(No Model.) 2 Sheets—Sheet 1.

J. ROBERTSON & H. COOPER.

MACHINE FOR FILLING INTO RECEPTACLES MEASURED QUANTITIES OF LIQUIDS, &c.

No. 559,540. Patented May 5, 1896.

Fig. 1.

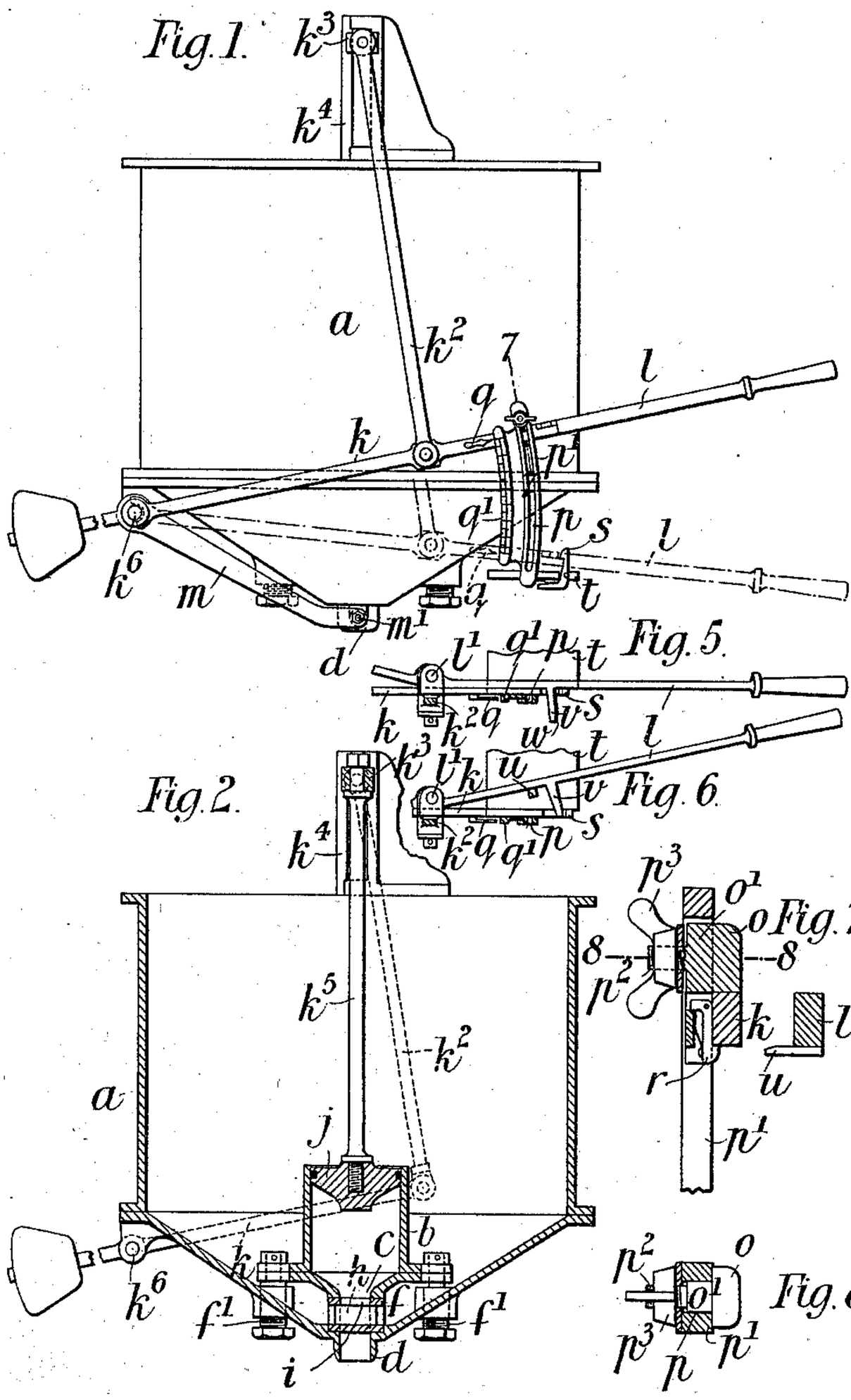

Fig. 2.

