S. E. HARBACK.

PNEUMATIC SCALE.

APPLICATION FILED JAN. 16, 1913.

1,070,461.

Patented Aug. 19, 1913.

2 SHEETS—SHEET 1.

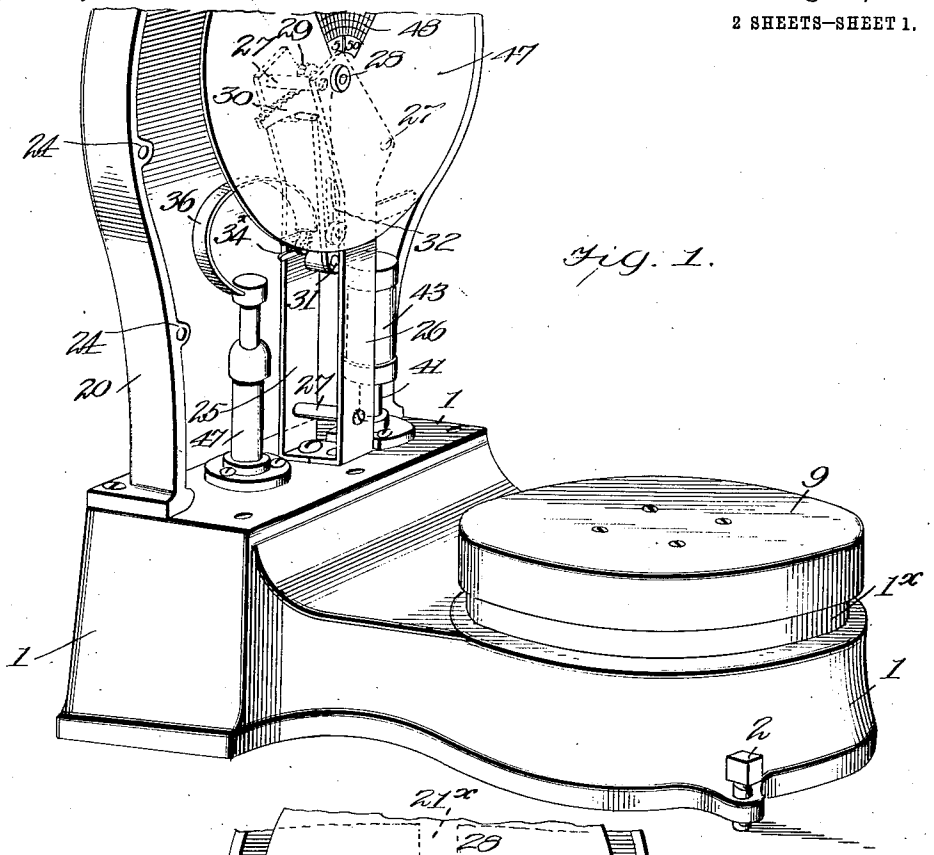


Fig. 1.

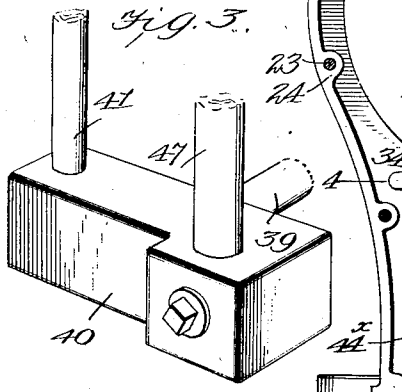


Fig. 3.

