

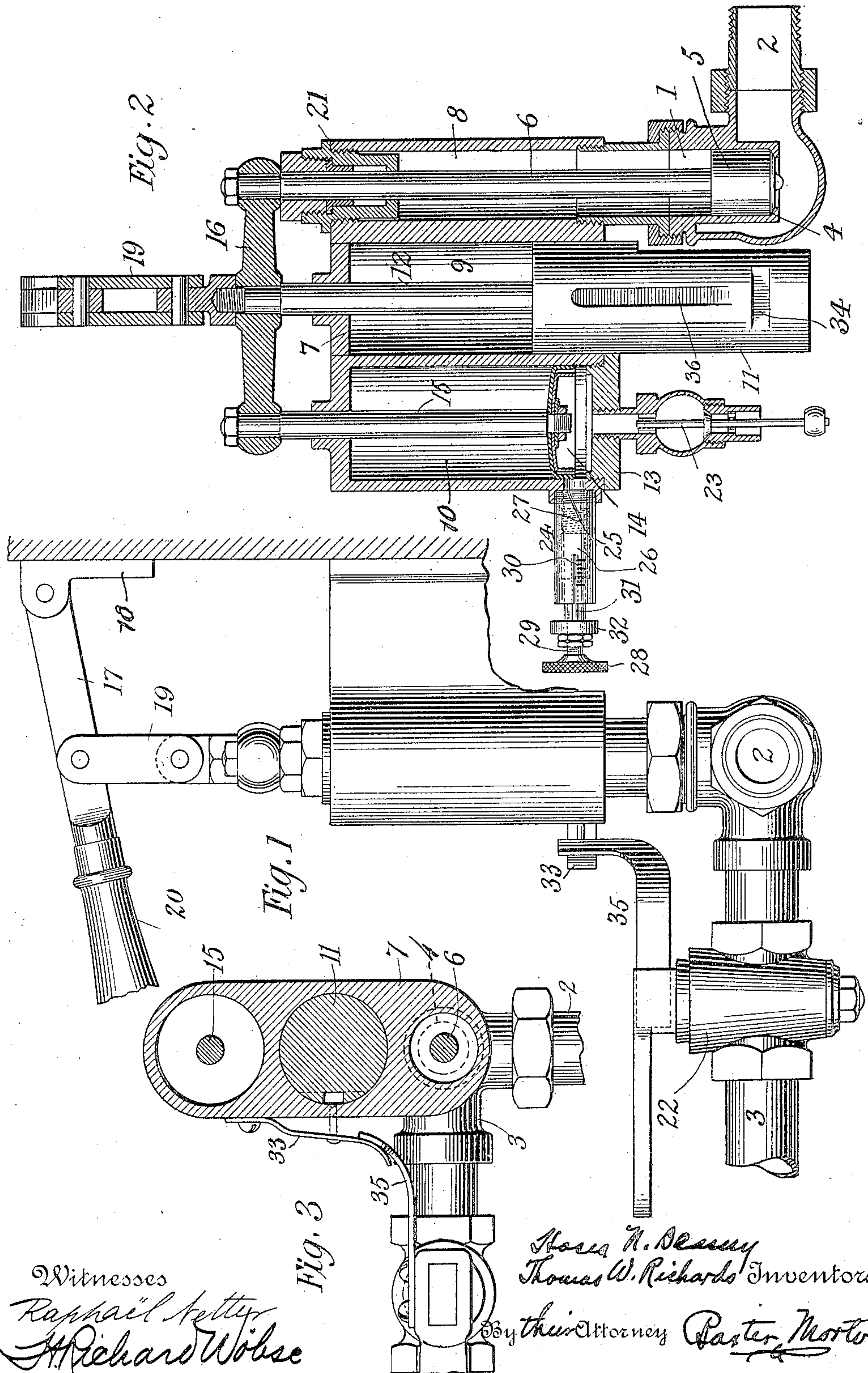
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H. N. DENNY & T. W. RICHARDS.

LIQUID METER.

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UNITED STATES PATENT OFFICE.

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LIQUID-METER.

No. 818,017.

Specification of Letters Patent.

Patented April 17, 1906.

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To all whom it may concern:

Be it known that we, HOSEA N. DENNY and THOMAS W. RICHARDS, citizens of the United States of America, and residents of Brooklyn, New York, have invented certain new and useful Improvements in Liquid-Meters, of which the following is a specification.

This invention relates to liquid-meters, and has for its object the provision of a simple and effective apparatus of this character which is especially adapted for the purpose of measuring and dispensing liquids in varying quantities with quickness and accuracy—as, for instance, in restaurants and groceries.

According to our invention, a valve is provided to control the flow of the liquid to be measured, and in connection with the valve we provide means for manually opening the valve to a predetermined extent, a weight or other means for closing the valve, and a pneumatic brake or check by means of which the duration of the time that the valve remains open may be accurately determined. The pneumatic brake or check comprises a cylinder, a piston connected with the valve and working in the cylinder, a valve to permit the ingress of air into the cylinder as the valve to control the flow of liquid is opened, and a device to regulate the rate of escape of air from the cylinder during the closure of the valve by which the flow of liquid is controlled.

