by means of knife edges 15 which are supported in hanging bearings 17 (see Fig. 8). The other lever 14 is provided with knife edges 18 which are supported in similar hanging bearings which are hung from the base housing. This lever 14 is a lever of the second order. Levers 13 and 14 are connected by means of a loop 19 which cooperates with suitable knife edges on the levers. The goods platform 20 is provided with two pairs of depending feet, one pair carrying agate bearings which are supported upon knife edges 21 carried by lever 13. The other pair of platform feet carry loops which are supported upon knife edges 22 carried by lever 14.

The lever 13 is forked and provided with a cross member 13^a. Rigidly fastened to this cross member is a thermostat 23 made up of a series of bimetallic elements. The opposite end of the thermostat is attached to a rod which extends in a channel in the lower side of lever 13 to the nose iron portion of the lever. The nose iron end 25 of the lever is bifurcated and carries a saddle 26 which connects to rod 24. Ball bearings are provided between the saddle and the lower face of the nose iron and the saddle is also provided with a knife edge 27 which receives a steelyard 28. The upper end of the steelyard connects with a loop which is supported by knife edges carried by an intermediate scale beam 29. This beam is preferably a lever of the second order and is provided with knife edges 30 which fulcrum upon bearings carried by brackets extending from the pedestal housing.

The scale beam 29 also carries knife edge 31 which through a link 32 connects with the lower end of a spring counterbalancing means 33. The upper end of the spring is supported by a U-shaped metallic member 34 having a high co-efficient of expansion. This thermostat element is suitably fastened at its lower end to the dial housing and is adapted to compensate for direct elogations and constractions of the spring. This thermal compensation maintains proper

zero balance and the thermostat in the base of the scale is adapted to maintain proper running or load balance. The base thermostat is adapted to change the leverage ratio between the base lever system and the intermediate beam and thereby maintain proper running or load balance under varying temperatures.

Extending upwardly from the scale beam is a link which through an intermediate lever connects with a rack 35 adapted to turn the indicating pointer 36 proportionally to the load upon the scale. The rack meshes with the usual pinion upon the pointer arbor as is customary in this type of scale.

In order to compensate for tare the pedestal housing is slotted and through these slots extend brackets 37 which fasten a tare beam 38 to the scale beam 29. The tare beam is provided with the usual sliding poise 39 (see Fig. 4).

In order to adjust the scale for proper zero balance, a removable closure 40 gives access to a knob 41 carried by a shaft 42. This shaft is jorunaled in bosses 43 extending up from beam 29 and also in the arm 35. The shaft 42 is prevented from moving endwise by means of a cap 44 which engages a notch in the shaft. Shaft 42 is threaded to receive an adjusting poise 45 and rotation of the poise is prevented by means of a cross rod 46 which extends through a slot in the poise. By turning the knurled knob 41 the poise can be advanced or retracted along the beam and the whole scale can be brought to proper zero balance.

In order to minimize oscillations of the scale beam a dash pot 47 is provided which is preferably connected to the scale beam.

The goods platform is steadied by means of links 48 which connect the platform with the base housing. These links are so arranged to permit the free vertical movement of the platform and to prevent excessive lateral shifting of the platform on its pivots.

Any suitable relieving gear may be provided. Such a gear is shown at 50.

What we claim as our invention is more particularly pointed out in the appended claims.

What I claim is:—

1. In a scale in combination, a base lever system, a goods platform supported thereby, an intermediate lever connected to said base lever system, a thermostat for varying the leverage ratio between the base lever system and the intermediate lever, spring counterbalancing means connected to said intermediate lever and a thermostatic device forming a support for said spring.

2. In a scale in combination, a base lever system, a goods platform supported thereby, an intermediate lever fulcrumed above the base lever system, means connecting the said base lever system and the intermediate lever, thermostatic means for shifting the said connecting means relatively to the base lever system whereby the leverage of the lever system is varied, spring counterbalancing means connected with the intermediate lever, a weight indicator and means for actuating said indicator from the intermediate lever.

3. In a portable scale, comprising in combination, a base lever system comprising a compound lever of the second order of leverage, an intermediate lever of the second order of leverage, a steelyard connecting said intermediate lever and one of said base levers, a thermostat carried by one of the base levers adapted to vary the point of connection of the steelyard and the base lever and thereby vary the ratio of leverage between the base lever system and the intermediate lever, and a spring load-counterbalancing means connected to the intermediate lever.

4. The invention set forth in claim 3 in which a thermostat member is provided for supporting the upper end of the spring counterbalancing means to compensate for variations in length due to variations in temperature.

5. The invention set forth in claim 3 in which a weight indicator is provided and operating connections are provided between said indicator and the intermediate lever.

6. In a scale, a housing, an intermediate lever fulcrumed therein, a load counterbalancing spring connected to said lever, and an inverted U-shaped thermostat connected to the dial housing and adapted to support one end of said spring.

In testimony whereof we hereunto affix our signatures.

JOSEPH HOPKINSON.
EDWARD G. FREED.