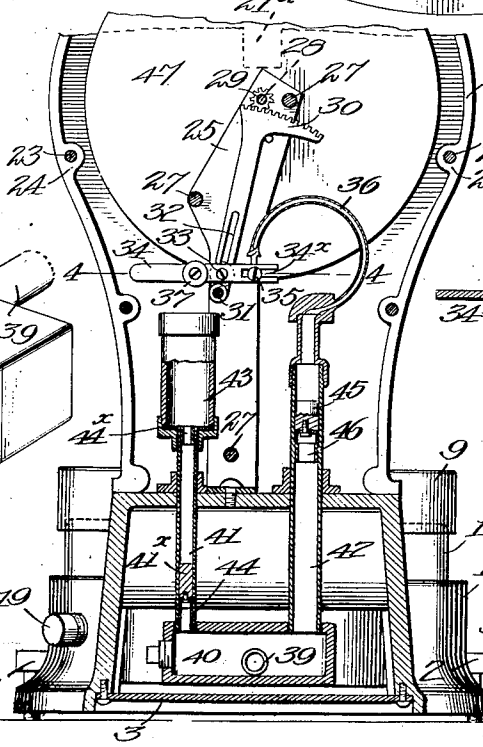


Fig. 2.

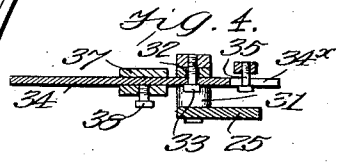


Fig. 4.

WITNESSES

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2 SHEETS—SHEET 2.

Fig. 5.

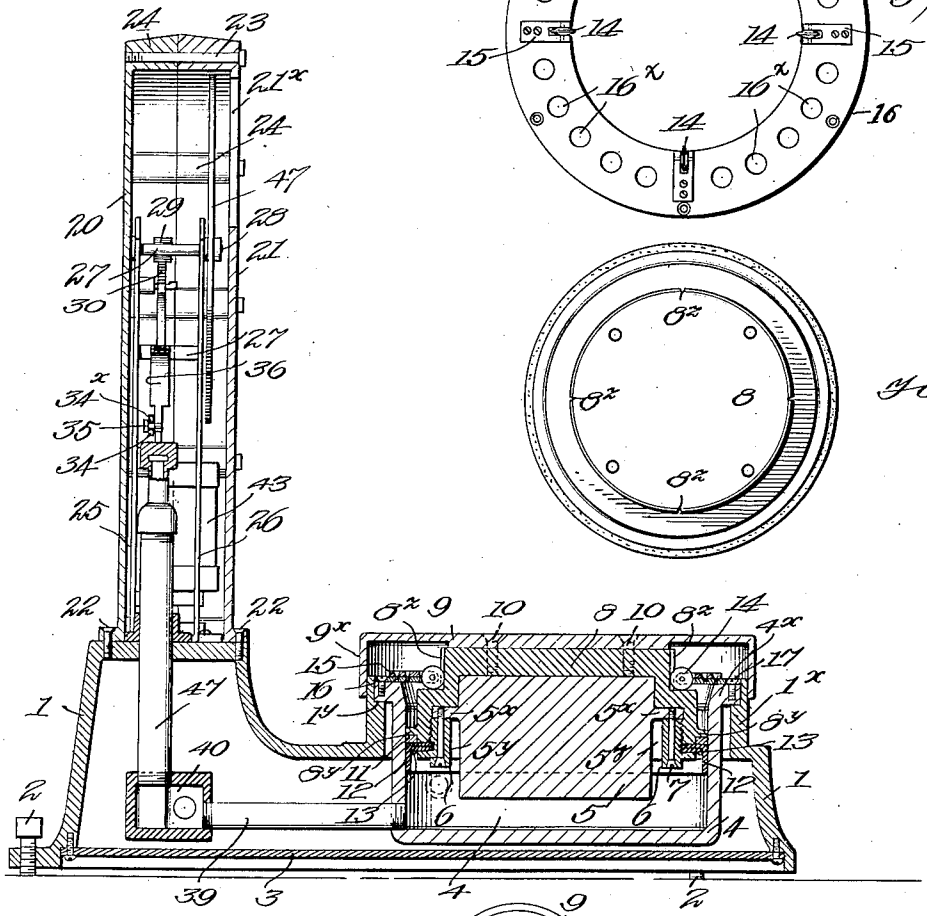


Fig. 6.

Fig. 7.

Fig. 8.

