No. 795,771. PATENTED JULY 25, 1905.

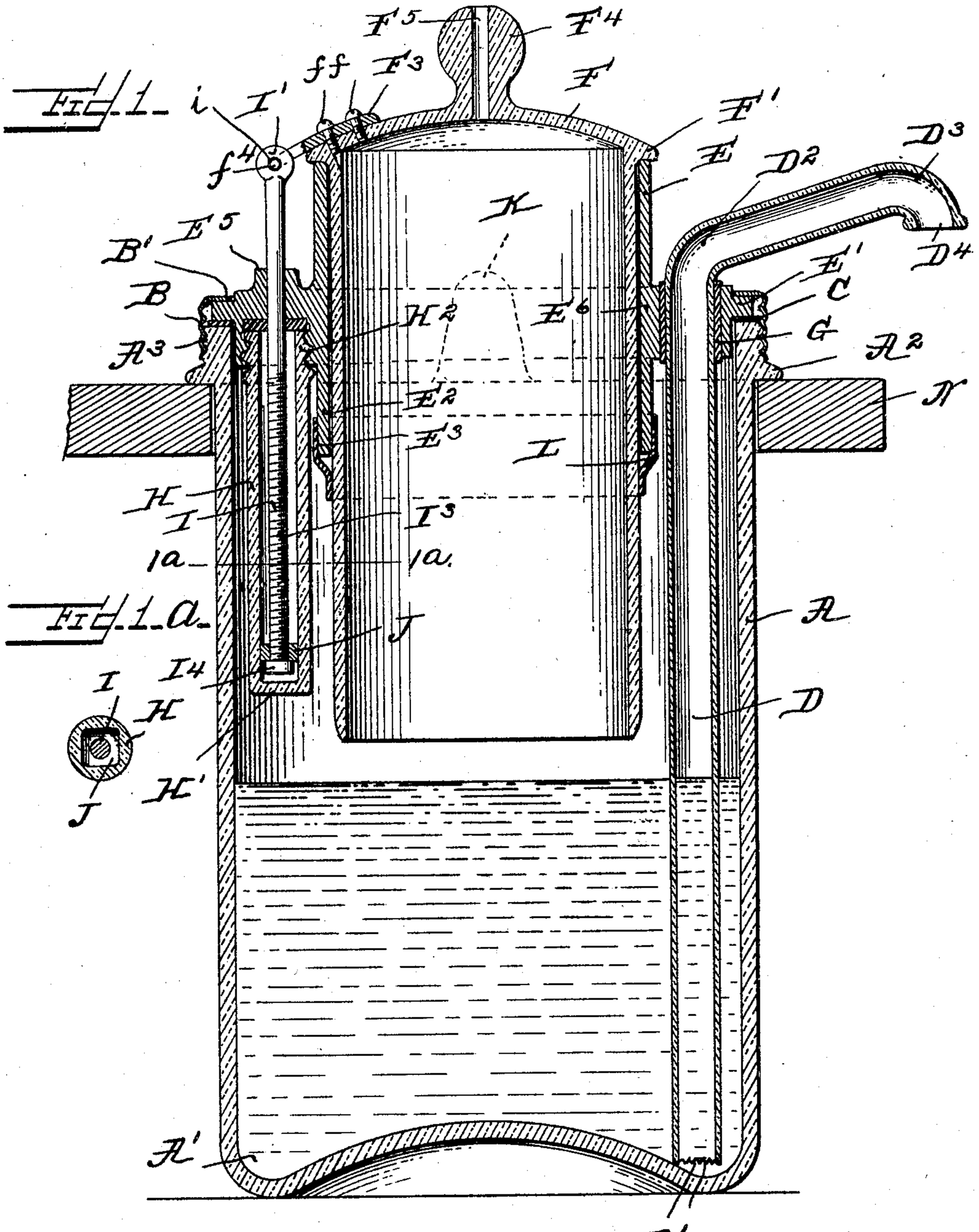
I. W. HEYSINGER.

PNEUMATIC DISCHARGING DEVICE FOR LIQUID CONTAINING VESSELS.

APPLICATION FILED JULY 30, 1904.

5 SHEETS—SHEET 1.

FIG. 1.



WITNESSES:

Jesse B. Keller

Michael B. Fenninger

INVENTOR

Isaac W. Heysinger.

No. 795,771. PATENTED JULY 25, 1905.

I. W. HEYSINGER.

PNEUMATIC DISCHARGING DEVICE FOR LIQUID CONTAINING VESSELS.

APPLICATION FILED JULY 30, 1904.

5 SHEETS—SHEET 2.

Fig. 2.

