No. 753,283. PATENTED MAR. 1, 1904.

T. E. MATHER.

LIQUID MEASURING APPARATUS.

APPLICATION FILED OCT. 24, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

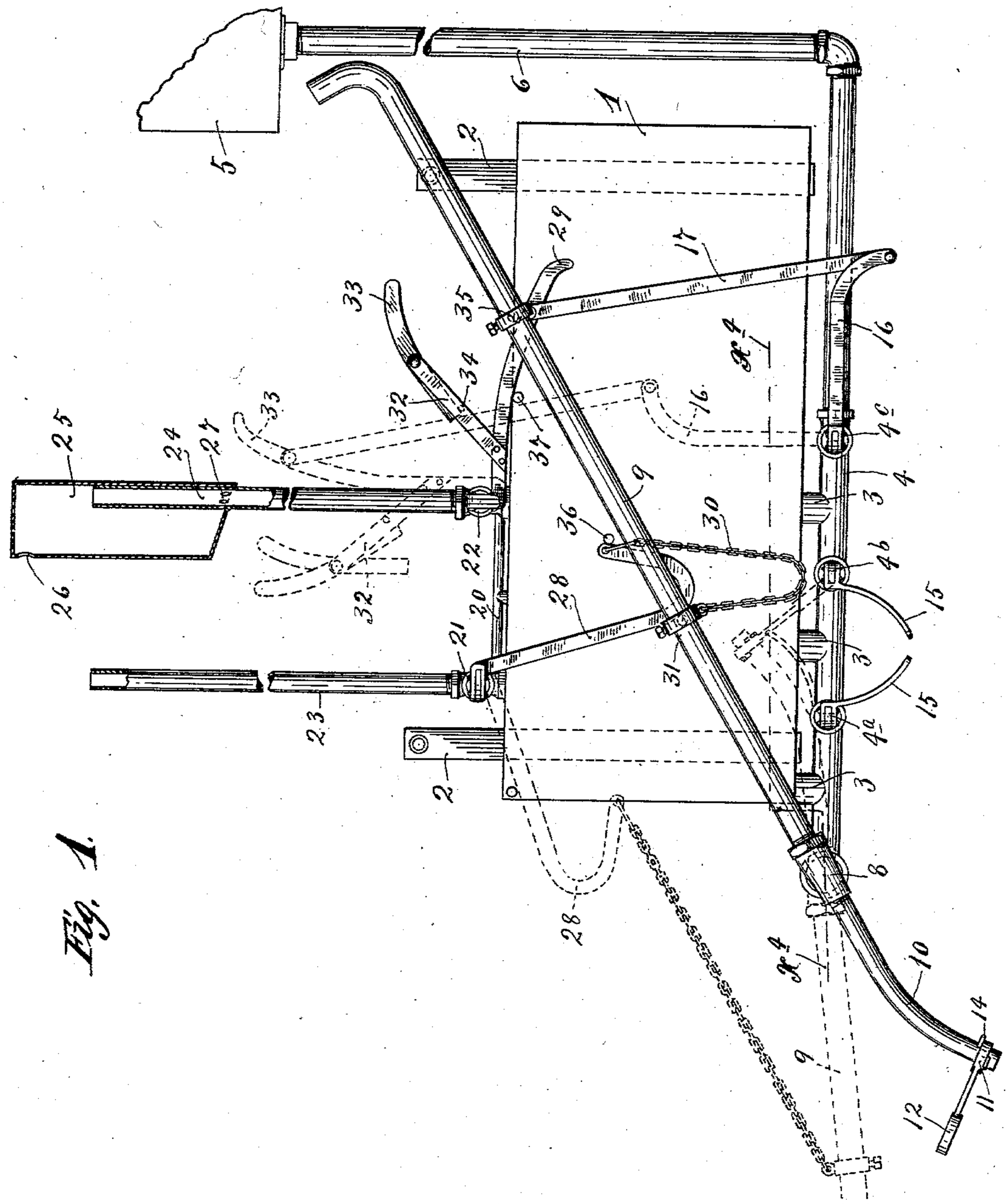

Fig. 1.

Witnesses.
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NO MODEL. 2 SHEETS—SHEET 2.

