

C. D. BISHOP.
GRAVITY BOX SCALE.
APPLICATION FILED NOV. 1, 1910.

1,003,421.

Patented Sept. 19, 1911.

2 SHEETS—SHEET 1.

Fig. 1

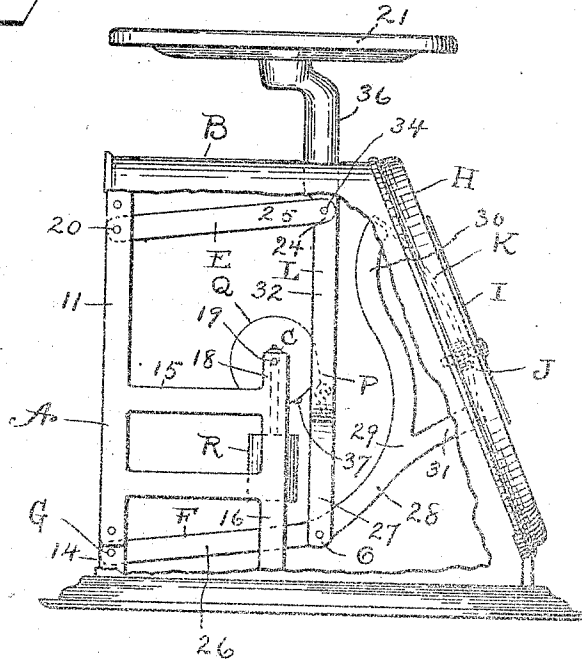
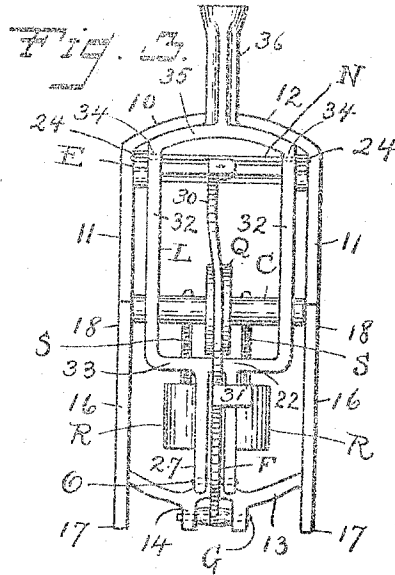
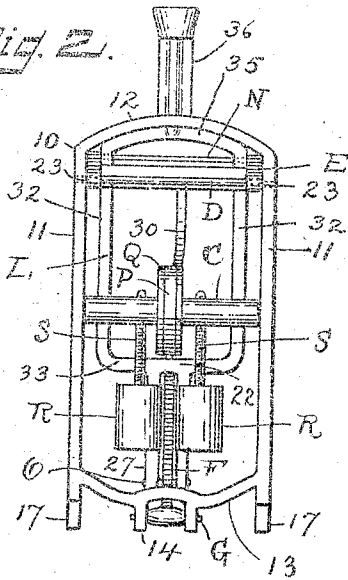


Fig. 2.



WITNESSES

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GRAVITY BOX-SCALE.

1,003,421.

Specification of Letters Patent. Patented Sept. 19, 1911.

Application filed November 1, 1910. Serial No. 590,165.

To all whom it may concern:

Be it known that I, CHARLES D. BISHOP, a citizen of the United States, residing at New Britain, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Gravity Box-Scales, of which the following is a specification.

My invention relates to improvements in gravity box scales and the objects of my improvements are simplicity and economy in construction, and convenience and efficiency in use.

In the accompanying drawings:—Figure 1 is a side elevation of my improved scale, the inclosing casing being in part broken out. Fig. 2 is a rear view, with the inclosing frame omitted. Fig. 3 is a front view of the same. Fig. 4 is a plan view of the same. Fig. 5 is a view similar to Fig. 3 of a modification of my scale. Fig. 6 is a side elevation of the same. Fig. 7 is a side view and Fig. 8 is a rear view, both in part broken out, of a modification of the balance weight.

A is the frame work for my scale and comprises a skeleton structure consisting of a rear frame member 10 having parallel vertical side bars 11 cross connected at the top by an inverted U shaped bridge or yoke 12 suitable for supporting part of the casing B and cross connected at the bottom by a bottom bridge 13, having at the middle a downwardly projecting bifurcated foot 14. Forward of the said rear frame member 10 and connected therewith by horizontal side bars 15 are a pair of vertical side bars 16, the lower ends 17 of which serve as supporting feet for the said frame work A, and which are provided adjacent the upper ends 18 with bearings 19 to receive a shaft C to be described. The upper ends of the said side bars 11 are provided with bearings 20 for a shaft D on which is mounted the rear end of the upper arm E of a pair of parallel guide arms, the lower member F of which pair is pivotally mounted at its rear end by means of a shaft G mounted between the arms of the said bifurcated foot 14. The said casing B comprising a box-shaped housing suitable for inclosing the said frame work A and the operating mechanism generally and in an ordinary manner and comprises at the front means for supporting a dial H and in coöperation therewith means for pivotally supporting a shaft carrying an