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

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Fig. 3

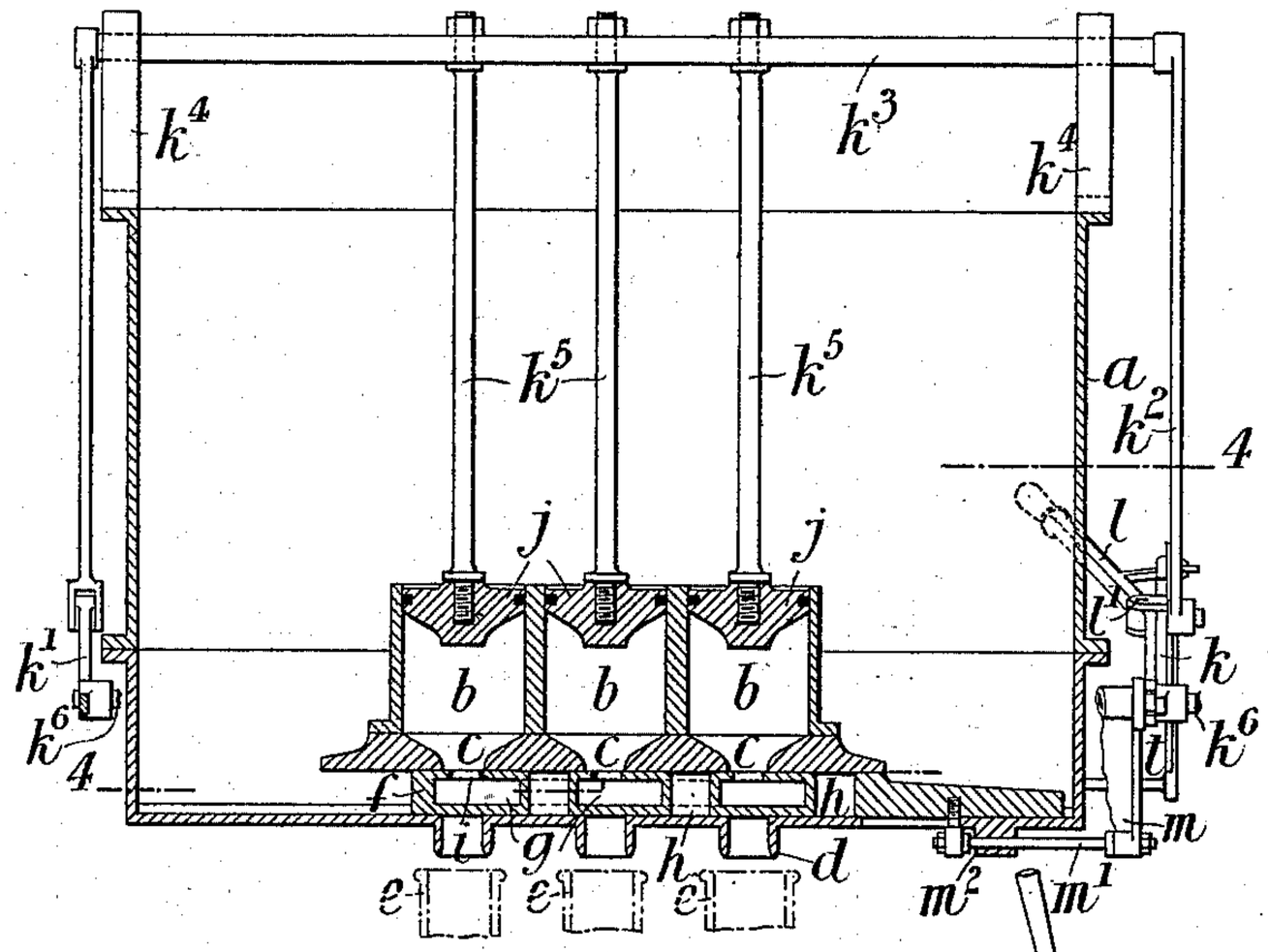