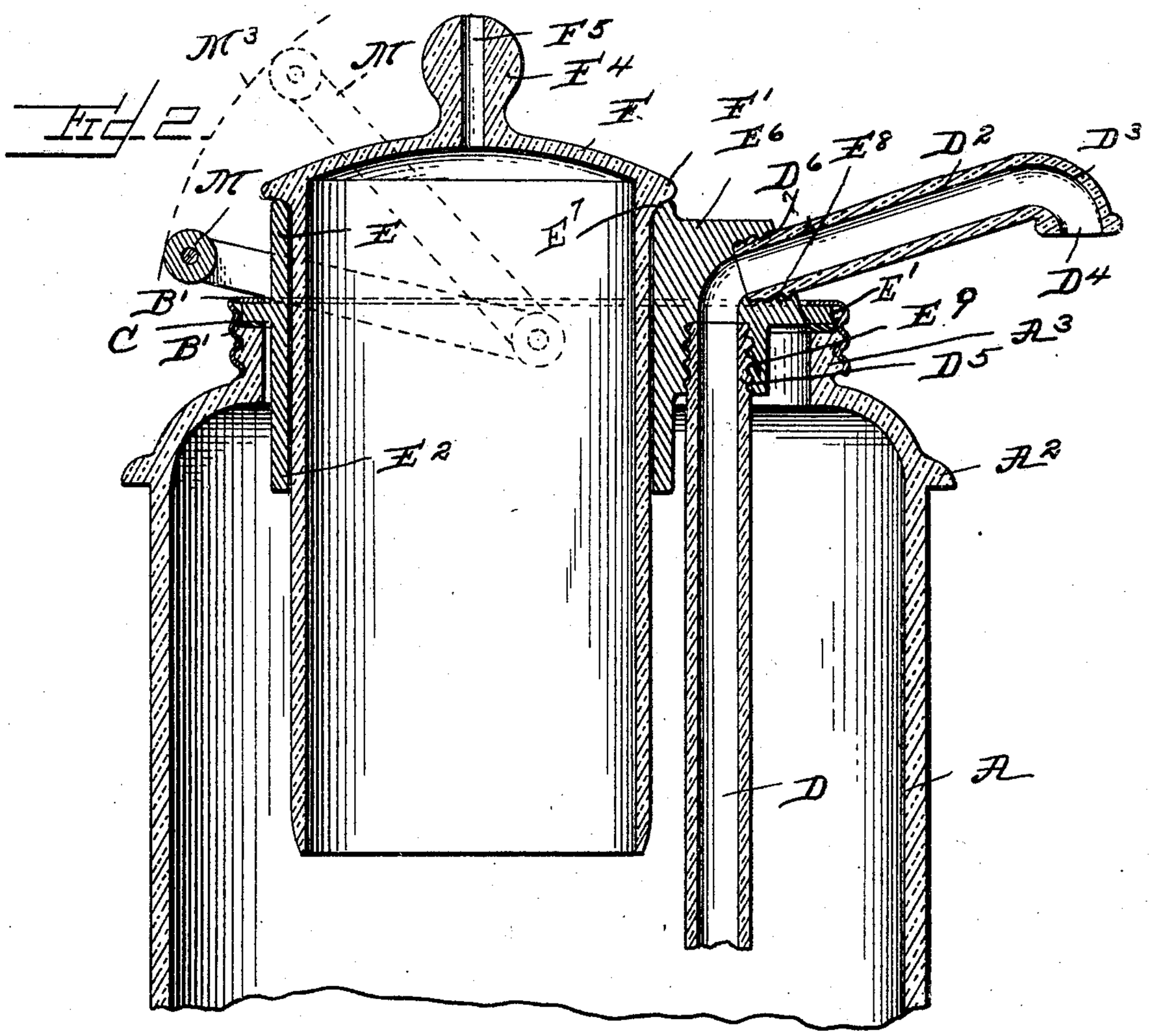
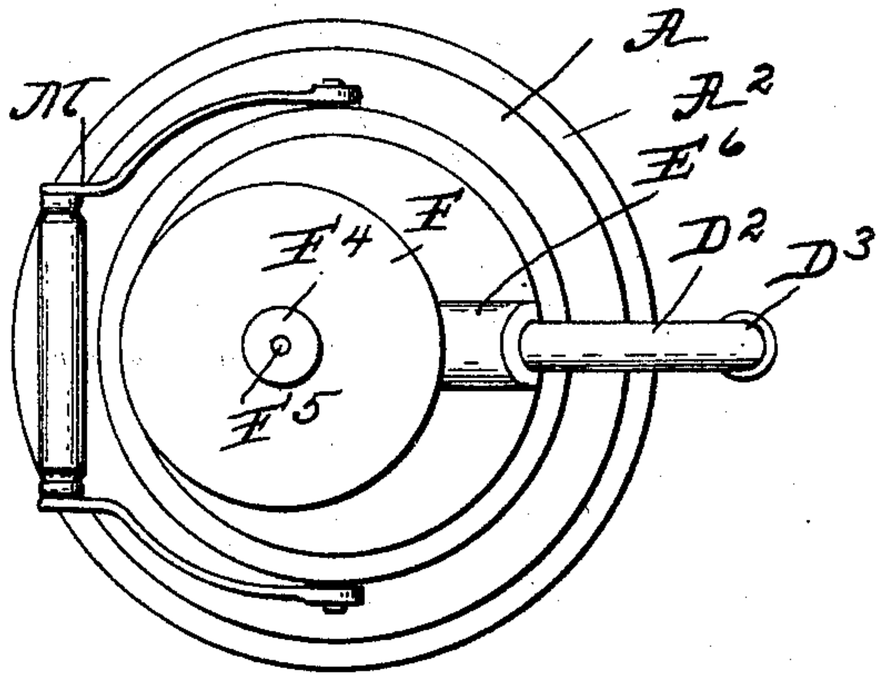


Fig. 2.a.



WITNESSES:

Jesse B. Sellers

Michael B. Fenninger

INVENTOR

Isaac W. Heysinger.

No. 795,771. PATENTED JULY 25, 1905.

