(No Model.)

E. N. BACHELDER & F. E. LOVEJOY.

AUTOMATIC WEIGHING SCALES.

No. 423,204. Patented Mar. 11, 1890.

Fig. 2.

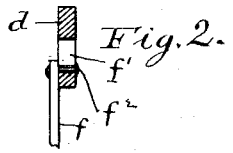
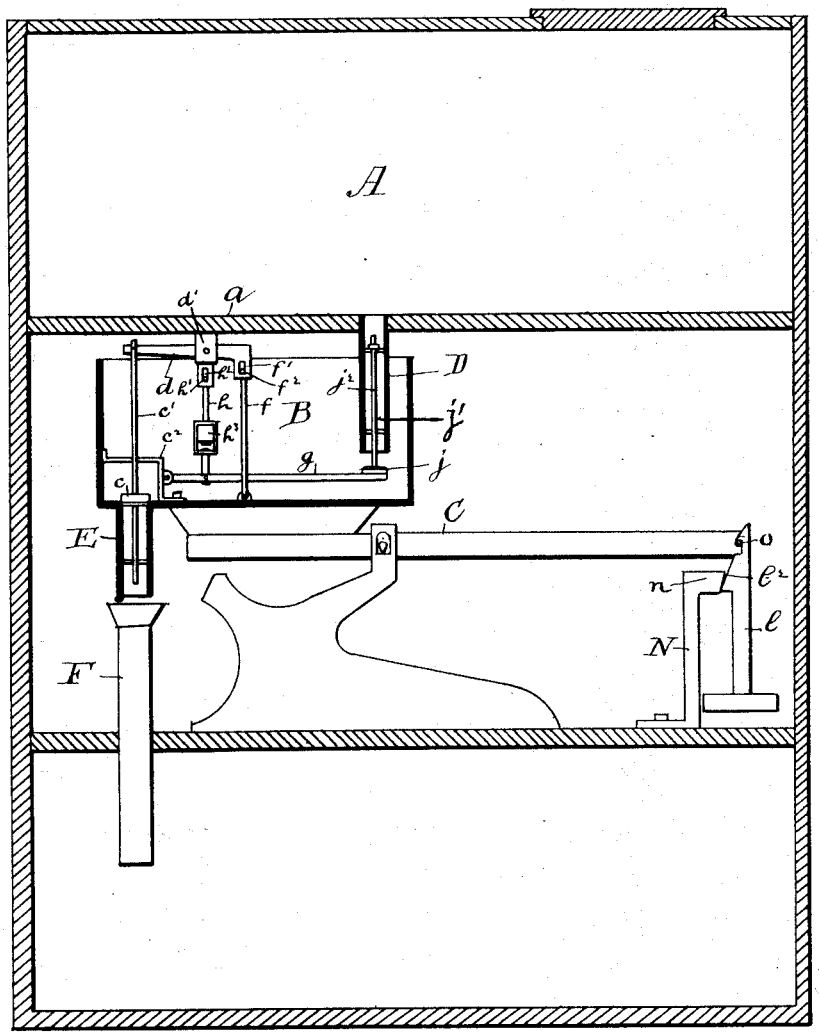


Fig. 1.



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UNITED STATES PATENT OFFICE.

ELMER N. BACHELDER AND FRED E. LOVEJOY, OF PORTLAND, MAINE.

AUTOMATIC WEIGHING-SCALES.

SPECIFICATION forming part of Letters Patent No. 423,204, dated March 11, 1890.

Application filed January 4, 1890. Serial No. 335,910. (No model.)

To all whom it may concern:

Be it known that we, ELMER N. BACHELDER and FRED E. LOVEJOY, citizens of the United States, residing at Portland, in the county of Cumberland and State of Maine, have invented certain new and useful Improvements in Automatic Weighing-Scales; and we 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.