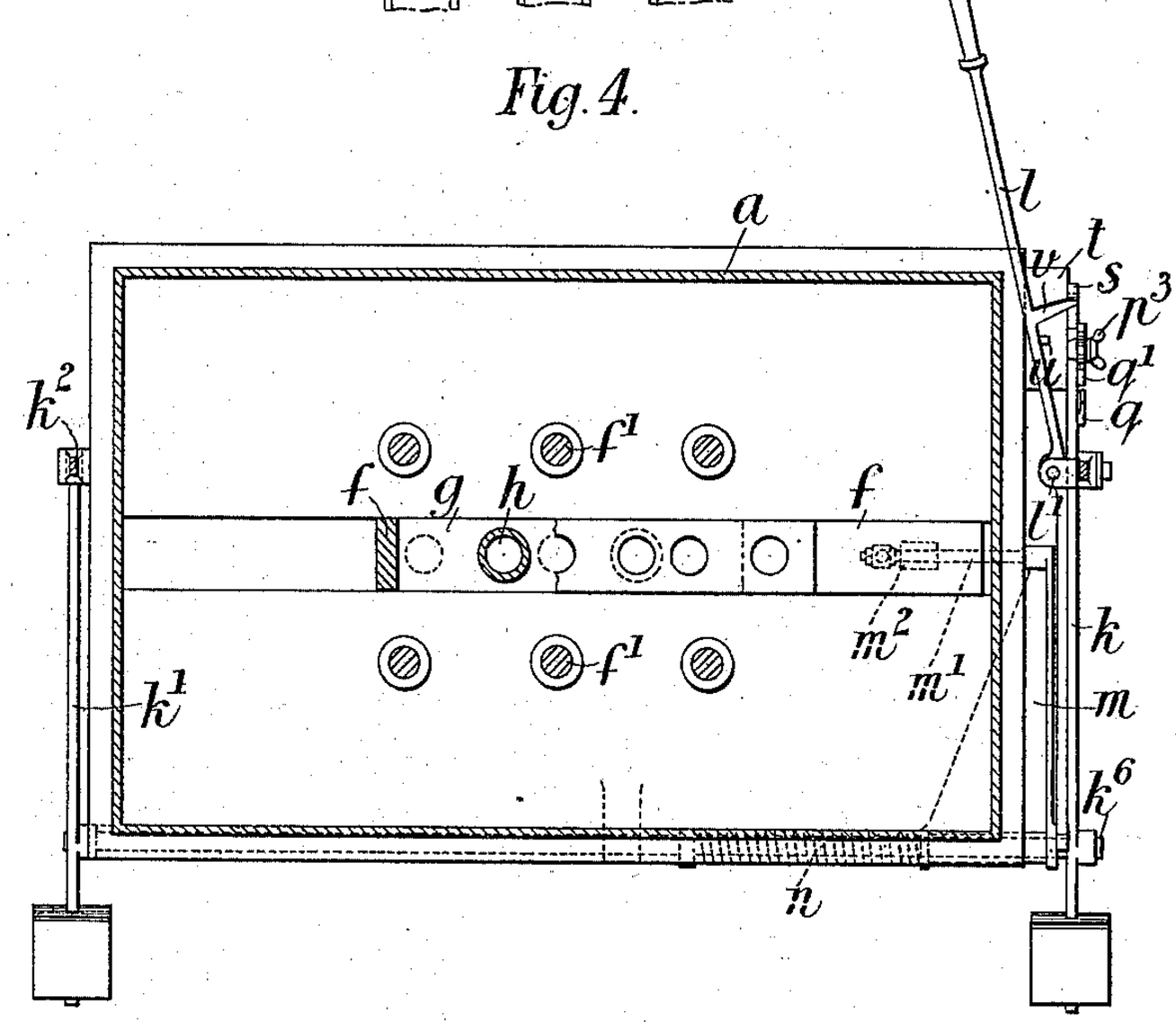


Fig. 4.



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UNITED STATES PATENT OFFICE.