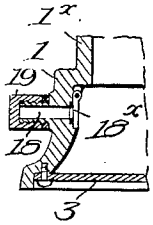
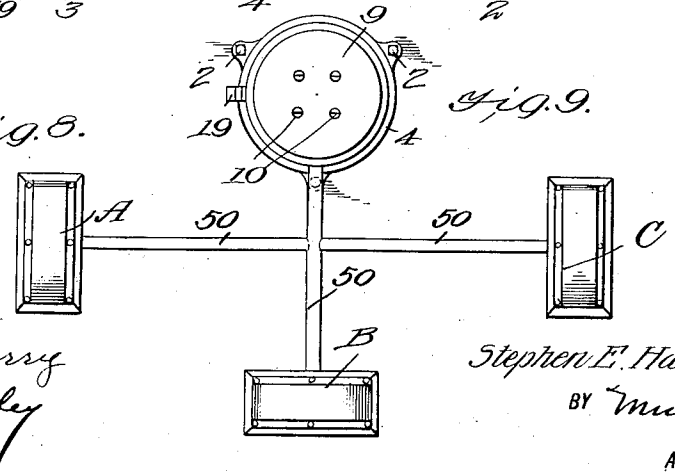


Fig. 9.



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UNITED STATES PATENT OFFICE.

STEPHEN ELLSWORTH HARBACK, OF FORT SMITH, ARKANSAS.

PNEUMATIC SCALE.

1,070,461. Specification of Letters Patent. Patented Aug. 19, 1913.

Application filed January 16, 1913. Serial No. 742,435.

To all whom it may concern:

Be it known that I, STEPHEN E. HARBACK, a citizen of the United States, and a resident of Fort Smith, in the county of Sebastian and State of Arkansas, have made certain new and useful Improvements in Pneumatic Scales, of which the following is a specification.

My invention relates to improvements in pneumatic scales, and it consists in the combinations, constructions, and arrangements herein described and claimed.

An object of my invention is to provide a device which is an improvement over that disclosed in a prior application, Serial Number 633,892, filed June 17, 1911.

A further object of the present invention is to provide a pneumatic scale in which the friction of the movable parts is reduced to a minimum.

A further object of my invention is to provide a device which may be readily assembled or taken apart for inspection or adjustment.

Other objects and advantages will appear in the following specification, and the novel features of the device will be particularly pointed out in the appended claims.

My invention is illustrated in the accompanying drawings forming part of this application in which—

Figure 1 is a perspective view of the device, part of the casing being removed to show the working parts, Fig. 2 is a vertical section through the device, Fig. 3 is a perspective view of one of the air chambers, Fig. 4 is a detail section of a portion of the device along the line 4—4 of Fig. 2, Fig. 5 is a vertical section at right angles to Fig. 6, Fig. 6 is a plan view of the guide plate, Fig. 7 is a plan view of the main piston or plunger, Fig. 8 is a detail sectional view of the check valve, and Fig. 9 is a view of a modified form of the device.

Referring particularly to Figs. 2 and 5, it will be seen that I provide a hollow base portion 1 which is mounted upon adjusting screws 2. This base portion has an upper annular extension 1^x and is provided with a bottom 3.

Disposed within the annular extension 1^x is a reservoir 4, which is provided with an outwardly extending annular flange 4^x arranged to rest on a shoulder 1^y upon the annular extension 1^a. The reservoir may be made of any suitable material, but is preferably made of brass.

Disposed on the interior of the receptacle 4 is the weight 5 provided with an annular flange 5^x having an annular recess 5^y. A ring or collar 6 is disposed in the recess 5^y, said ring being provided with a threaded exterior portion arranged to engage threads on the flange 5^x. Screws 7 extend through the ring in order to lock the latter in position. A metal cap 8 bears a plate or platform 9, which is held by screws 10 to the cap 8. The peripheral flange 9^x of the platform 9 extends downwardly over the outside edge of the extension 1^x. This prevents an accumulation of dust. A flange 8^y on the cap 8 serves as a means for holding in position an expansion ring 11 which bears against the interior of the reservoir. An extension of the collar 6 clamps an L-shaped leather gasket 12 against the flange 5^x and the lower portion of the weight 8 and the expansion ring, an auxiliary gasket 13 being also provided to insure an air-tight joint.

