(No Model.) 3 Sheets—Sheet 1.

# W. LINDSAY.

## APPARATUS FOR MEASURING, REGISTERING, AND DELIVERING LIQUIDS.

No. 594,630. Patented Nov. 30, 1897.

FIG. 5.

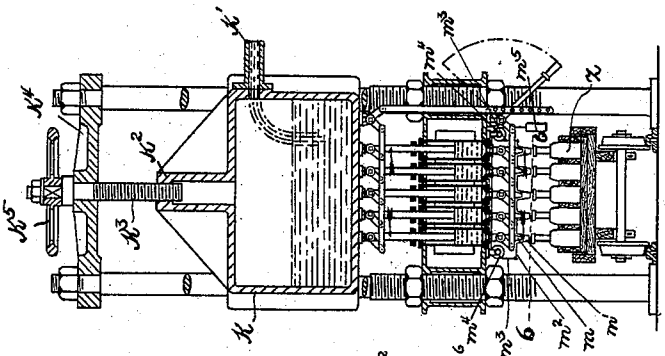


FIG. 6.

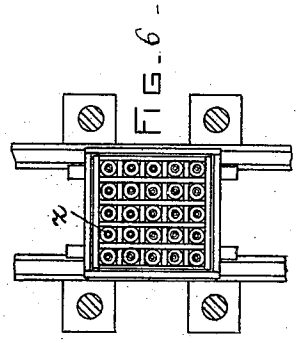


FIG. 2.

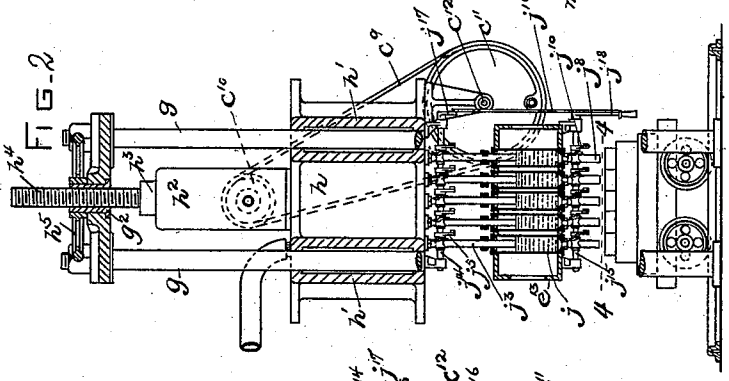


FIG. 4.

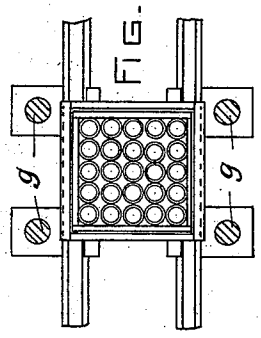


FIG. 1.

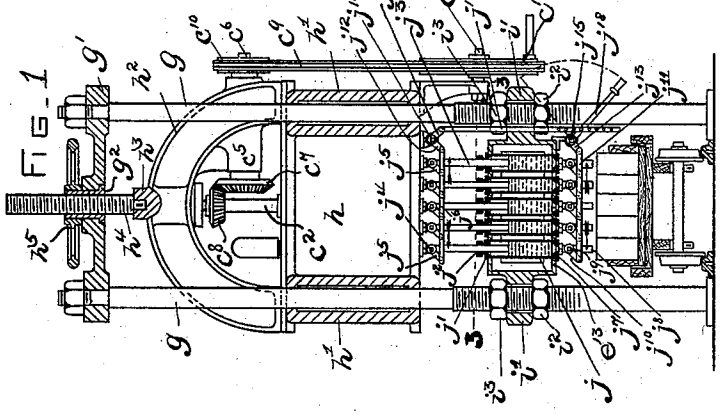
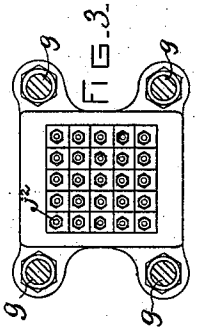


FIG. 3.