Our invention relates to a weighing-scale for automatically weighing oil or other liquids or any material which is capable of flowing, and for delivering it from one tank or reservoir to another in given quantities.

Our present invention is designed as an improvement on or a modification of the weighing oil-tank patented to us August 6, 1889, by Letters Patent No. 408,450. In the device therein shown and described one of the levers was pivoted on top of the upper tank, the connection between that lever and the weighing-scale passing through a tube which was made a water-tight joint with the bottom of the tank. The valve-stem and pitman were also increased in length unnecessarily. Again, the valve which closed the outlet-pipe leading from the weighing-tank was suspended from the floor of the tank above and was opened by the dropping of the weighing-tank. As thus arranged the outlet-valve only opened so far as the weighing-tank dropped; but we find by experience that it is desirable to give a wide opening to the valve by a small downward movement of the tank. Again, we find that in order to trip the weight-holder it is necessary to have a certain amount of momentum at the end of the scale-beam, and it is thus desirable to have the weighing-tank depressed to a limited extent without operating the valves, which would check the movement of the scale if they were operated at the moment it received its load.

The object of our present invention is to improve our apparatus in the points named and to simplify the mechanism for tripping the weight-carrier.

We accomplish the various objects of the invention as follows: First, we remove the lever which operates the inlet-valve from the top of the reservoir and pivot it in the weighing-tank, thus doing away with the passage of the pitman and its enveloping-tube through the tank and making the apparatus much more compact and simple; second, we operate the outlet-valve by means of a lever connected with the valve and with the tank proper, and by which the motion of the tank is increased as it is transmitted to the valve; third, we construct the connections which operate the inlet and outlet valves with a loose joint, so that as the scale tips it will not immediately act on the valves, but will come to a bearing immediately after the weight-carrier is tripped, and, fourth, we hang the weight-carrier on the end of the scale-beam and push it bodily off as it rises by means of a suitable tripping device. These modifications we have illustrated in the form preferred by us in the accompanying drawings.

In the drawings, Figure 1 is a longitudinal section through our scale, and Fig. 2 is a detail showing the slot or loose joint in the valve-connection.

A represents the tank or storage reservoir; B, the weighing-tank; C, the scale-beam; D, the outlet-pipe from the reservoir, and E the outlet-pipe from the weighing-tank; F, the discharge-tube, and *a* the floor or bottom of the reservoir, as already fully described in our prior patent, and which require no further description.

Within the weighing-tank B we pivot the lever *g*, which operates the valve *j* and controls the flow through the pipe D. As here shown, we pivot this lever by one end to a brace C^2, the opposite end being secured to the valve *j*, which closes the lower end of the pipe D. The valve-stem *j'* of the valve *j* extends up through the pipe D, and is held in guides j^2, as in our former patent. The lever *g* and the valve *j* are raised and lowered by means of a pitman or link *h*, the lower end of which is pivoted to the lever *g* near the fulcrum, while the upper end is loosely connected to some stationary portion of the machine. We here show it as connected with the stud *d*, in the lower end of which is formed a vertical slot h^2, in which plays the pin *h'*, which is secured to the upper end of the link *h*. In the link *h* we introduce a spring or buffer h^3, whereby undue pressure of the valve *j* on its valve-slot is avoided.

The outlet-valve *c* and its stem *c'* are constructed as shown in our former patent, except that the upper end of the valve-stem is

pivoted to the long arm of a lever d, which lever is pivoted to the stud d', already referred to. The short arm of the lever d is loosely connected in some suitable way with the weighing-tank or scale-beam, so that when the tank falls the short arm of the lever will be depressed and the long arm will rise, thus lifting the valve c. This connection we here show as being made by a link f, pivoted at its lower end to the bottom of the tank, while its upper end is pivoted by means of a pin f^2, passing through a vertical slot f' in the short arm of the lever d.