index I and a pinion J suitably for being operated by a rack K engaged with the said pinion J, also in an ordinary manner. A load post L generally is positioned vertically, and is operatively mounted and guided so as to be oscillated in a vertical plane by means of the said parallel guide arms E and F, is provided at its upper end with a load pan or platform 21, has a bifurcated lower end 27 and intermediate the said ends comprises a frame-like structure consisting of a pair of vertical side arms 32 cross-connected at their lower ends by a bridge 33 from the middle of which the said bifurcated lower end 27 projects downwardly. The upper ends of the said arms 32 are provided with bearings 34 for a shaft N by means of which the said load post L is pivotally connected to the forward end of the said upper guide arm E. Above the said bearings 34 the said arms 32 are cross-connected by a bridge or yoke 35 from the center of which the post proper 36 projects upwardly and which supports at its upper end the said scale platform or pan 21. Adjacent the middle 22 of the said bridge 33 of the load post L are attached equilibrating means to be described. The said upper guide arm E comprises a double arm structure or an essentially rectangular frame work comprising a pair of side arms 25 having at the rear ends a pair of ears 23 suitable for receiving the said shaft D and at the forward ends a pair of essentially similar ears or arm extensions 24 suitable for receiving the said shaft N and by means of which the forward end of the said guide arm or frame E is pivotally connected to the said load post L, the said lateral arms 25 being of suitable spread to have an appreciable guiding effect operating to maintain the said load post L in a vertical plane as described as opposed to lateral or distorting strains due to placing a load on the said scale platform in positions to one side of the said vertical plane. The function of the said guide arm or frame E is essentially limited to guiding as described. The said lower guide arm F is generally flat and centrally located and comprises a guide arm proper 26 at its rear, parallel to the said guide arm or frame E, has its rear end pivotally mounted on the said shaft G as described and the forward end of the said guide arm proper 26 is pivotally connected to the said bifurcated lower end 27 of the said load post L by means of a shaft O.

A forward extension 28 of the said lower guide arm proper 26 is forked at 29, and is divided into an upper branch 30 and a lower branch 31 having the usual means
 5 for supporting and guiding the said rack K so as to be in engaging position relatively to the said pinion J. The said shaft C is adjacent the said load post L and has a drum or cylinder Q rigidly secured thereto and
 10 which is centrally located and as mounted by means of the said shaft C is operative in the same plane as the said load post L, and is secured to the said load post by a balancing ribbon or band P. One end of
 15 the said ribbon P is secured to the said load post L at the point 22 as described and located at the said central operative plane and the other end is attached to the said drum Q at a point 37 on the periphery generally below the said shaft C and intermediate the said ends is guided by the said
 20 periphery so as to apply or transmit the equilibrating effect of the balancing weights to be described to the said load post L. The balancing or equilibrating means comprise a pair of weights R generally similar and laterally disposed at equal distances from the said drum Q and the said central operative plane, are adjustably secured to
 25 the said shaft C by supporting rods S and are normally in a pendant position and in equilibrium with the said load post L. As a load is applied to the said load post L the said load post drops and the said weights R
 30 are raised, increasing the effective lever arm until a new point of equilibrium is found.

In the modification shown in Fig. 5, guide rollers T bear against the side arms 32^a as shown which guide the said arms so as to
 40 maintain the line of movement of the same in a vertical plane, there being four such rollers shown, two on each side, and the said side arms being extended as shown at 38 below the bridge 33 so as to provide additional guiding length.

In the modifications shown in Figs. 7 and 8 a single centrally located weight R¹ is shown, which construction is serviceable for weighing relatively small loads.

50 My scale as described is particularly adapted to give accurate results in weighing essentially regardless as to the position of the load on the scale pan or platform, and this is the case even when set up so that
 55 the plane of movement of the load post deviates appreciably from the vertical plane.

As described, the guiding mechanism serves to guide the load post so that the same will move in a definite plane and
 60 which plane is vertical when the scale is set up in normal position, and the load post and

its load are supported essentially directly by the balancing or supporting ribbon and the position of support or rest is determined by the position of equilibrium for
 65 the weights or gravity balancing means corresponding to the load.

It is apparent that some changes from the specific construction herein disclosed may be made and therefore I do not wish to
 70 be understood as limiting myself to the precise form of construction shown and described, but desire the liberty to make such changes, in working my invention, as may fairly come within the spirit and scope of
 75 the same.

I claim as my invention:—

1. In a scale, a load post, means for guiding the same constantly in a fixed plane, supporting means comprising a ribbon having one end attached to the said post, a
 80 drum to which the other end of the said ribbon is attached, a shaft supporting the said drum, gravity balancing means supported by the said shaft, and the said post
 85 supported directly and entirely by the said ribbon and guiding means.

2. In a scale having a load post, means for guiding the same generally in a fixed plane and supporting means comprising a
 90 ribbon, a drum therefor, and a balancing weight, one end of the said ribbon attached to the said post and the other end attached to the said drum, auxiliary means for guiding the said load post comprising lateral
 95 guiding rollers in operative contact therewith.

3. In a scale, a load post, guiding mechanism suitable for guiding the same in a vertical plane, a drum in the said plane, a
 100 supporting ribbon passing over the periphery of the said drum, having one end secured thereto, and the other end secured to the said post, the said drum supported on a pivotally mounted shaft adjacent the said
 105 post, and gravity balancing means secured to the said shaft and symmetrically disposed relatively to the said plane and comprising a duplex set of weights depending from the said shaft and laterally disposed,
 110 one on each side of the said drum.

4. In a scale having a load post, means for guiding the same generally in a fixed plane, and supporting mechanism connected to the said post, auxiliary means for guid-
 115 ing the said load comprising lateral guiding rollers in operative connection therewith.

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Witnesses:

NEWTON L. LOCKWOOD,
 SHEFFIELD H. CLARKE.