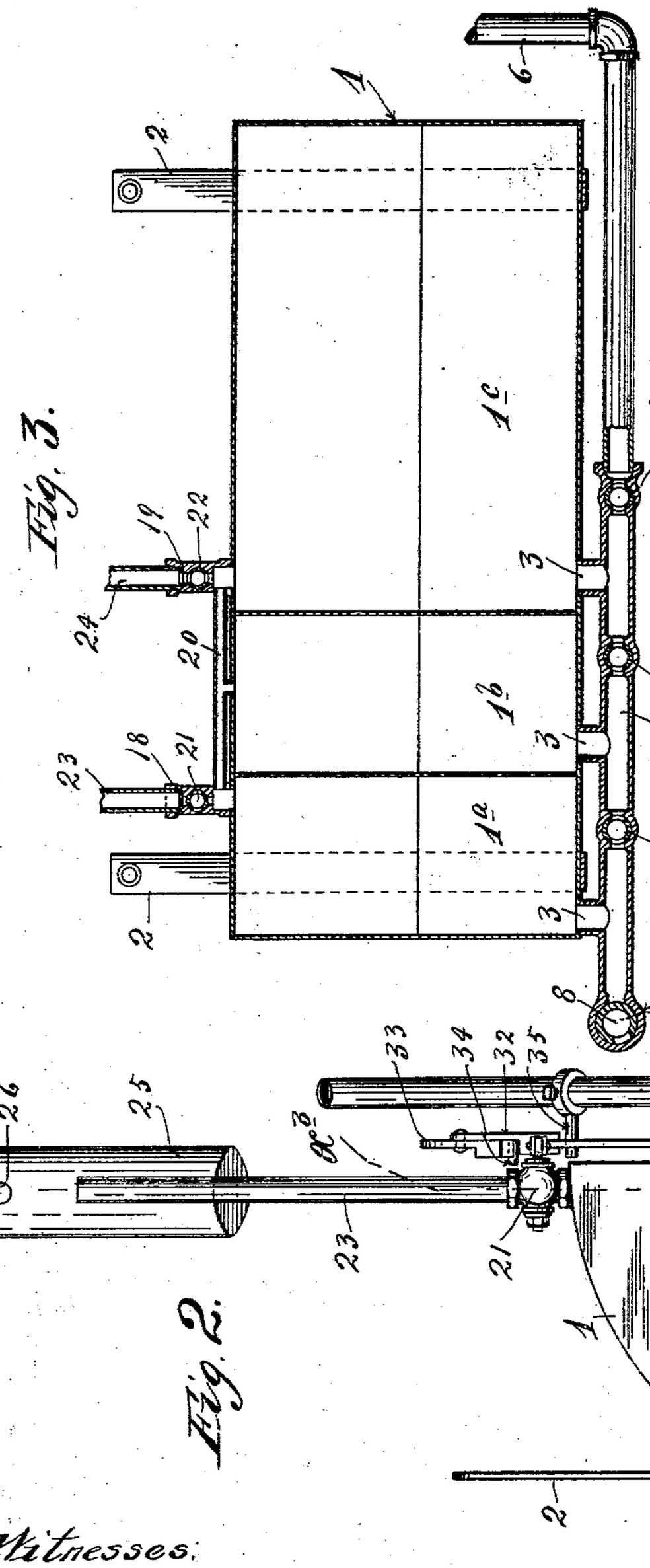

Fig. 3.

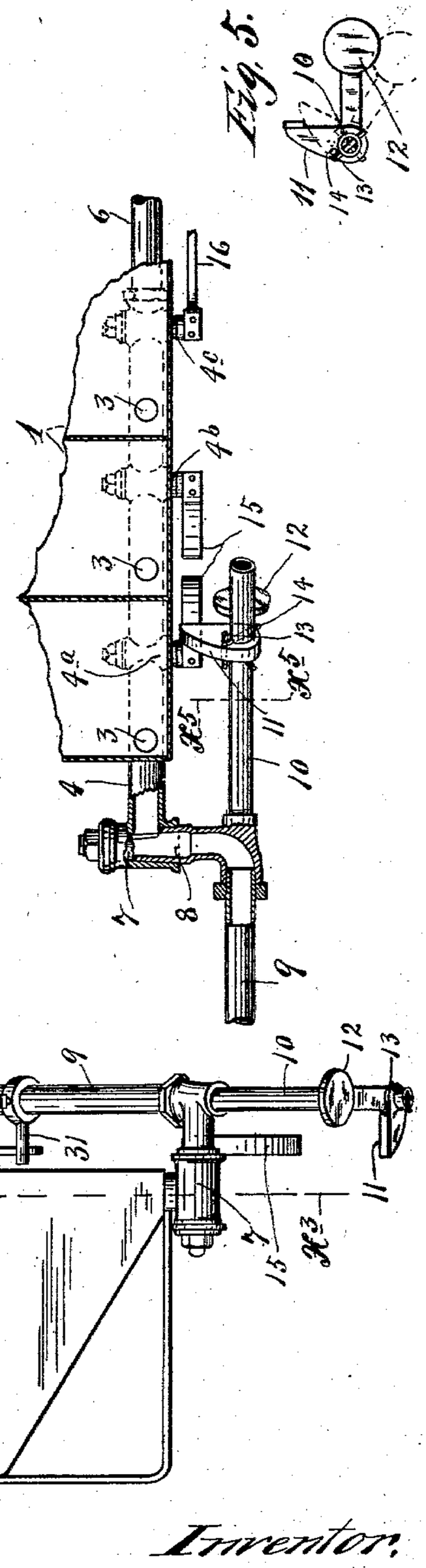

Fig. 4.

