Sept. 4, 1928. 1,683,337

W. ERNEST ET AL

BARREL FILLING APPARATUS

Filed April 23, 1927 2 Sheets-Sheet 1

Fig. 1.

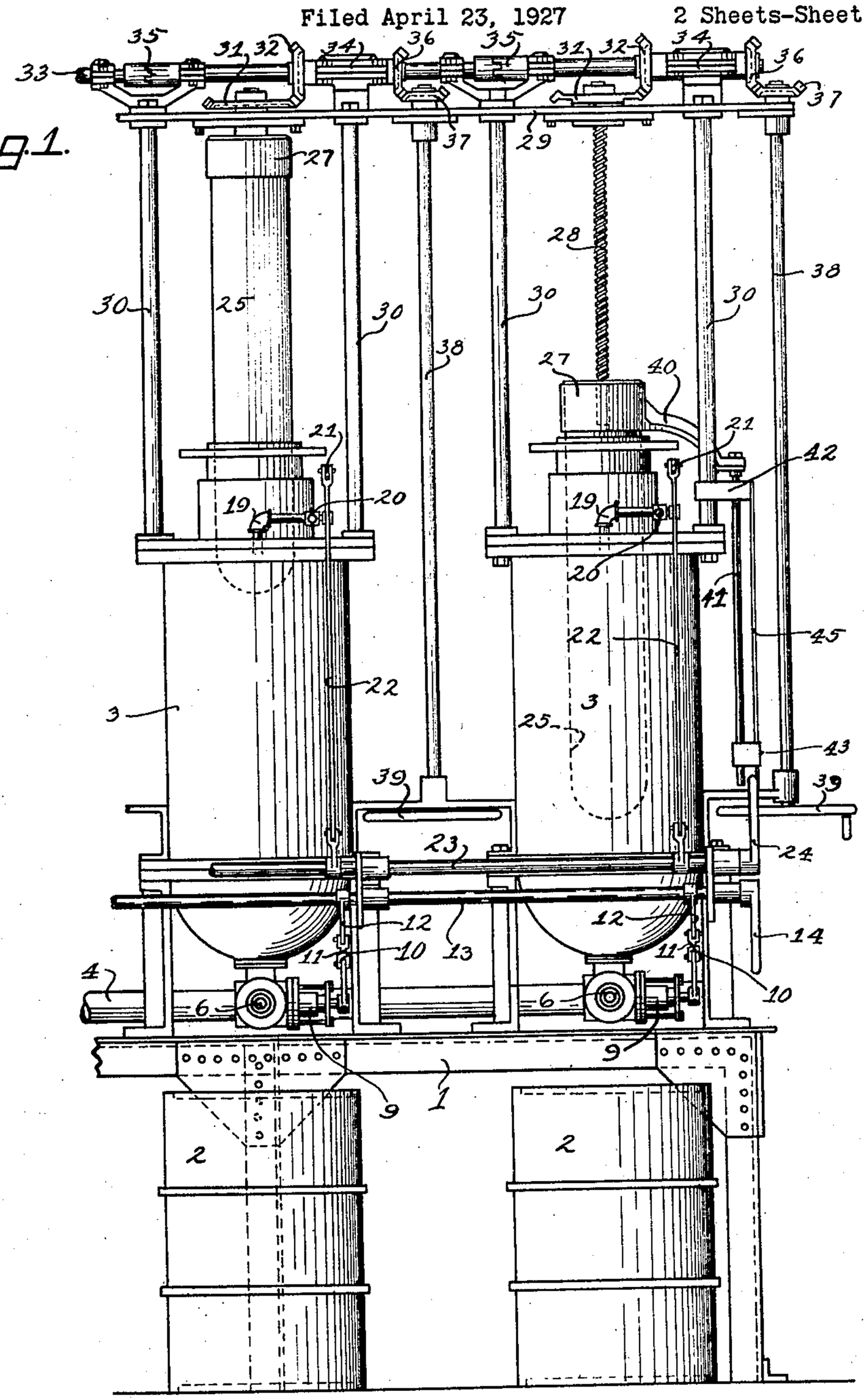

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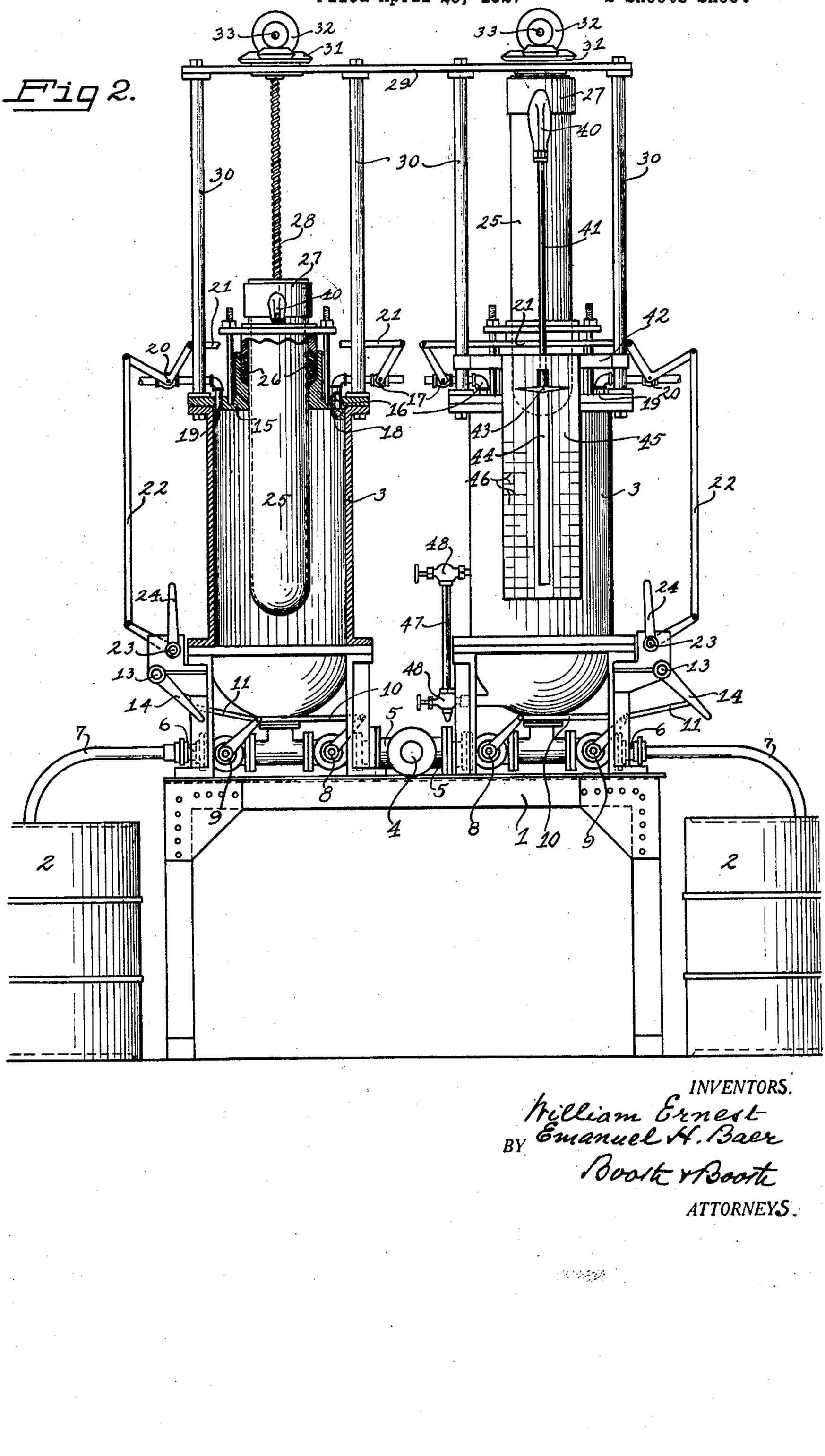
Fig 2.



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UNITED STATES PATENT OFFICE.

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BARREL-FILLING APPARATUS.

Application filed April 23, 1927. Serial No. 186,000.

Our invention relates to an apparatus for filling containers with measured quantities of liquids.

The principal object of our invention is to provide an apparatus for the described purpose in which the volume of liquid delivered in any given charge can be quickly and accurately varied, in order to compensate for changes in temperature, or to vary the amount of delivered fluid for any other purpose.

Another object of the invention is to provide a simple and easily operated apparatus which will not permit spilling or waste of the liquid even if the operator be inadvertent.

A still further object is to provide an apparatus in which a plurality of similar units may be coupled together for simultaneous operation to fill a plurality of containers.

Other objects and advantages of the invention will become apparent from the following specification which should be read with the understanding that the form, construction and arrangement of the several parts therein described may be varied within the limits of the claims hereto appended, without departing from the spirit of the invention as expressed in said claims.