As will be seen from Fig. 7 the cap 8 is provided with notches or grooves 8^z arranged to receive the guide wheels 14 which are carried by small plates 15 screwed to an annular plate or ring 16. The latter is secured to the top of the reservoir 4 by means of screws 17. The plate 16 is perforated at 16^x in the manner indicated in Fig. 6.

In Fig. 2 I have shown a valve casing 19 for holding the check valve 18. The latter is simply a cylinder provided at one end with a hinged closure 18^x, as shown in Fig. 8.

Disposed upon the base 1 is an upright consisting of two parts 20 and 21. These parts are secured to the base by means of screws 22 and are also secured together by means of screws 23 which pass through bosses 24 which are cast integrally with the members 20 and 21. The member 21 is provided with an opening 21^x which may be glazed or not.

Secured to the base portion 1 within the casing formed by the members 20 and 21 is a frame comprising the side members 25 and 26 (see Fig. 1), these side members being secured together by means of the cross pins 27.

Mounted on a shaft 28 pivotally disposed between the side members 25 and 26 of the frame is a gear 29 arranged to be engaged by an L-shaped segment 30, which is pivotally mounted at 31 (see Fig. 2). This

segment is provided with a slot 32 arranged to receive a pin 33 which passes through a lever 34. The latter is provided with a slot 34^x at one end arranged to receive a pin 35 on the end of a Bourdon tube 36. The lever 34 is provided with a slidable weight 37 arranged to be held by a set screw 38 at varying positions along the lever. The construction of this part of the device is best seen in Fig. 4.

Connected with the reservoir 4 is a pipe 39 which leads to an air chamber 40. The latter is in communication with two cylinders 41 and 42 respectively (see Fig. 2). In the cylinder 41 is a plunger or piston 41^x. At the top of the cylinder 41 is an air chamber 43. It will be observed that the air chamber is of larger diameter than the cylinder 41 and also that there is a stop member 44 at the bottom of the cylinder 41 to limit the downward movement of the piston 41^x. In the cylinder 42 is a piston 45 which rests normally on a stop member 46. The upper end of the cylinder 42 is in direct communication with the Bourdon tube 36.

From the foregoing description of the various parts of the device the operation thereof may be readily understood.

The reservoir 4 is supplied with air by attaching an ordinary air pump such as a bicycle pump to the valve casing 19 and pumping the air into the chamber 4. This will cause the weight 5, the cap 8, to which it is attached, and the platform 9, which is secured to the cap, to rise into the position shown in Figs. 1, 2 and 5 where it is held by the pressure of the air in the reservoir 4. This pressure is, of course, communicated through the tube 42 to the Bourdon tube 36, which will move so as to swing the lever 30 and turn the gear 29 and the dial 47 which is mounted upon the shaft 28 of the gear 29. The upper part of this dial has a scale 48, the parts of which may be brought into view through the opening 21^x. By means of the weight 37 the dial may be brought to zero when the compartment or reservoir 4 is filled with enough air to raise the platform. Now when a weight is placed on the platform 9, it will tend to force the latter downwardly. The air in the reservoir 4 will then become compressed. This will tend first of all to force up the small piston 41^x, because this piston is relatively lighter in proportion to the diameter of the tube 41 than is the piston 46^x in proportion to the piston 45. The piston 41^x will rise until it reaches the stop 44^x and the air in the cylinder 43 will be slightly compressed. As soon as the piston 41^x reaches its upper limit the continued pressure of the weight will cause the piston 45 to move upwardly driving the air into the tube and causing it to uncoil. This will raise the lever 34 and cause the shifting of the lever 30 a distance proportional to the uncoiling of the Bourdon tube. The dial will therefore be turned so as to bring that part of the scale which corresponds with the weight placed on the platform directly before the slot 21^x. The chamber 43 acts as an air cushion and prevents the undue swinging of the dial plate. When the weight is placed on the platform 9 and the latter moves downwardly it is guided by means of the wheels 14. These guide wheels, as will be seen by Fig. 5, are some distance above the lower edge of the cap 8, which bears on the interior of the reservoir 4. The platform 9 is therefore guided in its movement, even though the thickness of the expansion ring 11 may be made comparatively small.