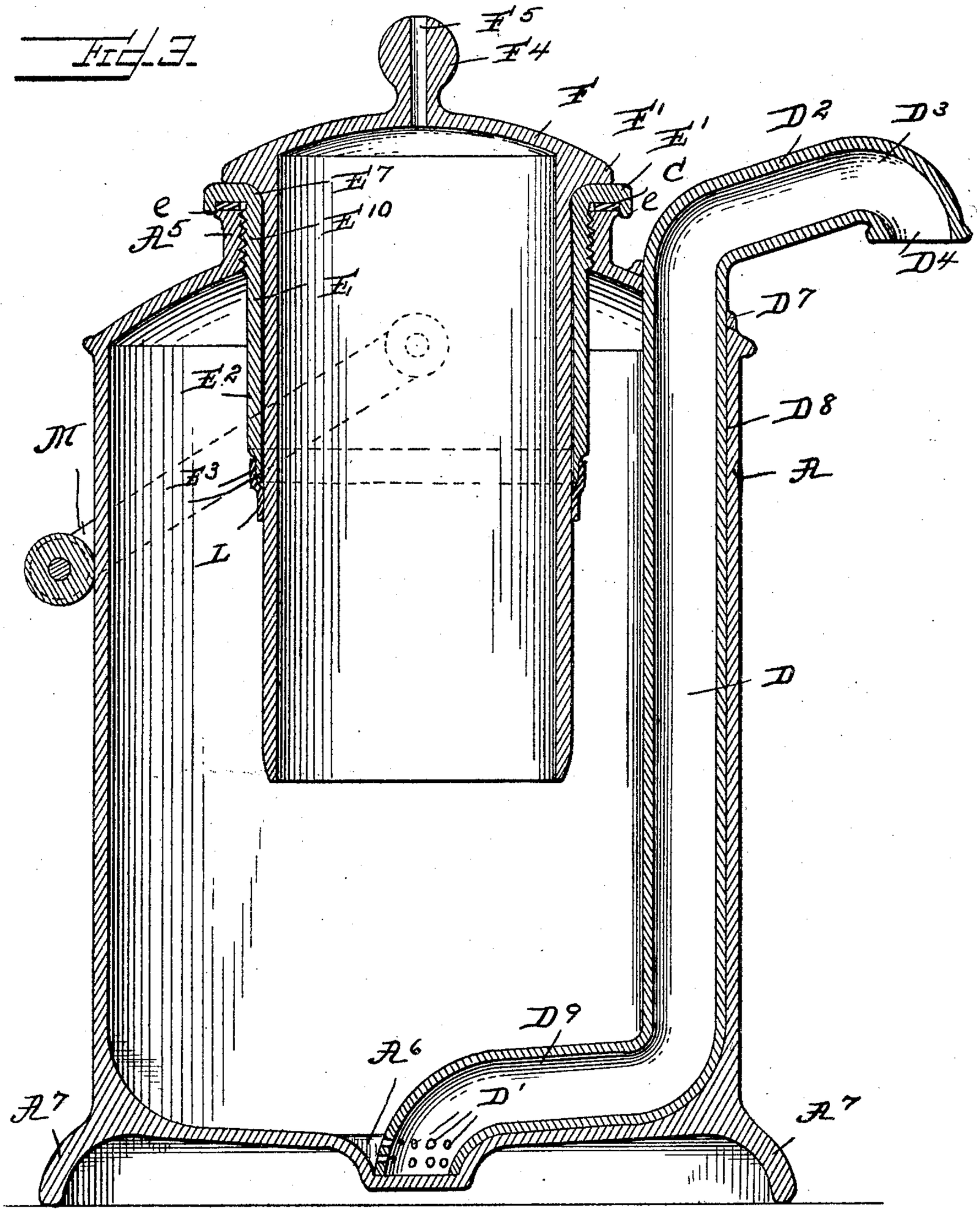
I. W. HEYSINGER.

PNEUMATIC DISCHARGING DEVICE FOR LIQUID CONTAINING VESSELS.

APPLICATION FILED JULY 30, 1904.

5 SHEETS—SHEET 3.

FIG. 3.



WITNESSES:

Jesse B. Kelly
Michael B. Fenninger

INVENTOR

Isaac W. Heysinger.

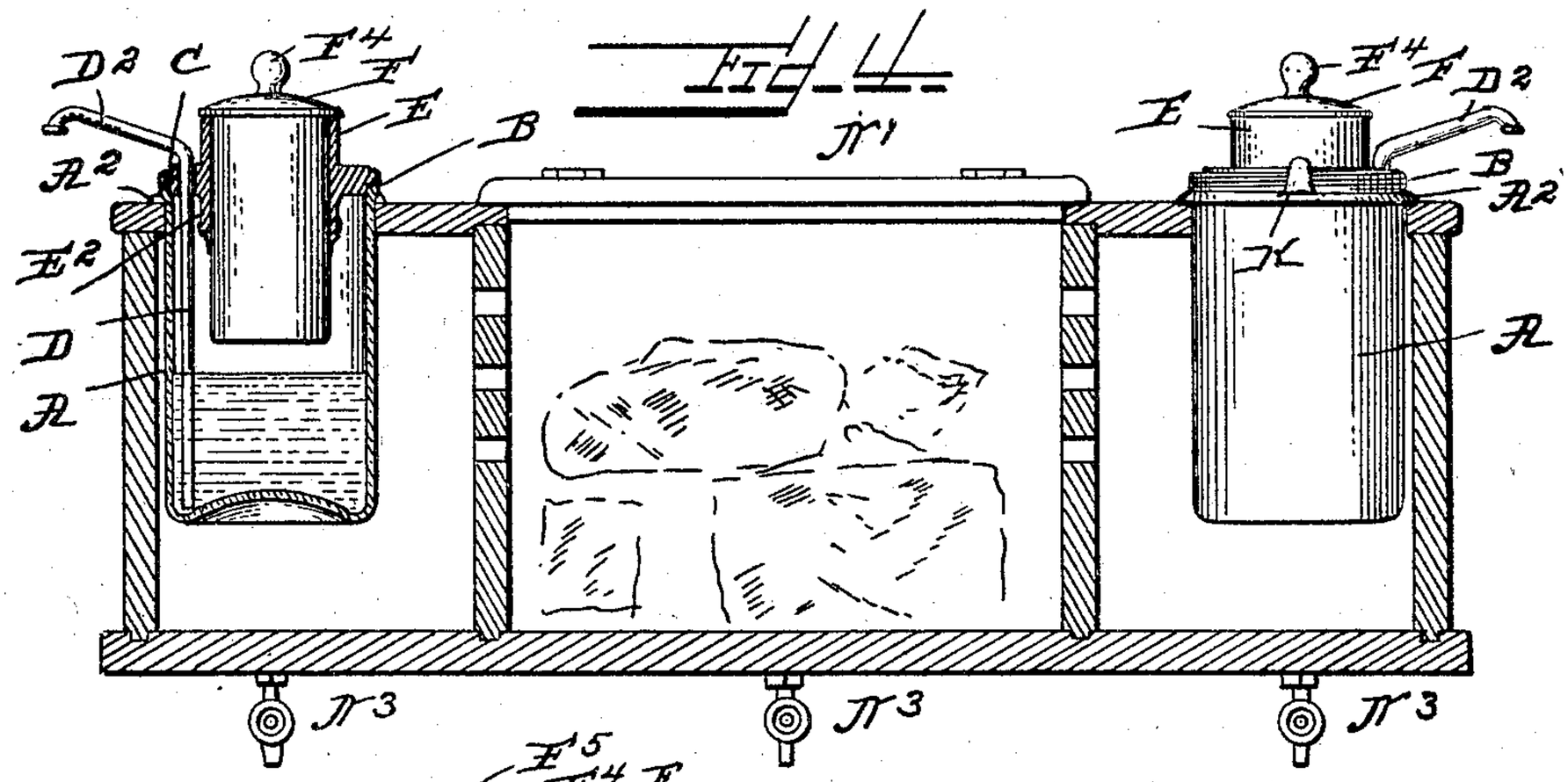
No. 795,771. PATENTED JULY 25, 1905.