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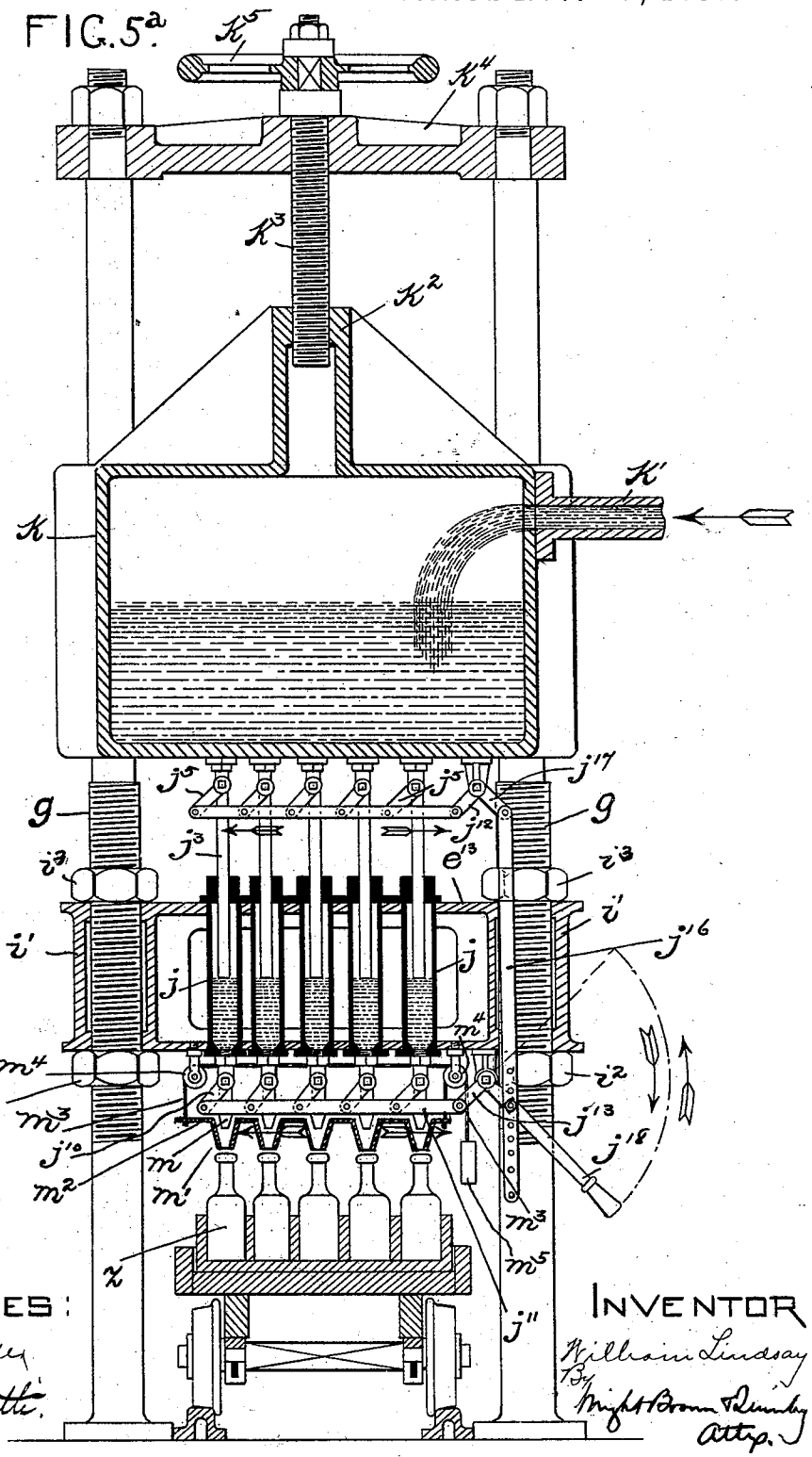
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# W. LINDSAY.