JAMES ROBERTSON AND HENRY COOPER, OF LONDON, ENGLAND.

MACHINE FOR FILLING INTO RECEPTACLES MEASURED QUANTITIES OF LIQUIDS, &c.

SPECIFICATION forming part of Letters Patent No. 559,540, dated May 5, 1896.

Application filed August 23, 1895. Serial No. 560,222. (No model.) Patented in England February 2, 1894, No. 2,320.

To all whom it may concern:

Be it known that we, JAMES ROBERTSON and HENRY COOPER, subjects of the Queen of Great Britain, residing at Plaistow, London, in the county of Essex, England, have invented a new and useful Machine for Filling into Receptacles Measured Quantities of Liquids and Semiliquids, (for which we have obtained a patent in Great Britain, No. 2,320, dated February 2, 1894,) of which the following is a specification.

This invention relates to a machine or apparatus for filling receptacles with predetermined quantities of liquids and semiliquids, and is especially adapted for filling pots with syrup, jam, or the like.

In carrying out our invention we employ a reservoir or tank of any convenient size or shape provided with a number of measuring vessels adapted to hold a predetermined quantity of liquid, and each having an opening through the bottom for the ingress and egress of the liquid or semiliquid. At the bottoms of the said vessels a valve is fitted adapted to act alternately as a receiving and delivery valve. The part of the machine on which the valve rests is provided with openings or nozzles corresponding in number to the measuring vessels and in such a position that the contents of the vessels can pass out through the valve into the receptacles. When the valve is closed over the openings or nozzles, the liquid or semiliquid is allowed to pass from the reservoir or tank into the measuring vessels, and when the latter are filled with the desired quantity the valve cuts off the supply from the reservoir or tank, and allows the contents of the measuring vessels to pass through the openings in the bottoms of the vessels and through the valve and openings or nozzles under the valve into receptacles below. The valve is advantageously manipulated by a lever, a pointer indicating the position of the movable end of each vessel corresponding with the quantity of liquid or semiliquid contained in each measuring vessel.

To enable our invention to be fully understood we will describe how it can be carried into practice by reference to the accompanying drawings, in which—

Figure 1 is a side elevation of a machine or apparatus constructed according to our invention for filling receptacles with predetermined quantities of liquids and semiliquids. Figs. 2 and 3 are respectively a vertical transverse section and a longitudinal transverse section of the same; and Fig. 4 is a horizontal section on the line 4 4, Fig. 3. Figs. 5 and 6 are plans illustrating different positions of the operating-lever. Fig. 7 is a section on the line 7 7, Fig. 1, drawn to an enlarged scale; and Fig. 8 is a section on the line 8 8, Fig. 7.

a is the reservoir or tank for holding the liquid or semiliquid to be filled into the receptacles, such as jam-jars, and *b b b* are the vessels for measuring the liquid or semiliquid. We have indicated three of such vessels, but any other number may be employed.

c c c are the openings at the bottoms of the vessels *b* for the ingress and egress of the liquid or semiliquid, and *d d d* are the nozzles for the discharge of the same into receptacles *e e e*, the said nozzles being in alinement with the openings *c c*.

f is the valve for opening communication between the vessels *b b* and the interior of the tank *a* and the discharge-nozzles *d d* alternately. The said valve is advantageously arranged to slide and is constructed with transverse openings *g g* in communication with the interior of the tank *a* and with vertical openings *h h* alternating with the openings *g g*, the latter also having openings *i i* at the top, so that when coincident with the openings *c c*, as shown in Figs. 2 and 3, the contents of the tank *a* can pass into the vessels *b b*. When, however, the valve is moved so that the openings *h h* coincide with the openings *c c* and nozzles *d d*, the contents of the vessels *b* can pass into the receptacles *e e*. The wear upon the faces of the valve *f* and surfaces in contact therewith we advantageously take up by drawing down the vessels *b b* by means of screws *f' f'*, screwed through bosses in the bottom of the tank *a* and connected to lugs on the said vessels, as shown clearly in Fig. 2.