I. W. HEYSINGER.

PNEUMATIC DISCHARGING DEVICE FOR LIQUID CONTAINING VESSELS.

APPLICATION FILED JULY 30, 1904.

5 SHEETS—SHEET 4.



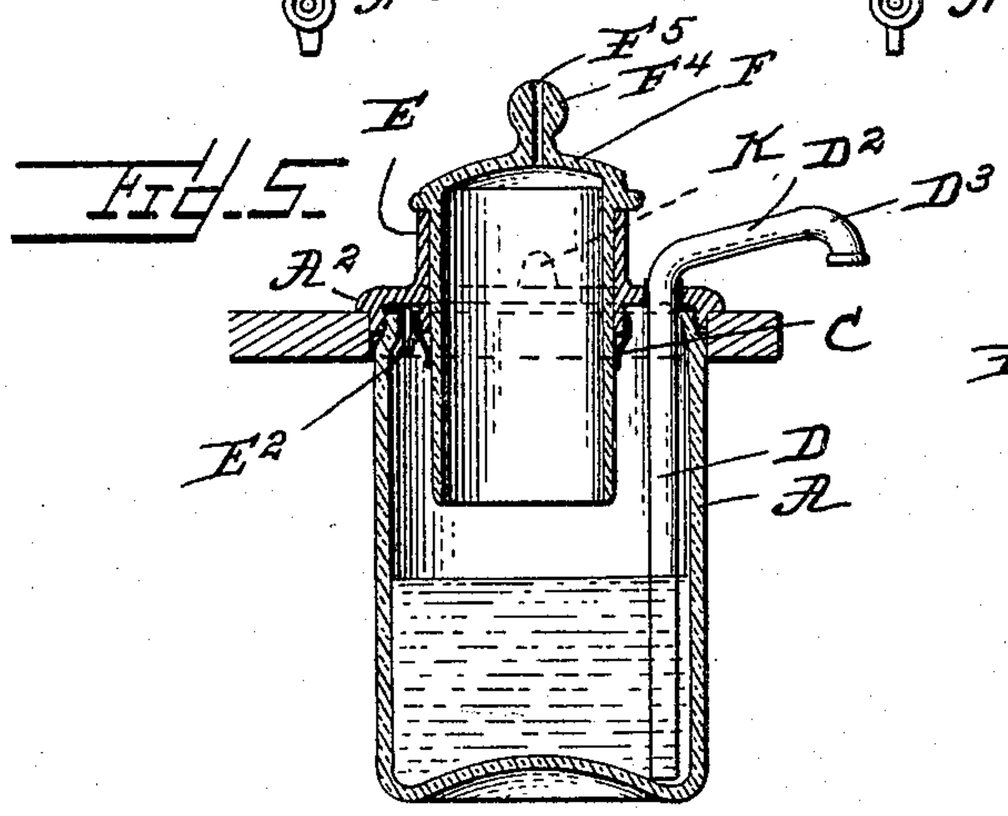


FIG. 5.

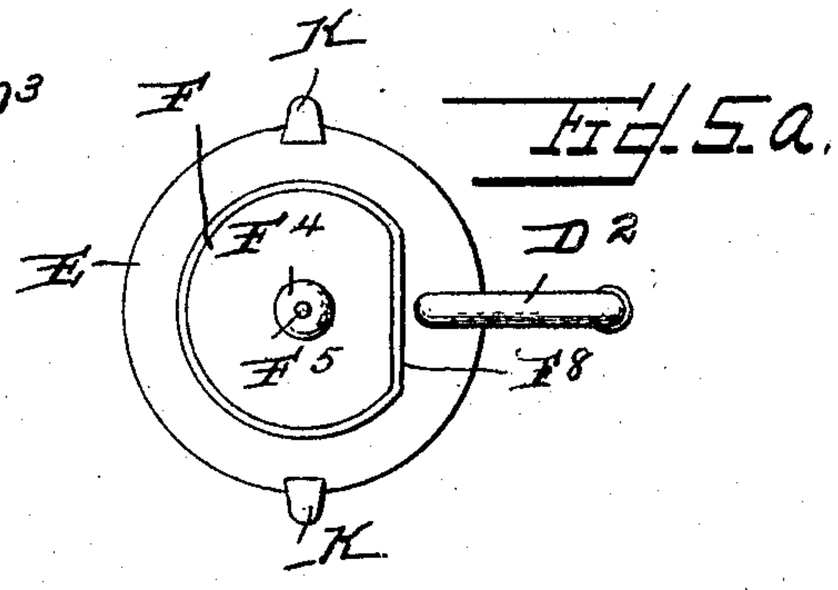
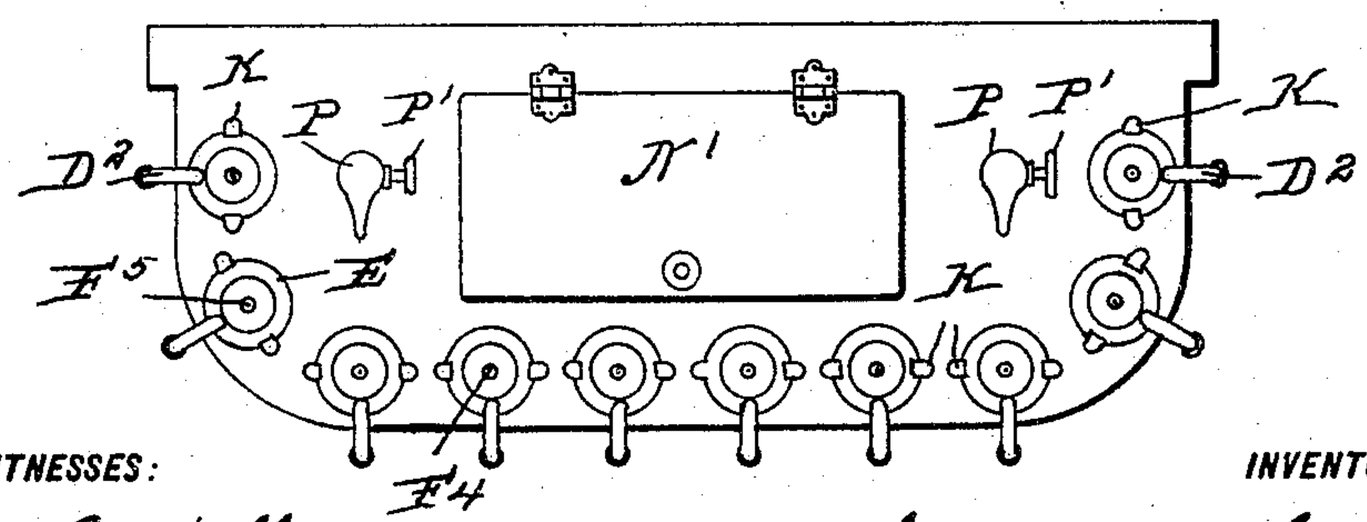