## APPARATUS FOR MEASURING, REGISTERING, AND DELIVERING LIQUIDS.

No. 594,630. Patented Nov. 30, 1897.

FIG. 5a.




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(No Model.) 3 Sheets—Sheet 3.

# W. LINDSAY.

## APPARATUS FOR MEASURING, REGISTERING, AND DELIVERING LIQUIDS.

No. 594,630. Patented Nov. 30, 1897.

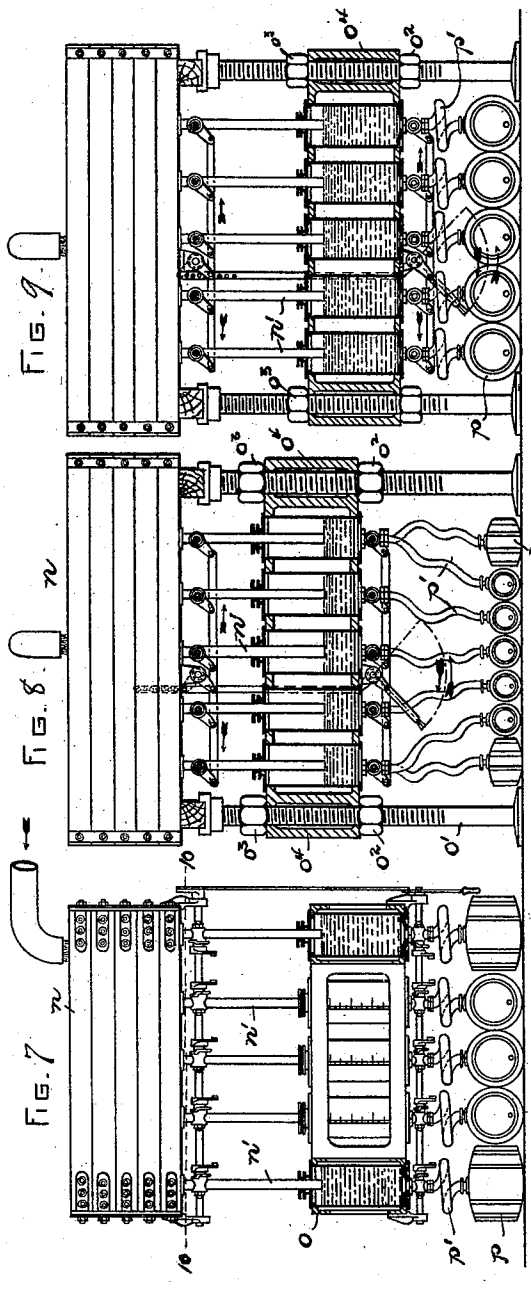


Fig. 9.

Fig. 8.

Fig. 7.

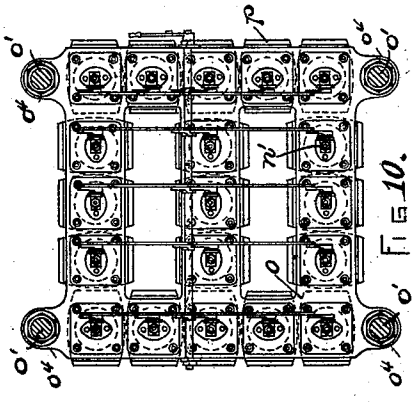


Fig. 10.

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# UNITED STATES PATENT OFFICE.

WILLIAM LINDSAY, OF MANCHESTER, ENGLAND.

## APPARATUS FOR MEASURING, REGISTERING, AND DELIVERING LIQUIDS.

SPECIFICATION forming part of Letters Patent No. 594,630, dated November 30, 1897.

Application filed December 30, 1896. Serial No. 617,490. (No model.) Patented in England June 7, 1894, No. 11,028.