One typical embodiment of our invention is hereinafter fully described in connection with the accompanying drawings, which form part of this specification, and the novel features of the invention are fully and clearly pointed out in the appended claims.

In the drawings, Figure 1 is a fragmentary side view of the meter, parts being broken away to save space and to show interior construction. Fig. 2 is a view in vertical section in a plane at right angles to the plane of Fig. 1. Fig. 3 is a view in horizontal section through the cylinders, showing in plan the inlet and outlet pipes and the latch mechanism for controlling the weight.

Referring to the drawings, in which corresponding reference characters are used to designate similar parts in the several views, 1 designates a valve-casing having an intake 2 and an outlet 3. A valve-seat 4 is provided in the casing, and a valve 5, which is rigidly secured to a valve-stem 6, is adapted for engagement with the valve-seat. The valve-casing is secured to the main casing or framework of the

apparatus, which is provided with three parallel cylindrical openings 8, 9, and 10, the opening 8 being in communication with the interior of the valve-casing and forming an extension of the chamber in which the valve 5 is arranged to move. In the opening 9 a weight 11 is arranged to slide, this weight being secured to a rod 12, which extends above the upper end of the main casing or framework of the apparatus, as best shown in Fig. 2. The opening 10 forms the air chamber or cylinder above mentioned and is closed at its lower end by a cap 13. The piston 14, which works in the air chamber or cylinder 10, is provided with a cup-packing which is secured, with the piston, to the piston-rod 15. This cup-packing prevents the passage of air between the piston and the cylinder-wall during the downward movement of the piston, but permits air to pass readily between the piston and the cylinder-wall during the upward movement of the piston. The rods 6, 12 and 15 are all secured to the cross-head 16 above the main casing or framework of the apparatus and accordingly move together.

Movement is imparted to the cross-head 16 by means of a lever 17, pivoted in a wall-bracket 18 and connected with the cross-head by means of a link 19 or other equivalent connection. A handle 20 is provided at the free end of the lever 17 to facilitate the manual operation of the apparatus.

At the upper end of the cylinder 8 a stuffing-box or gland 21 is provided to prevent the possibility of the escape of liquid around the rod 6, and a cock 22 is provided in the outlet-pipe 3 to prevent the premature escape of liquid from the valve-casing 1.

The admission of air into the chamber or cylinder 10 when the piston 14 is raised and the prevention of the escape of air at the bottom of the cylinder during the descent of the piston are both provided for by the check-valve 23 at the bottom of the cylinder. The escape of air from the cylinder during the descent of the piston is controlled by means of an adjustable outlet 24, which comprises a barrel 25, extending laterally from the cylinder 10, and a block or plug 26, which is threaded for adjustment within the barrel, which is correspondingly threaded upon its interior. The barrel is provided in its side wall with a slot 27, which is preferably oblique, as shown, and through this slot air passes as the piston descends in the air cylinder or chamber. The adjustment of the

block or plug 26 is brought about by means of a milled head 28, carried by the stem 29, extending from the block, and the position of the block or plug 26 is indicated by means of a scale 30, formed on the exterior of the barrel 25 adjacent to a groove in which works a pin 31, secured to a collar 32, carried by the stem 29.

To prevent the premature descent of the weight 11 in the cylindrical opening 9, a spring latch or pawl 33 is mounted on the exterior of the casing or framework 7, and the transverse groove 34 is formed in the weight near its lower end, with which the pawl automatically engages when the weight is raised to its uppermost position. The pawl 33 is thrown out of engagement with the groove by means of a trip 35 when the cock 22 is opened to permit the escape of liquid from the valve-casing 1, and the pawl extends into the vertical slot 36 in the weight during the descent of the weight, any retardation of the descent of the weight being thereby prevented.

In the operation of the apparatus the parts must first be moved from the position shown in Fig. 2 before any liquid can pass into the interior of the valve-casing 1. This is done by raising the lever 17, which causes the cross-head to rise, carrying with it the three rods 6, 12, and 15. When the cross-head reaches its uppermost position, the pawl 33 locks the weight in raised position by engaging with the transverse groove 34. Liquid can now enter the valve-casing 1; but it cannot escape until the cock 22 in the outlet-pipe is opened. When the cock 22 is opened to its full extent, the trip 35 engages the pawl 33 and forces it out of engagement with groove 34 in weight, which then descends at a rate determined by the position of block or plug 26 in the barrel 25. The position of the block or plug 26 determines the length of slot 27, which is available for the passage of air from the air-chamber. If the plug 26 is set in position to leave a large portion of the slot 27 unobstructed, the escape of air from the chamber 10 will be rapid and the amount of liquid which is allowed to flow through the outlet-pipe during the descent of the valve will be correspondingly small. If, on the other hand, the plug 26 is set to obstruct the greater portion of the slot 27, the escape of air from chamber 10 will be slower and the amount of liquid allowed to flow through the outlet-pipe 3 will be correspondingly large. By suitably calibrating scale 30 the adjustment of the block or plunger to provide for the measurement of small or large quantities of liquid in a very accurate and expeditious manner may be readily effected. After the measurement of the quantity of liquid for which the apparatus is set the cock 22 should be closed to make the apparatus ready for the next measuring operation.