FIG. 5a.

FIG. 6.



WITNESSES:

Jesse B. Keller

Michael B. Fenninger

INVENTOR

Isaac W. Heysinger.

No. 795,771. PATENTED JULY 25, 1905.

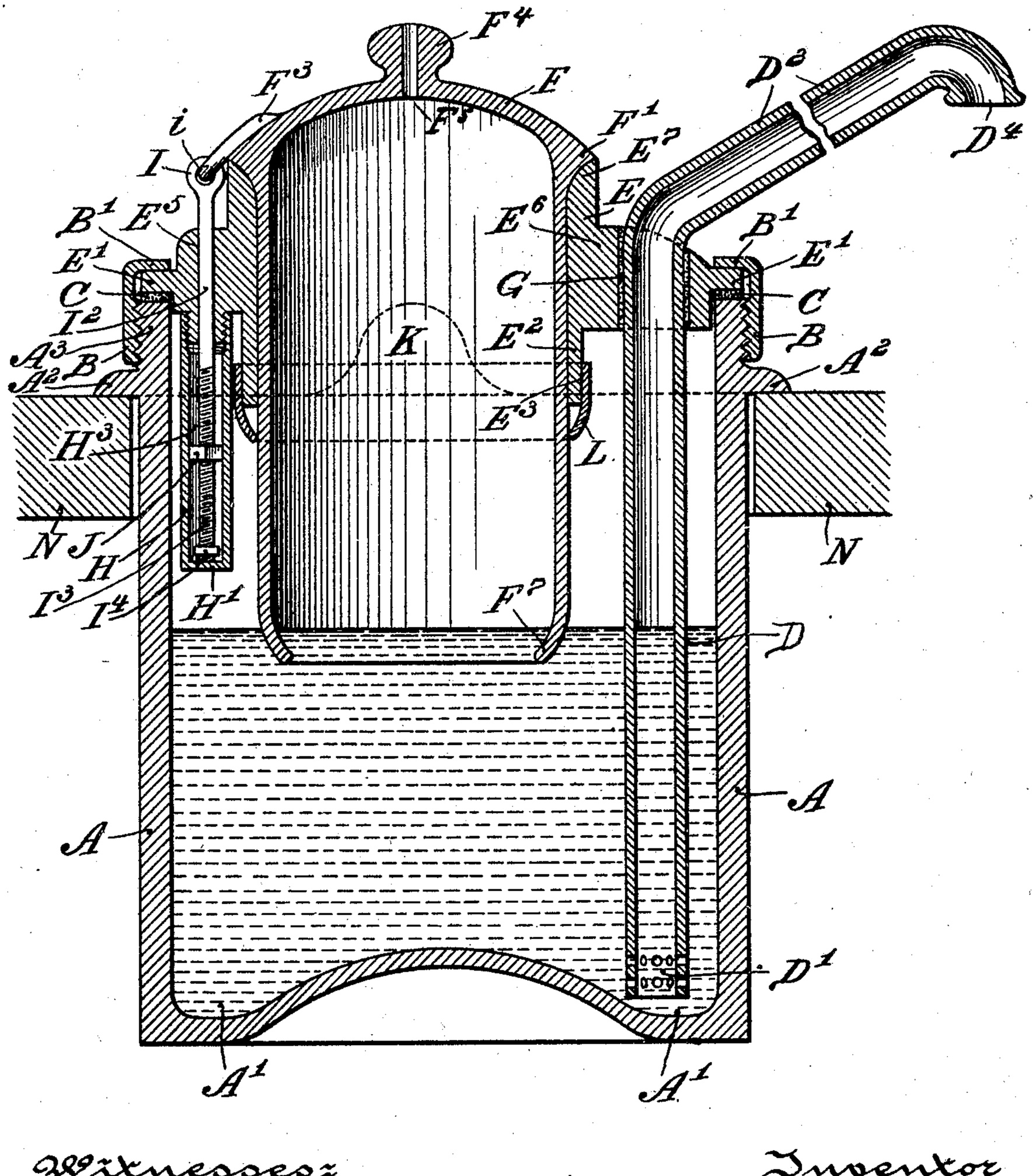
I. W. HEYSINGER.

PNEUMATIC DISCHARGING DEVICE FOR LIQUID CONTAINING VESSELS.

APPLICATION FILED JULY 30, 1904.

5 SHEETS—SHEET 5.

Fig. 7.



Witnesses:
Jas. C. Wobmsmith
M. B. Fenninger

Inventor
Isaac W. Heysinger

UNITED STATES PATENT OFFICE.

ISAAC W. HEYSINGER, OF PHILADELPHIA, PENNSYLVANIA.

PNEUMATIC DISCHARGING DEVICE FOR LIQUID-CONTAINING VESSELS.

No. 795,771. Specification of Letters Patent. Patented July 25, 1905.