*To all whom it may concern:*

Be it known that I, WILLIAM LINDSAY, of Manchester, England, have invented certain new and useful Improvements in Apparatus for Measuring, Registering, and Delivering Liquids, Powders, &c., (for which I have obtained Letters Patent in Great Britain June 7, 1894, No. 11,028,) of which the following is a specification.

This invention relates to an apparatus for measuring matter in liquid, semiliquid, or powdered form preparatory to filling of receptacles—such as jars, bottles, casks, or the like.

The principal object of the invention is to provide an apparatus whereby receptacles can be supplied with an ascertained quantity of matter previously measured, so that when delivered no possibility of waste by the overflowing of the matter can occur.

The accompanying drawings, which form part of this specification, illustrate a number of forms in which the invention may be embodied.

Figure 1 shows a sectionalized end elevation of one form of apparatus embodying the invention. Fig. 2 shows a longitudinal section of the same. Fig. 3 shows a cross-section on the line 3 3 of Fig. 1. Fig. 4 shows a sectionalized plan view taken on the line 4 4 of Fig. 2. Fig. 5 shows a view similar to Fig. 1, illustrating a modification. Fig. $5^a$ shows the same view on an enlarged scale. Fig. 6 shows a section on the line 6 6 of Fig. 5. Fig. 7 shows a sectionalized side elevation of another form of apparatus embodying the invention. Figs. 8 and 9 show sectional views of this modification under different adjustments. Fig. 10 shows a sectionalized plan view taken on the line 10 10 of Fig. 7.

Referring to Figs. 1 to 6, inclusive, the letter $g$ designates supporting-columns screw-threaded to a limited extent and connected at their upper ends by a cross-head $g'$. A tank $h$ is formed with guides $h'$, embracing the columns $g$ and adapted to slide thereon, the vertical adjustment of the tank in the present instance being effected through the following-described means: The bridge-piece $h^2$ on the tank is formed with a centrally-located boss $h^3$, in which is fastened one end of a screw $h^4$, projecting through the cross-head $g'$, and engaged by a nut $g^2$, fitted to rotate in said cross-head, but held from longitudinal movement therein by a shoulder formed on its lower end, and a hand-wheel $h^5$, fastened to it above the cross-head $g'$ and resting thereagainst. By turning the hand-wheel and with it the nut it will be seen that the tank may be raised and lowered and an accurate adjustment thereof obtained.

I preferably arrange a stirrer within the tank $h$ and drive it through the following-described connections with its spindle $c^2$: The said bridge-piece is formed with a horizontal bearing $c^5$ for a shaft $c^6$, operatively connected with the said spindle through miter-gears $c^7$ and $c^8$, affixed to the shaft and spindle, respectively. A sprocket-wheel $c^{10}$ is affixed to the outer end of the shaft $c^6$ and is connected by a chain $c^9$ with a handle-equipped sprocket-wheel $c^{11}$, loosely mounted on a stud $c^{12}$, which is fixed in a suitable lug formed on the lower flange of the tank.

In the present case the frame or support $e^{13}$ for the receivers is adjustably supported by means of lugs $i'$, formed thereupon and loosely embracing the columns $g$ at the screw-threaded portions thereof, and nuts $i^2$ on said screw-threaded portions below the said lugs, locking-nuts $i^3$ being arranged on said screw-threaded portions above the lugs.