A special feature of our invention to which we desire to call particular attention is the readiness with which the apparatus may be adjusted to measure widely-varying quantities of liquid. It will be noted that the measurement of liquid by means of the liquid-meter forming the present invention is not accomplished by the use of a measuring-chamber the capacity of which determines the quantity of liquid measured at each operation of the apparatus. Liquid-meters of this character, such as that shown in Patent No. 745,811, to Fritsche, are either adapted to measure only a certain fixed quantity at each operation of the meter or require a change in the capacity of the measuring-chamber to vary the quantity of liquid measured at each operation of the meter. In the meter forming the present invention, however, the measurement being determined by the period during which the liquid is allowed to flow through a valve, adjustment to provide for the measurement of widely-varying quantities of liquid may be easily effected by simply varying the period during which the controlling-valve is kept open. The pneumatic check by which the period of the opening of the controlling-valve is regulated in our invention is susceptible of easy and quick adjustment and provides means for determining most accurately the quantity of liquid to be measured.

It will be obvious that many of the details of construction of our invention may be varied at will without departing from the spirit of the invention or sacrificing any of its advantages, and we do not, therefore, limit ourselves to the precise construction shown and described, but reserve the right to make changes within the scope of the following claims by which we define our invention.

We claim—

1. A liquid-meter comprising a valve-casing having an intake and an outlet, a valve within said casing to control the flow of liquid through the intake and the outlet, a hollow cylinder communicating with said valve-casing, a valve-stem attached to said valve and extending through said hollow cylinder, a second cylinder parallel with the first-named cylinder, a piston working in said second cylinder and having a piston-rod parallel to said valve-stem, a rigid connection between said valve-stem and said piston-rod, means for controlling the escape of air from said second cylinder during the descent of the piston therein, and means for simultaneously effecting the closure of said valve and the descent of the piston in said second cylinder.

2. A liquid-meter comprising a valve-casing having an intake and an outlet, a valve within said casing, a hollow cylinder registering with said casing in which said valve can move, a valve-stem extending longitudinally

dinally through said hollow cylinder, a second hollow cylinder parallel to the first-mentioned hollow cylinder, a piston and piston-rod working in said second hollow cylinder, said piston-rod being rigidly connected and parallel to said valve-stem, a barrel extending laterally from said second cylinder below said piston and having a slot in the wall thereof, a block or plug adjustably secured within said barrel, whereby said slot can be closed wholly or in part, and means for imparting simultaneous downward movement to said valve and said piston, whereby the closure of said valve is effected within a period determined by the amount of opening of the slot in the barrel extending laterally from said second cylinder.

3. The combination in a liquid-meter, of a valve-casing having an intake and an outlet, a measuring-valve for controlling the flow of liquid through said intake and outlet, a hollow cylinder communicating with said valve-casing and registering with the chamber thereof, a valve-stem extending through said hollow cylinder, a second hollow cylinder having an intake-valve in the bottom and an adjustable escape for fluid contained in said second cylinder, a piston working in said second cylinder and having a piston-rod parallel to said valve-stem, a yoke forming a rigid connection between said valve-stem and said piston-rod, and a weight secured to said yoke between said valve-stem and said piston-rod, whereby said valve may be closed and said piston forced downward within said cylinder at a rate determined by the rate of escape of the fluid contained in the cylinder beneath said piston.

4. In a liquid-meter, the combination with a valve-casing having an intake and an out-

let, of a valve in said casing to control the passage of liquid through the casing, means for gradually closing the valve to cut off the flow of liquid through the casing, a valve in the outlet from said casing, and means for simultaneously opening the valve in the outlet and setting in operation the means for closing the valve in the valve-casing, whereby the valve in the valve-casing is gradually closed after the opening of the valve in the outlet.

5. In a liquid-meter, a valve-casing having an intake and an outlet, a valve in said casing to control the passage of liquid through the casing, a weight adapted by its descent to close said valve and cut off the flow of liquid through the casing, a valve in the outlet from said casing, means for locking said weight when raised, and means operative when the valve in said outlet is opened to release said weight and permit it to descend.

6. The combination in a liquid-meter, of a valve-casing having an intake and an outlet-pipe, a valve controlling the flow of liquid through said casing from the intake and into the outlet-pipe, a valve in said outlet-pipe, means for closing the first-mentioned valve, said closing means being inoperative as long as the valve in the outlet-pipe is closed, and means for releasing said closing means when the valve in the outlet-pipe is opened.

In testimony whereof we have signed our names to this specification in the presence of two witnesses.

HOSEA N. DENNY.
THOMAS W. RICHARDS.

Witnesses:

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WM. ROSS.