Application filed July 30, 1904. Serial No. 218,846.

To all whom it may concern:

Be it known that I, ISAAC W. HEYSINGER, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Pneumatic Discharging Devices for Liquid-Containing Vessels, of which the following is a specification, reference being had to the drawings which accompany and form a part thereof.

My invention relates to improvements in devices for discharging liquids from jars, pitchers, or other like vessels above the surface level of said liquids by means of variable pneumatic pressures applied above the surface of said liquids and within said jars or the like in which said devices are made more effective in operation, more simple to manufacture, and having the different parts more readily removed and replaced than in other discharging devices, and in which also simple and inexpensive glass jars or cans are used for the containing vessels, to the upper or open part of which the entire devices which constitute my invention are readily applied or detached therefrom, so that said jars can be shipped already filled and closed by a simple detachable cap, which being removed my devices can be immediately applied interchangeably therewith, and the jar can be discharged by pneumatic pressure applied as I describe in such intermitted discharges as are requisite, for example, in water-pitchers, syrup-jars, or other like liquid-containing vessels, and also in which a containing-jar of glass is fitted with my entire discharging devices of hard rubber, metal, or other different material, which being removed a simple glass vessel, which may be of the ordinary fruit-jar pattern, is left, said devices being detachable therefrom and interchangeably applied to various similar jars successively, as may be desired, and also in the specific details of construction, as will be hereinafter set forth.

Referring to the drawings, Figure 1 is a vertical section through a pneumatic discharging device which embodies my invention, taken through the middle thereof and which shows at one side the discharging-tube and at the opposite side the regulating device adapted to control the upward ascent of the reciprocating piston of said device. Fig. 1^a is a cross-sectional view of said regulating device on the line 1^a 1^a of Fig. 1. Fig. 2 is a vertical section similar to Fig. 1, showing a modification in the construction of the tube for discharging liquids, which is in this figure made in segments screwed into sockets instead of continuous, as in Fig. 1, and in which the regulating device shown in Fig. 1 has been dispensed with and in which also a swinging handle supported by projections at the opposite sides of the jar is shown for lifting the same. In this figure the cylindrical opening in the annular cover and the pressure-piston are shown as eccentric to the peripheral margin of said cover. Fig. 2^a is a top view of a discharging device embodying my invention in which the guide-cylinder of the top of said jar is shown as set eccentric to the periphery thereof and which is not shown in Figs. 1 and 3, which are vertical sections, irrespective of the position of said guide-cylinder in the top of said jar. Fig. 3 is a view similar to Fig. 1 and Fig. 2, excepting that the detachable jar-cover is secured by a modification of the connection shown in the preceding figures, and other modifications of construction are represented, which do not depart from the principles of my invention as shown, described, and claimed. Fig. 4 represents a casing provided with an internal chamber adapted to be artificially maintained at a different temperature from the surrounding air and having in its upper surface a series of openings adapted to receive in each opening one of my liquid-containing vessels, the same supported by means of an external flange and provided with projections at the opposite sides of the jar for lifting the same, the said jar otherwise adapted to be retained in place to close said opening while being refilled. Fig. 5 is an enlarged view similar to Fig. 4, showing one of said jars in position in said casing. Fig. 5^a is a top view of Fig. 5, showing an increased space at one side of the annular cover thereof for the discharging-spout of said jar. Fig. 6 is a top view of a casing with internal temperature-chamber and provided with a series of my jars in place in openings in the top of the same, said chamber common to said jars and said cover shown as provided with discharge-faucets independent of said jars for soda-water or like purposes. Fig. 7 is a sectional view similar to Fig. 1, showing the open guide-cylinder E E^2 as set to one side of the annular cover, as in Fig. 2^a, and the upper margin of said open guide-cylinder flared outwardly, as in Figs. 2 and 3.

Similar letters refer to similar parts in all the several figures of the drawings.

A is a jar, preferably of glass or porcelain, though it may be of metal when used, for example, as an ice-water pitcher, a syringe, or the like, as shown in Fig. 3. I prefer for syrups or like liquids to use plain cheap glass jars, which, if desired, may be kept already filled with their liquids in stock, merely covered with a screw-cap with interposed air-tight band, and when one is to be used merely unscrewing the cap and replacing it with my pneumatic discharging device, as hereinafter described. Of course more elaborate jars A may be employed, if desired, and refilled when empty, and in such case the screw-cover, which may be secured air-tight to the top of the jar by other means than a screw-band or a screw-joint, will remain permanently in place, except when removed for cleaning or to replace breakage, and to fill the jar it is only necessary to pull out the hollow cylindrical pneumatic pressure-piston, which is replaced in a moment.

As shown in Fig. 1, the top of the glass jar A is externally screw-threaded, as in ordinary screw-top jars. It is covered by a circular annular cover, which is preferably of vulcanite, which can be easily and accurately molded to shape and is unaffected by liquids, though metal or other suitable material may be employed, if desired. This cover fits upon the upper margin of the jar A and is held in place by the screw-band B, which is inwardly flanged above to overlap and hold down under screw-pressure the cover in place. The screw-band B engages with the screw-threaded portion A^3 of the jar A. Between the peripheral margin of the annular cover E E′ E^2 and the top or free margin of the jar A is laid the rubber ring C, which being compressed will afford an air-tight joint, the cover being detachable at will. The horizontal surface of this annular cover E E′ E^2 is provided with a large cylindrical opening, the cover E E′ E^2 being molded or otherwise formed around said opening above and beneath the surface to make an accurate vertical cylinder, as represented by E above and E^2 below the plane of the cover. This forms an accurately-shaped vertical cylinder. Between this cylinder and the margin of the cover E′ the cover is preferably thickened, as shown at E^6, Fig. 1, and is pierced vertically, through which is inserted the discharge-pipe D, which may be also detachable. A thin sleeve of rubber G may be interposed between the pipe D and the sides of the perforation in the cover E E′ E^2 secure an air-tight but adjustable seat for the pipe D, which may thus be pushed down to the bottom of the jar, as shown, when jars of different depths are used. The lower part of the jar A has its bottom convex upward, so that around the bottom is formed the annular recess A′, into which the lower end of the pipe D enters, the lower end being notched to prevent closure of its orifice, as shown at D′. In Fig. 3, however, the concavity is shown in the middle of the bottom of the jar at A^6, and the discharge-pipe D^9 extends across and enters this depression, being perforated, as shown at D′, intead of notched, as in Fig. 1. The object is simply, of course, to insure complete discharge of the contents of the jar, and either form for securing said recess may be employed indifferently, as preferred.