The interior of the reservoir is designed to be oiled so that the parts will slide easily. This also prevents the escape of air.

It will be obvious that since the movement of the dial is effected by pressure transmitted from the reservoir 4 a plurality of dials may be connected with one reservoir and will register simultaneously at different places. In Fig. 9 I have shown dial casings A, B and C containing dials similar to that shown at 47. These dial casings are connected by pipes 50 with a common reservoir 4 having a weighing platform 9 similar to that already described. This arrangement is convenient in places where it is desirable to indicate in different places the result of the same weighing operation. Thus one of the indicating dials may be in the warehouse where goods are received or shipped, another in the office, and others at any desirable points.

I claim;

1. A pneumatic scale comprising a hollow base, a hollow air reservoir within said base, a Bourdon tube, an indicating dial operated thereby, means for direct communication between said Bourdon tube and the interior of said reservoir, a weight normally held in an upper position by the air confined in the reservoir, a platform secured to said weight, means for guiding the movement of the weight with respect to the walls of the reservoir, said guiding means comprising a plate secured to the upper edge of said reservoir, and anti-friction wheels carried by said plate and arranged to engage the weight.

2. A pneumatic scale comprising a hollow base, a hollow air reservoir within said base, a Bourdon tube, an indicating dial operated thereby, means for direct communication between said Bourdon tube and the interior of said reservoir, a weight normally held in an upper position by the air confined in the reservoir, a platform secured to said weight, means for guiding the movement of the weight with respect to the walls of the reservoir, said guiding means comprising a plate secured to the upper edge of said res-

ervoir, anti-friction wheels carried by said plate and arranged to engage the weight, and an expansion ring carried by the weight and arranged to bear against the walls of the reservoir.

3. A pneumatic scale comprising a hollow base, a hollow air reservoir within said base, a Bourdon tube, an indicating dial operated thereby, means for direct communication between said Bourdon tube and the interior of said reservoir, a weight normally held in an upper position by the air confined in the reservoir, a platform secured to said weight, means for guiding the movement of the weight with respect to the walls of the reservoir, said guiding means comprising a plate secured to the upper edge of said reservoir, anti-friction wheels carried by said plate and arranged to engage the weight, an expansion ring carried by the weight and arranged to bear against the walls of the reservoir, and an auxiliary gasket carried by the weight below the expansion ring for preventing the escape of air.

4. In a pneumatic scale, a hollow base, a casing mounted on said base, a Bourdon tube disposed within said casing, a dial arranged to be moved by said Bourdon tube, a cylinder connected with said Bourdon tube, a piston within said cylinder, a reservoir connected with said cylinder, a weight slidably disposed within said reservoir and normally held in an upper position by the air in the reservoir, means for preventing the escape of air past the weight, and a platform secured to said weight and arranged to move with respect to the reservoir.

5. In a pneumatic scale, a hollow base, a casing mounted on said base, a Bourdon tube disposed within said casing, a dial arranged to be moved by said Bourdon tube, a cylinder connected with said Bourdon tube, a piston within said cylinder, a reservoir connected with said cylinder, a weight slidably disposed within said reservoir and normally held in an upper position by the air in the reservoir, means for preventing the escape of air past the weight, a platform secured to said weight and arranged to move with respect to the reservoir, an auxiliary cylinder also in communication with said air reservoir, and a piston in said auxiliary cylinder, said last named piston being arranged to move under air pressure before the movement of the first named piston.

STEPHEN ELLSWORTH HARBACK.

Witnesses:
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FRED REISING, Jr.