At the end of the scale-beam we provide a weight-carrier l, as in our former patent, except that it hangs from a pin or projection o at the end of the beam. On the weight-carrier we provide a cam-surface l^2, and a stud N, with a projecting arm n, is arranged so as to strike the cam-surface l^2 and to knock the weight-carrier from the pin o.

The operation of our improved scale is evident from its construction. The scale-beam is first depressed and the weight-carrier caused to engage the pin or projection o. By this movement the weighing-tank and its connecting parts are lifted. The link h allows the lever g and the valve j to fall, and the pin h rises in the slot h^2 as the valve j^2 comes to a bearing. In the same manner the link f, rising, allows the long arm of the lever d to fall, shutting the valve c, after which as the tank continues to rise the pin f^2 lifts in the slot f'. The parts are so adjusted that when the weighing-tank is at its highest point the loose joints formed by the slots h and f will be entirely relaxed, so that on the reverse motion they will not come taut until the beam has risen high enough to trip the weight-carrier. When the weighing-tank has taken its load from the pipe D, it will rise slowly at first to about a horizontal position, as we have here shown it, until it reaches the point when the weight is tripped. While it is making this movement it is acquiring a momentum, so that when it reaches the tripping-point the weight-carrier is easily displaced. The loose joints or connections, as before explained, prevent any pressure from coming on either of the levers g or d or the valves j or c before the weight-carrier is tripped. When the weight trips and the weighing-tank and its contents fall, bearing with it its load, the lever g is lifted, quickly closing the valve j, and the short arm of the lever d is pulled down a short distance, raising the long arm and the valve c a much greater distance, according to the relative lengths of the two arms of the lever d, and pulling the valve c wide open. It will be seen that if the attempt were to be made to trip the weight-carrier, which is not always weighted the same at the very moment when the scale is balanced and when there is no excess of weight in the weighing-tank, it would be practically impossible to do this without taking in an added quantity of material into the tank, which quantity would be varied according to the weight on the weight-carrier, thus preventing that degree of accuracy which is desirable when varying weights are used. For the same reason it is necessary that the valves g and c should not be at once operated as soon as the scale starts to descend; and hence we introduced a loose joint in each valve-connection, as and for the purposes described. It is evident that this loose joint may be formed in many well-known ways without departing from the spirit of our invention, it only being necessary that there shall be a limited amount of lost motion in the valve-connections. It is also obvious that the loose joints spoken of may be placed in any convenient portion of the mechanism which operates each valve.

We claim—

1. In an automatic weighing-scale, the combination of a scale-beam, a weight-carrier adapted to hang from the end thereof, and a tripping device for pushing the said weight-carrier bodily from the end of said beam, substantially as described.

2. In an automatic weighing-scale, the combination of a scale-beam, a weight-carrier adapted to hang from the end thereof, a tripping device, and a cam-surface on said weight-carrier against which said tripping device acts, substantially as described.

3. In an automatic weighing-scale, the combination of a scale-beam and a weighing-tank thereon, a reservoir, a pipe leading from said reservoir to said weighing-tank, a valve for closing said pipe, connecting mechanism between said scale-beam and said valve, whereby the latter is controlled by the motion of said scale-beam, and a loose joint or connection in said connecting mechanism for allowing a limited motion of said beam before said valve is operated, substantially as described.

4. In an automatic weighing-scale, the combination of a scale-beam, a weighing-tank thereon, an outlet-pipe and a valve for controlling said pipe, a pivoted lever having a short arm and a long arm for lifting said valve, and a connection between the short arm of said lever and said tank, whereby a depression of said tank raises said valve, substantially as described.

5. In an automatic weighing-scale, a weighing-tank, an inlet and an outlet pipe for said tank, valves for controlling said pipes, pivoted levers for operating said valves, each of said levers having a connection with said tank and with the fixed portion of the machine, and a loose joint in some portion of the mechanism which operates each valve, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

ELMER N. BACHELDER.
FRED E. LOVEJOY.

Witnesses:
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