The receivers $j$ are transparent and cylindrical and are supported between the upper and lower sides of the frame $e^{13}$. Their upper ends are closed by stuffing-boxes $j'$, receiving stuffing-glands $j^2$, and tubes $j^3$, which depend from the tank $h$, enter the receivers through said glands and stuffing-boxes, whereby, although a relative movement may be had between the tank and receivers, air-tight joints are maintained between the said tubes and the receivers. These tubes are designed to conduct the matter in the tank to the receivers, and such communication is controlled by plug-cocks $j^4$, arranged in the tubes $j^3$, the said plug-cocks having crank-arms $j^5$, all of which are connected together by a tie-rod $j^6$, so as to secure simultaneous operation. The lower ends of the receivers are closed by covers $j^7$, which are tapped to receive delivery-nozzles $j^8$, in which are arranged plug-cocks $j^9$, having crank-arms $j^{10}$, connected by a tie-rod $j^{11}$. The plug-cocks $j^9$ are set oppositely to the plug-cocks $j^4$, so that when the latter

are closed the former are open. A mechanism of the following description is provided to secure reverse operations of these plug-cocks: The tie-rods $j^9$ and $j^{10}$ are connected, respectively, with crank-arms $j^{12}$ and $j^{13}$, affixed to shafts $j^{14}$ and $j^{15}$, respectively, and the said shafts are connected together by a lengthening-rod $j^{16}$, coupled to crank-arms $j^{17}$ and $j^{18}$, affixed to the shafts at an angle to the crank-arms $j^{12}$ and $j^{13}$, so as to form bell-cranks therewith. The crank-arm $j^{18}$ is elongated to form a handle, by manipulation of which the plug-cocks can be opened and closed.

The measure is ascertained by a suitable scale marked thereon, the tubes $j^3$ being adjusted so that their lower ends register with the marks on the scales indicating the measure desired. As before indicated, the receivers are air-tight, and therefore when the matter from the tank $h$ is allowed to flow into the receivers it will rise in the same only to the points where the lower ends of the tubes $j^3$ are located.

The operation of this form of apparatus will now be apparent and will be but briefly reviewed. The operator by manipulating the hand-wheel $h^5$ brings the lower ends of the nozzles $j^3$ to register with the marks on the scales corresponding with the measure desired. He then manipulates the handle $j^{18}$ and opens communication between the tank and receivers and closes communication between the receivers and their delivery-nozzles. The transparency of the receivers enables the operator to ascertain at a glance when they have received their full quota of matter, and thereupon he again manipulates the handle $j^{18}$, closing communication between the tank and receivers and opening communication between the receivers and their delivery-nozzles. A truck having previously been run in under the receivers containing the jars or other receptacles which are to be filled, the said receivers discharge into said jars in the manner before explained in connection with the first-described apparatus.

The stirrer hereinbefore described is not indispensable, but is very desirable when matter in a semiliquid or powdered state is under treatment. In Fig. 5 I show an apparatus without the stirrer, which apparatus is designed more especially for the handling of liquids. Here the tank $k$ is closed at the top and the supply-pipe $k'$ enters at the side. The form of means for vertically adjusting the tank is slightly modified as compared with the showing in Figs. 1 and 2. The tank is formed with a screw-threaded boss $k^2$ in its top portion, which boss is engaged by a screw $k^3$, passing loosely through the cross-head $k^4$ and carrying above the same a hand-wheel $k^5$, which is fastened to it, so that upon turning said hand-wheel the screw is turned and the tank moved vertically. A modification is also here illustrated of the arrangement for delivery of the contents of the receiver. In the former figures I have shown simply nozzles to discharge into jars with comparatively large open upper ends. In the figure now described the delivery apparatus is shown adapted to bottles, and to this end the delivery-nozzles $m$ are contracted and funnels $m'$ are arranged to embrace the same and to be capable of vertical adjustment, the said funnels being preferably struck up from a sheet of metal $m^2$, which is supported by cords $m^3$, passing through pulleys $m^4$, and carrying a counterbalancing weight $m^5$. When the truck containing the bottles to be filled is first run under the receivers, the funnel-plate is elevated, as shown in Figs. 5 and $5^a$, sufficiently to clear the mouths of said bottles $z$, but when the bottles have been properly positioned the funnel-plate is drawn down so that the small ends of the funnels can enter the mouths of the bottles. By this arrangement it will be seen that the contents of the receivers will be conducted into the bottles without any possibility of spilling.