Referring to Fig. 7, at the side opposite to the discharge-pipe, shown opposite simply for clearness of the drawings, for it may be at any part of the periphery, the annular cover E E′ E^2, between the marginal lip E′ and the interior opening thereof, is also perforated, as shown at E^5. From the under side of E^5 extends downward the tubular barrel H, the upper end of which is vertically perforated with a cylindrical passage and the lower portion of such sectional form of said passage that an angular or irregularly shaped screw-nut may traverse the same freely, but cannot be rotated therein. This barrel is preferably closed at the bottom to prevent contact with the contents of the jar A. The rod I is also cylindrical and is smooth above and screw-threaded below, as shown at I^3, and its lower end is enlarged, as shown at I^4, or has a cross-pin to prevent escape of nut J. The upper end of the rod I is enlarged to form a screw-head or thumb-piece and is transversely perforated or otherwise shaped, as shown at *i*, to engage with a horizontal pin or other projection, or a portion of the margin of the top of the pneumatic pressure-piston F, and to be readily detached therefrom. It will now be seen that as the screw-rod I is rotated by the thumb-piece I′ at the top, being disengaged from F, it will screw up or down the nut J within its angular tube H, so that the pressure-piston F when afterward engaged therewith will be free to travel up or down to a limited extent only, as regulated by the position of the nut J. In this way I am enabled with a series of jaws to regulate each one to discharge only the proper quantity of syrup or other liquid according to the varying quantity required of each kind for a glass of effervescent or other beverage. In the form shown in Fig. 1 the engagement or disengagement of the piston F with the screw-rod I is effected by simply rotating the loose pressure-piston F slightly on its axis one way or the other, the attached part F^3 (which may be integral with F, if desired) and which is attached by the screws *f f*, terminating in a forwardly-projecting pin f^4, which is adapted to enter the hole *i* in the head of the rod I or by rotating the piston F slightly backward to be entirely disengaged therefrom.

The construction and arrangement of the parts may be varied to suit special requirements. When so much accuracy is not required, I use the simpler device shown in Figs. 2 and 3. This is simply an arched bail or

handle, which is clearly shown in Fig. 2ª. When elevated, it serves to carry the jar from place to place. I prefer making this handle when to be used as a gage also with sufficient friction or spring-pressure to cause it to stand at any angle at which it may be placed. As it extends across the top of the pressure-piston F, as shown especially in Figs. 2 and 2ª, it will limit the ascent of the piston in accordance with the length of the handle from its pivot-supports or the position of the pivots on the jar. These can be varied at will or may be made adjustable, if desired. In Fig. 2 I secure a differential lift of the piston by attaching the handle diametrically across the middle of the jar-top, while the piston is set eccentric thereto, as shown in Fig. 2ª. The dotted arc M^3 (shown in Fig. 2) will show that the lift of the piston will be greater or less as the handle is set at different angles relatively to the jar. Other analogous devices may be used for engaging the piston with the regulator if deemed requisite, the purpose simply being to prevent the detachable piston from being carelessly pulled out altogether or from being pulled up to a greater extent than the occasion requires.

The pneumatic pressure-piston as shown in the different figures consists of a hollow cylinder F, closed at its upper end except at its air-vent, as described, and open beneath. It is externally flanged at F′ to give it a seat upon the guide-cylinder of the annular cover E E′ E^2, in which it vertically reciprocates by hand-power. Is is fitted pretty accurately within the said guide-cylinder, yet so as to move freely, the descent of the cylindrical piston in close contact with the inner surface of the guide-cylinder largely counteracting the tendency of the liquid or of air in the jar to rise between the two opposing surfaces. For example, a very forcible expulsion of the contents of the jar can be made through the pipe D, as when used for a forcing device or syringe, with scarcely any escape of air and with none at all of liquid. This pressure-piston may be made to extend to the bottom of the jar, if desired. Where an air-tight joint is required between the piston and its surrounding tubular cylinder, I spring around the lower and projecting free margin of the guide-cylinder E E^2 a flexible and slightly elastic cylindrical band L, attached at E^3, the lower projecting free margin of which lies in contact with the external surface of the hollow pressure-piston F. There is no pressure on the upstroke, and on the downstroke, when there is pneumatic pressure within, this will compress the flexible band against the external surface of the descending piston and make an air-tight sliding joint. This flexible band is secured, as shown, to the external cylindrical surface of the tubular guide-passage by its own elasticity, or it may be additionally secured thereto by cement or otherwise, if desired.

The discharge-pipe D, as shown, rises within the jar and at its upper part turns off at an angle to project, as shown at D^2, D^3, and D^4, outside the vertical line of the vessel, being bent downward at its end to discharge downward into a tumbler or the like. When the thumb-pressure, to be described, is removed from the opening of the pressure-piston F^5, the sudden escape of the air contained within the vessel will make an active back suction, which will suck or force back into the pipe at D^2 the liquid at the nozzle D^4, so that there will be no drip, gravity carrying back the contents of the tube or pipe D along the downwardly-inclined portion from D^2 to the vertical portion of the pipe within the vessel A.

As shown at D^4, Figs. 1, 2, and 3, I provide the external end of the discharge-pipe D, preferably turned downward, with a fillet or other suitable means, whereby a flexible-rubber syringe tube and nozzle may be attached when the device is used for forcing liquids, as in a syringe or the like, or, if desired, for suction instead of expulsion.

The pneumatic pressure-piston, as above described, is provided in the middle of its closed top with a suitable thumb-piece or thumb-and-finger knob or handle F^4. This is centrally perforated into the chamber of the hollow cylindrical piston F, as shown at F^5.