Fig. 2.

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UNITED STATES PATENT OFFICE.

THOMAS EVERETT MATHER, OF MINNEAPOLIS, MINNESOTA.

LIQUID-MEASURING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 753,283, dated March 1, 1904.

Application filed October 24, 1902. Serial No. 128,629. (No model.)

To all whom it may concern:

Be it known that I, THOMAS EVERETT MATHER, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Liquid-Measuring Apparatus; and I 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.

My present invention has for its object to provide a simple, cheap, and efficient device for rapidly measuring liquids; and to this end it consists of the novel devices and combinations of devices hereinafter described, and defined in the claims.

The invention is illustrated in the accompanying drawings, wherein like characters indicate like parts throughout the several views.

Figure 1 is a view in side elevation showing the complete apparatus, some parts thereof being broken away and some being shown in sections. Fig. 2 is an end elevation of the apparatus. Fig. 3 is a vertical longitudinal section on the line x^3 x^3 of Fig. 2, some parts being shown in full. Fig. 4 is a detail showing the lower portion of the apparatus principally in horizontal section on the irregular line x^4 x^4 of Fig. 1, but with some parts shown in full and with parts broken away; and Fig. 5 is a detail in transverse section on the line x^5 x^5 of Fig. 4.

The numeral 1 indicates a measuring-tank, which is conveniently supported from a wall by brackets 2. The tank 1 is shown as segmental in cross-section, and it is divided into a plurality of compartments (as shown into three compartments) 1^a 1^b 1^c. The compartments 1^a and 1^b we will assume to hold one gallon each and the compartment 1^c to hold three gallons, although this arrangement may of course be varied, so as to increase or decrease the measuring capacity of the apparatus. The three compartments of the tank communicate at their lower portions through short necks 3, with a horizontally-extended pipe or tube 4 equipped with valves or rotary stop-cocks 4^a, 4^b, and 4^c.

The numeral 5 indicates an elevated supply-tank, which communicates through a supply-pipe 6 with the receiving end of the pipe 4 outward of the valve 4^c.

The delivery end of the delivery or discharging pipe 4 terminates in a valve-seat 7, in which is swiveled an elbow-like valve 8. An oscillating delivery pipe or tube 9 communicates with and is carried by the elbow portions of said valve 8. A valve-actuating rod or arm 10, shown as of tubular form, is also carried by the elbow portion of the valve 8 and projects in a diametrically opposite direction from a tube 9. A valve-actuating dog 11 is loosely pivoted on the rod or arm 10, as best shown in Figs. 4 and 5. Said dog is provided with a weighted arm 12, which yieldingly holds the same in a horizontal position. (Best shown in Fig. 4.) The dog 11 is free to move in one direction, but is held against movement in the other direction by coöperating stops 13 and 14, respectively, on the said dog and on said rod 10. The purpose of this dog will presently appear. The valves 1^a and 1^b are provided with reversely-curved cam-arms 15, with which the dog 11 coöperates in a manner to be set forth in the description of the operation. The valve 4^c is provided with an arm 16, to which the lower end of a link 17 is pivotally connected, as best shown in Fig. 1.

Valve-seats 18 and 19 communicate, respectively, with the tops of the compartments 1^a and 1^c, and the three compartments 1^a, 1^b, and 1^c are in communication at their tops through an air-tube 20, which opens at its intermediate portion into said compartment 1^b and at its ends into the lower ends of the valve-seats 18 and 19. The valve-seats 18 and 19 are provided, respectively, with rotary valves or stop-cocks 21 and 22, one of which stands in an open position while the other is closed, and vice versa. Air-venting pipes 23 and 24, respectively, lead upward from the valve-cases 18 and 19. The upper end of the venting-pipe 24 opens into an enlarged head 25, provided at its upper portion with air-holes 26. The bottom of the head 25 is preferably inclined, as shown in Fig. 1, and the pipe 24 is provided just above said bottom with perforations 27, through which the water may run back from said head and said tube. For