It will be evident that with an apparatus such as shown in Figs. 1 to 6, just described, the adjustment to ascertain the desired measure might be accomplished as well by vertical movement of the receiver-support as by movement of the tank; and in Figs. 7 to 10 I have shown the form of apparatus in which the tank $n$ is stationarily supported, and the receiver support or frame $o$ is adjustably supported on the columns $o'$, which are screw-threaded throughout the greater portion of their length and carry nuts $o^2$ and $o^3$ above and below the guides $o^4$, which embrace said columns. In this form of apparatus the tank $n$ rests upon beams supported by the upper ends of the columns, and, of course, the tubes $n'$, which depend from the tank, do not partake of any vertical movement, as in the former case, but the receivers are moved up and down with their support to effect adjustment to the measure desired.

A further modification is illustrated in these figures in connection with the delivery from the receivers. The apparatus is here adapted to the filling of casks $p$, and flexible pipe-sections $p'$ are attached to the delivery-nozzles of the receivers and are coupled with the bung-holes of the casks. The valve mechanism in this modification is substantially the same as that before described in connection with Figs. 1 to 6.

Various forms of apparatus other than those here shown might be devised for embodying the invention, and I do not, therefore, confine myself to any one particular form of apparatus.

Having thus described my invention, what I claim is—

1. A measuring apparatus comprising an air-tight receiver, a measure-regulating supply-tube extending into and communicating with said receiver with provisions for varying the extent of its projection thereinto, and valves controlling the supply through said

tube and the delivery from the receiver, substantially as described.

2. A measuring apparatus comprising an air-tight receiver, a measure-regulating supply-tube extending into and communicating with said receiver with provisions for varying the extent of its projection thereinto, a valve controlling the supply through said tube, a valve controlling the delivery from the receiver, and connections between said valves to effect their simultaneous operation, substantially in the manner described.

3. A measuring apparatus comprising a plurality of air-tight receivers, measure-regulating supply-tubes extending into and communicating with the receivers respectively, with provisions for varying the extent of their projection thereinto, and valves controlling supply to said receivers through said tubes, and delivery from the receivers, and connected for simultaneous operation, substantially as described.

4. A measuring apparatus comprising a gang of receivers, measure-regulating supply-tubes extending into and communicating with the said receivers respectively and longitudinally adjustable therein, and valves controlling supply to the receivers through the tubes and delivery from the receivers and connected for simultaneous operation, substantially as described.

5. In a measuring apparatus, the combination of a supply tank or reservoir, an air-tight measuring chamber or receptacle below the same, one of said parts being adjustable toward and from the other, a tube fastened to the tank and communicating with the interior thereof and extending through a stuffing-box in the top side of the measuring-receptacle and communicating with the interior of the latter, and adjusting means for varying the distance between the tank and the receptacle and consequently the extent of projection of the tube into the latter, to regulate the measure therein by entrapment of air in the receptacle above the lower end of the tube.

6. A measuring apparatus comprising a supply-tank, a support below the same, one of said parts being adjustable toward and from the other, a gang of air-tight receivers carried by said support, tubes carried by the tank and extending into the top sides of the receivers respectively, with a sliding engagement, valves controlling communication between the tank and the receivers through said tubes, valves controlling the delivery from the receivers, connections between all the said valves for securing simultaneous operation thereof, and means for varying the distance between the tank and the receiver-support and consequently the extent of projection of the tubes into the receivers, to regulate the measure by entrapment of air in the receptacles above the lower ends of the tubes.

7. In a measuring apparatus, the combination of receivers, in communication with a source of supply and having outlet-nozzles, valve mechanism controlling such communication, and, also, the outlet from the receivers, a plate having a series of funnels embracing the said nozzles respectively, a counterbalance, flexible connections between the same and the funnel-plate, and guides for said connections.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 9th day of October, A. D. 1896.

WILLIAM LINDSAY.

Witnesses:
JOHN HAMMILL,
W. SENIOR ELLIS.