In order that predetermined quantities of liquid or semiliquid shall be measured, we arrange for varying the capacity of the measuring vessels *b b*. For this purpose we advantageously form the said vessels with movable ends or pistons *j j* working within the vessels which are cylindrical and, in order

that the liquid or semiliquid shall meet with no resistance in its passage into the vessels *b b* due to any confined air, we arrange the ends or pistons *j j* to be moved so as always to be in contact with the liquid or semiliquid. With semiliquids, such as jam, this arrangement also facilitates the passage of the jam into and out of the vessels *b b*.

k k' are counterweighted levers for operating the movable ends *j j* through the medium of rods k^2 k^2, a cross-head k^3, working in guides k^4 k^4, and piston-rods k^5 k^5, the said levers being connected to a shaft k^6.

l is the lever for operating the valve *f*, the said lever being in the form of a hand-lever and fulcrumed at *l'* to the lever *k* in such a manner that its plane of movement is at right angles to that of the said lever *k*, whereby it also serves to operate the latter, and consequently the movable ends or pistons *j j*. The operation of the said pistons is obtained by a vertical movement of the lever *l*, while the valve *f* is operated by a lateral movement of the same, the free end of the lever acting in one direction upon a bracket *m*, adapted to slide upon the shaft k^6 and connected to the valve *f* by a rod *m'*, working in a guide m^2, the bracket and valve being operated in the reverse direction by a spring *n*. The movable ends or pistons *j j* of the vessels *b b* are limited in their movement in one direction by the bottoms of the said vessels and in the other direction by an adjustable stop *o* (shown clearly in Figs. 7 and 8) against which the lever *k* strikes in its upward movement. This stop is formed with a projection *o'* fitting in the slot *p* of a quadrant *p'* and having a stud p^2, whereby it can be clamped in any position in the slot *p* by means of a nut p^3, so as to limit the upward movement of the lever *k* and movable ends or pistons *j j* to vary the capacity of the vessels *b*, and consequently the quantity of liquid or semiliquid delivered at each reciprocation.

q is a pointer on the lever *k*, working over a scale *q'* and serving to indicate when the lever *k* is in its highest position the quantity of liquid or semiliquid which will be measured or filled into the receptacles.

To insure that the lever *k* at the termination of each up-and-down movement shall not be again moved until the valve *f* is operated, we advantageously provide means for automatically locking the said lever in such positions, the unlocking being effected by the movement of the lever *l* when moving the valve *f*. For this purpose we employ two spring-catches *r s*, the catch *r* being pivoted in an extension upon the stop *o*, so as to engage the bottom edge of the lever *k* when in its highest position, while the catch *s* is pivoted upon a bracket *t*, arranged in such a position that the said catch can engage with the end of the lever *k* when in its lowest position. To disengage the catches *r s* from the lever *k*, we provide projections *u v* on the lever *l*, the projection *u* serving when the said lever is moved toward the lever *k* to push back the catch *r*, while the projection *v* is arranged in such a position that its edge *w* forces back the catch *s* when the lever *l* is moved away from the lever *k*.

The operation of the apparatus is as follows: Assume the tank *a* to be charged with the liquid or semiliquid to be filled into the receptacles, the receptacles in position beneath the nozzles *d d*, the movable ends or pistons *j j*, and consequently the levers *k* and *l* in their lowest positions and the valve *f* in the position shown in Fig. 1, the lever *l* being in a position corresponding with that of the valve—that is to say, with the handle farthest from the lever *k*. If now the levers *k* and *l* are raised, the ends or pistons *j j* will also be raised and the liquid or semiliquid will pass through the openings *g i* in the valve *f* into the vessels *b b*. The lever *k* then coming into contact with the stop *o* will be locked thereto by the catch *r*, as indicated in Fig. 7. To disengage the lever *k* from the said catch, the handle portion of the lever *l* must be moved toward the lever *k*, whereby the projection *u* will press back the catch, as hereinbefore described, and the valve *f* be moved and bring the openings *h h* in line with the openings *c c* and nozzles *d d*. By moving down the levers *k l* the contents of the vessels *b b* will pass into the receptacles *e e*, the lever *k* when at its lowest point being locked by the catch *s*, as indicated by the dotted lines in Fig. 1 and in plan at Fig. 5. To disengage the said lever *l* from the said catch, the lever must be moved back to its former position relatively with the lever *k*, as indicated in plan at Fig. 6, whereby the projection *v* will force back the catch, as hereinbefore described, and the valve *f* be moved so as to bring the openings *i i* again beneath the openings *c c*. By removing the filled receptacles *e e* and substituting empty ones the operation can be repeated.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is—