a reason which will hereinafter appear the head 25 should be located at approximately the same altitude as the supply-tank 5. The valves 21 and 22 are provided, respectively, with long arms 28 and 29. The free end of the arm 28 is preferably curved, as shown in Fig. 1, and is connected to the delivery-tube 9 by a chain or other flexible connection 30. The said tube 9 is also provided with a projecting cam-pin 31, which acts upon the free end of the arm 28, as will be hereinafter described. The link 17, which is connected to the valve-arm 16, is pivotally connected to the valve-arm 29. The said arm 29 is provided with a projection 32, to which is pivoted a dog 33. In the normal positions of the parts the dog 33 is gravity-held against a stop-pin 34 on the projection 32, as shown in Fig. 1. The oscillating delivery-tube is further provided with a second cam-pin 35, which acts upon the arm 29 and upon the dog 33 thereof to oscillate the valve 22 in a manner presently to be described. Stops 36 and 37 on the side of the tank 1 limit the return movements of the valve-arms 28 and 29, respectively.

Operation: Normally the parts stand as shown by full lines in Figs. 1, 2, and 3. Directing attention to Fig. 3, it will be noted that the valves 4^a, 4^b, 4^c, and 22 are open, while the valves 8 and 21 are closed. It is evident that in these positions of the valves the liquid from the supply-tank 5 will freely flow into the several compartments 1^a 1^b 1^c of the measuring-tank 1 and will fill the same, since the air is freely exhausted therefrom through the open valve 22 and vent-pipe 24. It is also evident that the liquid will rise within the said tube 24 in seeking its level within the supply-tank 5. If five gallons—to wit, the entire contents of the several compartments of the measuring-tank 1—are to be measured out, the valves 4^a and 4^b are left standing open, with their arms 15 positioned as shown in Fig. 1, and the delivering-tube 9 is simply oscillated from its normal position (indicated by full lines in Fig. 1) into the position indicated by dotted lines in said view and by full lines in Fig. 4. This movement of the said delivery-tube, it will be noted by reference to Fig. 4, opens up the valve 8, so that the liquid will freely run out through the said delivery-tube. It will, however, be noted that the said same movement of the delivery-tube causes the cam-pin 35 thereof to engage the dog 33, and thereby force the valve-arms 16 and 29 into the positions indicated by dotted lines in Fig. 1, in which positions the two valves 4^c and 22 are closed. The closing of the supply-valve 4^c cuts off the supply of liquid while the measured liquid is being discharged, and the closing of the valve 22 prevents the downflow of the liquid contained in the vent-pipe 24, and thus insures the accuracy of the measuring device. Again, the latter part of the downward movement of the delivery-tube 9 after it has closed the two valves 4^c and 24 draws upon the chain 30 and moves the valve-arm 28 into the position indicated by dotted lines in Fig. 1, and thereby opens the vent-valve 21. Thus it will be seen that the liquid will not begin to run from the delivery-tube 9 until said tube has reached approximately its extreme lowered position. After the measuring-tank has been emptied or the predetermined amount of liquid drawn therefrom the delivery-tube 9 is turned back to its normal position, under which movement its cam-pins 31 and 35 acting, respectively, on the valve-levers 28 and 29, close the vent-valve 21 and again open the vent-valve 22. It will of course be seen that the supply-valve 4^c will be opened simultaneously with the opening of the vent-valve 22, since the arms of the said two valves are connected by the link 17. It will also be understood that the dog 33 will freely swing under the return movement of the delivery-spout to permit the cam-pin 35 to pass by the same and into engagement with the valve-arm 29. If but one gallon of the liquid is to be measured and drawn off, the valve 4^a should be closed before turning down the delivery-spout 9, while if two gallons are to be drawn off the valve 4^a should be left open and the valve 4^b should be closed. The said valves are closed by hand or by operating the levers 15. When one of the said valves is closed—for instance, the valve 4^a—its lever 15 will stand as indicated by dotted lines in Fig. 1, in which position it stands in the path of movement of the dog 11. This being the case, when the delivery-tube 9 is turned downward the said dog swings freely to clear the same; but as said dog cannot swing in an opposite direction it will when the said tube 9 is turned back to normal position engage the said valve-lever 15 and cam the same back to normal position and close the valve. In this way the valves 4^a and 4^b are always automatically restored to their normal open positions by the return movement of the delivery-tube.