With this in view, a preferred embodiment of our invention will now be described fully with reference to the accompanying drawings, wherein:—

Fig. 1 is a front elevation of a portion of an apparatus having a plurality of units arranged in two lines or rows, one behind the other. Two such units, in the front row, appear in this view, the corresponding two units of the rear row being directly behind the two units shown.

Fig. 2 is a part sectional end elevation of the same apparatus, showing the relative positions of the two rows of measuring units.

In the drawings, the reference numeral 1 designates a base or stand upon which the apparatus is mounted. 2 are the containers to be filled, which in this instance are shown as steel barrels of well known form. The stand 1 supports a plurality of liquid measuring units, identical in construction, each of which comprises a preferably cylindrical receptacle 3 of a size sufficient to contain the maximum amount of fluid to be delivered to one barrel at any one charge.

The fluid is supplied to all the receptacles 3 through a common supply line 4, positioned between the front and rear rows, and which has a branch 5, Fig. 2, leading to the bottom of each receptacle. Except for the common supply line, the two rows of units are preferably entirely independent of each other, one being operated from the front of the stand 1 and the other from the rear. The units of each row are connected together for simultaneous operation, as will be presently described. The fluid is discharged from each receptacle independently through a pipe 6 provided with a suitable delivery extension indicated as a flexible tube 7 adapted to conduct the fluid to the container 2. The supply line branch 5 and the discharge pipe 6 of each receptacle are provided with respective valves 8 and 9, interconnected by a link 10, and both are operated by a link 11 and a lever 12, the latter being secured upon a horizontal rock shaft 13, as shown in Fig. 1. The shaft 13 extends across the entire apparatus and operates all the supply and discharge valves of the front row of receptacles simultaneously. The corresponding valves of the rear row or line of receptacles are operated by a similar shaft extending across the rear of the apparatus, as shown in Fig. 2. The shafts 13 are provided with suitable operating handles 14. The valves 8 and 9 are arranged for opposite operation, one being open when the other is closed and vice versa, so that by the operation of the handle 14 in the one direction, fluid is admitted to the receptacles 3, and by its operation in the other direction the fluid is allowed to flow out of said receptacles into the containers 2.

Each receptacle 3 is provided with a closed top 15, Fig. 2. A vent pipe 16 is provided in the upper end of said receptacle and is adapted to be opened or closed by a manually operated valve 17. A float valve 18 is also preferably provided to close the vent 16 when the receptacle 3 is full of liquid, in order to prevent any waste of said liquid through said vent. An air inlet connection 19 is also preferably provided in the upper end of the receptacle 3, and is understood to be connected with any suitable source, not shown, of air under pressure. The air inlet 19 is controlled by a valve 20, and said valve 20 and the vent valve 17 are interconnected for simultaneous and opposite operation by

a link 21. The valves 17 and 20 of the front line of receptacles are preferably operated simultaneously through links 22 from a rock shaft 23 provided with a handle 24. The corresponding valves of the rear line of receptacles are similarly operated by a similar shaft and handle, as shown in Fig. 2.

In operating the apparatus, the attendant, after placing the empty containers 2 in position to be filled, throws the lever 14 to open the supply valves 8 and close the discharge valves 9. By means of the lever 24, he also opens the vent valves 17 and closes the air valves 20. The liquid thereupon flows into the receptacles 3 through the common supply line 4 and the branches 5. When said receptacles are full, the float valves 18 close the vents 16 automatically, thereby preventing further flow of liquid. The operator then throws the lever 14 to its opposite position, closing the supply valves 8 and opening the discharged valves 9, and he also operates the lever 24 to close the vent valves 17 and to open the air valves 20. The liquid within the receptacles 3 now flows out through the pipes 6 and the delivery nozzles 7 into the containers 2, and its delivery is expedited by the air pressure entering through the pipes 19. When the receptacles 3 are empty, the operation is repeated.

The air supply pipes 19 and their controlling valves may be omitted if the nature of the liquid being handled is such that it will flow with sufficient rapidity without the assistance of air pressure in the receptacles 3, but for operating with viscous liquids, the use of the air connections described enables the receptacles 3 to be emptied more quickly. If the air connections are dispensed with, the manual valves 17 for controlling the vents 16 are superfluous.

It will be understood from the above description that the volumetric contents of the receptacles 3 controls the amount of liquid supplied to the containers 2 on a given charge. The mechanism for varying the volumetric capacity of the receptacles 3 will now be described. A displacement body in the form of a plunger 25 extends slidably through the upper end 15 of each receptacle 3, and is provided with suitable packing indicated at 26 in Fig. 2, to prevent leakage around it.