1. In a filling apparatus, the combination with the reservoir provided with one or more stationary measuring vessels each having an aperture at one end, of pistons working in said vessels, and closing their opposite ends, a valve exterior to said vessels and movable transversely across the discharge-apertures in said measuring vessels, said valve having inlet-ports communicating with the interior of the reservoir, and outlet-ports, means for moving said pistons in said vessels, and means for moving said valve to bring the inlet and outlet ports alternately in line with said apertures in said vessels, substantially as described.

2. In a filling apparatus the combination with the reservoir provided with one or more measuring vessels, each having an aperture at one end, pistons working in said vessels

and closing their opposite ends, a movable valve having inlet and outlet ports adapted to be brought alternately in line with said apertures, a single operating-lever operatively connected with all of said pistons and with said valve, substantially as described.

3. In a filling apparatus the combination with the reservoir provided with a plurality of measuring vessels, each having an aperture at its lower end, pistons working in said vessels, and closing their upper ends, a movable valve having inlet and outlet ports adapted to be brought alternately in line with said apertures, a pivotally-mounted arm connected with said pistons for reciprocating the same, a single operating-lever pivotally connected with said arm and having a movement perpendicular to the plane of movement of said arm, said lever having a part operatively connected with said valve, whereby said pistons and valve are operated by a single lever, substantially as described.

4. In a filling apparatus the combination with the reservoir, provided with a plurality of measuring vessels, each having an aperture at its lower end, of a piston working in each of said vessels and closing its upper end, a movable valve provided with inlet and outlet ports adapted to be brought alternately into line with the said apertures of said vessels, operating mechanism for reciprocating said pistons, operating mechanism for said valve, and locking devices for said piston-operating mechanism located at each end of its movement and parts carried by said valve-operating mechanism for engaging and releasing said locking devices whereby a movement of the valve is necessitated after each movement of the piston, substantially as described.

5. In a filling apparatus the combination with the reservoir provided with a plurality of measuring vessels, each having an aperture at its lower end, of a piston working in each of said vessels and closing its upper end, a movable valve provided with inlet and outlet ports adapted to be brought alternately in line with the said apertures, operating devices for said valve, an operating device for said pistons and an adjustable stop in the path of said piston-operating devices for regulating the quantity drawn into said vessels, substantially as described.

6. In a filling apparatus the combination with the reservoir, provided with a plurality of measuring vessels, a piston working in each of said vessels, a valve for controlling the ingress and egress of material into and from said vessels, a pivoted arm operatively connected with said pistons, a hand-lever pivotally connected to said arm, adapted to move the same but having an independent movement perpendicular to the plane of movement of said arm, locking devices for said arm at each end of its movement and projections on said lever for engaging and releasing said locking devices, substantially as described.

7. In a filling apparatus the combination with the reservoir, of a plurality of measuring vessels adjustably supported above the bottom of the same, plungers working in said vessels and a sliding valve for controlling the ingress and egress of material into and from said vessels, said valve sliding between said vessels and the bottom of the reservoir, whereby the said vessels may be adjusted with respect to said valve to take up wear, substantially as described.

8. In a filling apparatus the combination with the reservoir having discharge-openings in its bottom, a plurality of stationary measuring vessels supported above the bottom of the reservoir, each having an aperture in line with one of said discharge-openings, a plunger working in each of said vessels, a sliding valve located between said vessels and the bottom of said reservoir, having inlet-ports for connecting said vessels with said reservoir and outlet-ports for connecting said vessels with said discharge-openings and a single operating-lever operatively connected with said plungers and said valve, substantially as described.

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