As is clear from the above description, the valve 22 in the vent-pipe 24 is opened up to permit air to be exhausted from the measuring-tank and the said tank to be filled with the liquid, while the valve 21 in the vent-pipe 23 is opened up to permit air to flow into the said tank and the said tank or certain compartments thereof to be emptied. When air is forced upward through the pipe 24 while the said pipe is filled or partially filled with liquid, the liquid therein will be caused to bubble up and overflow the upper end of the said pipe, but will be caught by the expanded head 25 and will flow back into the pipe 24 when the valve 22 is opened.

A liquid-measuring apparatus of this character is capable of a great many different uses, but will be found especially serviceable by grocerymen and other merchants for measur-

ing and dispensing various oils, such as kerosene and gasolene, table liquids, such as vinegar, and even the heavier liquids, such as molasses and syrup.

It will of course be understood that the device is capable of considerable modification as to its details of construction within the scope of my invention, as herein set forth and claimed.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. The combination with a measuring-receptacle having inlet and outlet passages equipped, respectively, with supply and discharging valves, of an oscillating delivery-tube pivoted with respect to said receptacle and communicating with said discharging-valve, and connections whereby said supply-valve is closed and opened by the movements of said delivering-tube, respectively, to and from a delivering position, the said two valves receiving their opening and closing movements in reverse order under the movements of said tube, substantially as described.

2. The combination with a measuring-receptacle having inlet and outlet passages equipped, respectively, with supply and discharging valves, and having also a vent-passage equipped with a venting-valve, of an oscillating delivery-tube communicating with and connected to said discharging-valve, and operating the same, as described, and connections whereby the movement of said delivery-tube into a discharging position closes said supply-valve and opens said venting-valve, substantially as described.

3. The combination with a measuring-receptacle having inlet and outlet passages equipped, respectively, with supply and discharging valves and having also a pair of venting-pipes equipped with venting-valves arranged to operate in reverse order, of an oscillating delivery-tube, connections whereby said valve and one of the venting-valves will be closed and opened by the movements of said tube, respectively, to and from a discharging position, and connections whereby said discharging-valve and the other venting-valve will be opened and closed, by the movements of said tube, respectively, to and from a discharging position, said tube having communication with said discharging-valve, substantially as described.

4. The combination with a measuring-receptacle having inlet and outlet passages equipped, respectively, with supply and discharging valves, of an elevated supply-tank communicating with said supply-passage, a venting-pipe leading to an altitude above the bottom of said supply-tank and equipped with a venting-valve, an oscillating delivery-tube communicating with and connected to said discharging-valve and operating the same as described, connections whereby said supply-valve and venting-valve are closed and opened by the movements of said tube, respectively, to and from a discharging position, and a second venting device for affording a supply of air to said measuring-receptacle when said discharging-valve is opened and the said other two valves are closed, substantially as described.

5. The combination with a measuring-receptacle made up of several compartments and having inlet and outlet passages communicating with all of the compartments thereof and equipped, respectively, with supply and discharging valves, of cut-off valves in the communicating passages between the several compartments, said cut-off valves having arms by means of which they may be closed at will, a venting device leading from the several compartments of said measuring-receptacle, an oscillating delivery-tube communicating with and operating said discharging-valve, as described, connections whereby said supply-valve is closed and opened by the movements of said delivery-tube, respectively, to and from a discharging position, the said tube having a projection for action on the arms of said cut-off valves to automatically close the same when it is turned back to normal position, substantially as described.

6. The combination with a measuring-tank made up of compartments, of the pipe 4 communicating with said compartments through necks 3 and equipped with the cut-off valves 4^a 4^b, supply-valve 4^c and discharging-valve 8, the elevated supply-tank 5 having the supply-pipe 6 leading to said valve 4^c, the venting-tubes 23 and 24 and valve-seats 18 and 19 opening from said measuring-tank, the valves 21 and 22 mounted, respectively, in said seats 18 and 19 and provided, respectively, with the arms 28 and 29 the latter of which carries a dog 33 pivotally movable in one direction only, the venting-tube 20 affording communication between the several compartments of said measuring-tank, the cam-arms 15 on said cut-off valves 4^a and 4^b, the arm 16 on said supply-valve 4^c connected to said valve-arm 29 by a link 17, the oscillating delivery-tube 9 connected to and communicating with said discharging-valve 8, the rod or extension 10 also carried by said valve 8, the dog 11 mounted for pivotal movement in one direction only on said extension 10 and acting on said cam-arms 15, as described, a flexible connection between said tube 9 and the valve-arm 28, and a projection from said tube 9 coöperating with the valve-arm 29 and its dog 33, as described.

In testimony whereof I affix my signature in presence of two witnesses.

THOMAS EVERETT MATHER.

Witnesses:
ELIZABETH H. KELIHER,
F. D. MERCHANT.