The displacement plunger 25 is hollow, and in its upper end is fixed a nut 27 adapted to engage a screw 28. Thus rotation of the screw 28 raises or lowers the plunger 25 and thereby varies the volumetric capacity of the receptacle 3. The upper end of the screw 28 has a bearing in a frame 29 supported by uprights 30 from the receptacle 3, and carries a beveled gear 31 which meshes with a similar gear 32 mounted upon a horizontal shaft 33, the latter being carried in bearings 34, Fig. 1, upon the frame 29. Each unit in the front row has an independent section of the horizontal shaft 33, and all said sections are aligned and interconnected by jaw clutches 35. Each section of the shaft 33 is also provided with a beveled gear 36 adapted to mesh with a similar gear 37 carried upon the upper end of a vertical shaft 38, the lower end of said vertical shaft being provided with a hand wheel 39. Thus when the jaw clutches 35 are engaged, the displacement plungers of all the units of the front row may be adjusted simultaneously by means of any one of the hand wheels 39, but if it be desired to adjust said plungers independently, the jaw clutches 35 are disengaged and each plunger is then adjusted by its own hand wheel. The plungers of the rear row of units are similarly operated. The frame 29 preferably extends continuously across all the receptacles of both rows, thus forming a bracing connection between the upper ends of the uprights 30.

A forwardly extending arm 40 is secured to the upper end of the plunger in the endmost unit of each row. A vertical rod 41 is secured to said arm and extends downwardly therefrom through a guide 42. The lower end of said rod carries a pointer 43 adapted to extend forwardly through a slot 44 in a fixed indicator plate 45. The outer face of the plate 45 is provided with a suitable scale 46, Fig. 2, preferably graduated to express directly the volumetric capacity of the receptacle 3, so that the attendant, by observing the position of the pointer 43 upon said scale, can determine such volumetric capacity instantly. Each receptacle may be provided with an independent indicating means, if desired, but as such means would be merely a repetition of that described above, it has been omitted from the drawings.

The scale 46 may be removable from the plate 45 in order to permit the substitution of other scales of different notation, and if desired the scale may be calibrated to express the volume of the liquid charge within the receptacle 3 in terms of one or more temperature variations.

The receptacles 3 may be provided with gauge glasses, if desired. One such glass is indicated at 47 in Fig. 2, and is mounted between the usual type of valved fittings 48.

It is to be noted that our apparatus does not depend for accuracy of result upon the attention of the operator, except to the extent that he must adjust the positions of the plungers 25 to cause the receptacles to deliver the proper volume of liquid at each charge. The controlling valves are so arranged that there can be no waste of the liquid even if the attendant should neglect to operate the valves at the proper times. With the supply valve 8 open and the delivery valve 9 closed, the liquid will flow into the receptacle 3 until it is full, and will then cease flowing automatically, and when said

valves are in the opposite position only the amount of liquid within said receptacle can flow out through the delivery pipe 6.

It is also to be noted that there are no moving parts subject to wear in our apparatus. The plungers 25 are moved only when it becomes necessary to vary the capacity of the measuring receptacles, and are therefore subject to very little wear. Moreover, the only parts which require accurate machining are the outsides of said plungers; the interiors of the receptacles require no finishing whatever.

We claim:—

1. An apparatus for the described purpose comprising a closed measuring receptacle having a liquid inlet and outlet; a vent in the upper portion of said receptacle; a connection for introducing air under pressure into the upper portion of said receptacle; valves in said vent and said pressure connection; means interconnecting said valves for simultaneous and opposite operation; and an adjustable displacement body within said receptacle for varying its volumetric capacity.

2. An apparatus for the described purpose comprising a plurality of fixed closed measuring receptacles, each having an inlet and an outlet; a displacement plunger adjustable into and out of each receptacle; means for adjusting all said plungers simultaneously; and means for independently adjusting each plunger, said adjusting means being adapted to prevent movement of said plungers by the liquid in said receptacles.

3. An apparatus for the described purpose comprising a plurality of measuring receptacles arranged in a row; an adjustable displacement plunger extending into each receptacle; a rotatable shaft extending the length of the row of receptacles and divided into sections; means connecting each section with a plunger whereby rotation of said section will adjust said plunger; means for independently rotating each section; and means for connecting said sections together for simultaneous rotation.

4. An apparatus for the described purpose comprising a plurality of measuring receptacles; an adjustable displacement plunger extending into each receptacle; a rotatable screw having threaded engagement with each plunger for adjusting the same; means for rotating each screw independently; and means interconnecting said screws for simultaneous rotation.

In testimony whereof we have signed our names to this specification.

WILLIAM ERNEST.
EMANUEL H. BAER.