In operating the device the knob F^4 is seized between the thumb and fingers and the cylindrical pressure-piston F is raised from its seat to a suitable distance. The air rushes into the interior through the hole F^5. When raised to a sufficient height, the thumb is placed over the hole F^5, so as to close it, and the piston is forced down. The added volume of air within now produces pressure on the liquid beneath, which is rapidly discharged through the pipe D, which is preferably bent downward for this purpose, into a tumbler or other suitable vessel held beneath the nozzle D^4. When the tumbler is full or sufficient liquid has been discharged into it, the thumb is lifted and the remaining portion of the descent of the pressure-piston (if any) is made without any further discharge of liquid from the pipe D.

I provide when necessary projecting lugs K K at opposite sides, as shown in Fig. 5, by means of which the jars can be lifted from the recesses, as shown in Figs. 4 and 6. These lugs K K may be attached to the jar itself, as shown in dotted outline in Fig. 1, or to the screw-band, as shown in Fig. 4, or to the annular cover, as shown in Fig. 5.

In Fig. 2 I show the pipe D made for convenience in sections instead of continuous, as in Fig. 1. The cover E E′ E^2 is enlarged at E^6 and provided with an angularly-directed opening, one part E^8 nearly horizontal and

the inner part E^9 vertical. These are screw-threaded, and the two parts D^5 and D^6 are screw-threaded at their ends and screwed into the sockets E^9 and E^8, thus making a continuous outlet-tube, as in the other figures. As shown in Fig. 2 also, the pressure-piston, as already stated, may be set to one side of the cover instead of in the center thereof, the said annular cover having its cylindrical opening eccentric to its periphery, for the reasons already given.

The modification shown in Fig. 3 is simply to adapt my device more especially for use in an ordinary ice-water pitcher, fountain-syringe, or the like. Here the detachable annular cover, with its guide-cylinder E E^2, is shown as screw-threaded externally at E^{10}, and the narrowed outlet of the jar is threaded internally at A^5. The elastic air-tight ring C is interposed, as shown, between the overhanging lip E′ of the annular cover and the top margin of the jar A, and the outer margin of this lip E′ is bent downward at *e e* to conceal and protect the ring C. The pipe D is shown as preferably soldered or otherwise secured at D^7 to the inturned upper portion of the jar, projecting down vertically and then laterally through the same, and it passes down in close contact with the inside of the jar, to which it may be soldered, if desired. The lower part of the jar may be provided with an ordinary expanded annular or other foot A^7 A^7, though this is not essential, and may be omitted, and the bottom is dished downward into a central receptacle A^6, into which the discharge-pipe enters, having been bent across from the side of the vessel at its bottom and closely conforming thereto. When made of metal, I prefer soldering the pipe D to the wall and bottom of the inside of the jar. The pipe D ends in the strainer shown at D′ of Fig. 3. When the jar is made of porcelain or porcelain-lined, I secure the pipe D in any of the ways already described and shown in the other figures, or in any other well-known manner. At Fig. 4 I show in vertical longitudinal section a casing, as in a store-fixture, with an ice-box in the middle, covered by means of the hinged lid N′, and at each end of the ice-box proper is shown a vertical partition transversely perforated above and solid below, whereby the jars A A, as shown, will be immersed in a cooling-chamber, but out of contact with ice or ice-water. N^3 N^3 N^3 represent faucets by means of which the waste water or drip can be discharged by gravity. The jars A A, as shown in the figure, are suspended in this cooling-chamber by means of the flanges A^2 A^2, the top of the counter or cooling chamber being suitably pierced to admit the body of the jar, but to engage with the flanges A^2 A^2 and hold the jars, with their covers and pressure-pistons and their discharge-pipes, exposed above. In Fig. 6 is shown a top view of a similar casing, around the sides and rear of which a number of my pneumatic discharge-jars are placed in suitable openings in the top thereof, having their discharge-pipes D^4 D^4 projecting over the free margin, as already described. The ice-box N′ is shown in the middle of Fig. 6 and is common, if desired, for all the jars shown in the figure. The ordinary carbonated or effervescent water draft-tubes and their cocks are shown at P P′ P P′ external to the ice-box lid, their tubes beneath thus passing up in the usual manner and are cooled in the same ice-chamber which cools the jars A A A. The lugs or hooks K K K K are shown in place whereby said jars are lifted out of their recesses for refilling or for other purposes.

It is obvious that this device is equally well adapted for use with hot liquids—such as coffee, soups, &c.—as for cold ones. In this case the chamber N instead of being supplied with ice may be supplied with hot water or steam, whereby the contents of the jar or jars are kept at a suitable temperature for use.

Fig. 5 shows a pneumatic discharge-jar in which to gain additional room for the discharge-pipe to ascend through the cover of the jar and which is thus detachable with said cover. I do not make the guide-cylinder of the cover E (shown at E^2) in the form of a complete vertical cylinder, but give one side thereof a flat surface along a chord of the circle, as seen at F^8, Fig. 5^a. I also give the hollow cylinder of the pressure-piston the same truncated form to conform thereto and reciprocate vertically in said guide cylinder or passage of the cover E. It is obvious, of course, that other transversely-sectional shapes may be given these coapted parts—hexagonal, oval, square, or the like—as convenience may dictate.

In the form shown in Fig. 5 it will be seen that the lugs K K are attached to the cover E instead of the jar A or the band B, as in the other figures.

As shown in Figs. 1, 2, and 3, the free lower margin of the tubular pressure-piston F is externally beveled off or inturned, so as to more easily admit its entrance into the guide-cylinder E E^2. This inturning may be a mere bevel, or the lower end of the tubular cylinder or piston may be bent inward bodily, as desired. At E′ also, as shown in Figs. 2, 3, and 7, the upper margin of the guide-cylinder is beveled outwardly, making a flared opening. Any liquid which may chance to rise to this level around the piston will be held in this annular dish or channel without flowing over the margin of the guide-cylinder and will afterward be enabled to flow down into the jar again.

In the form shown in Fig. 7 of the drawings it will be seen that the guide cylinder or opening in the top of the annular cover E E′ E^2 is not at an equal distance from the margin of said cover on all sides, but that it is so

placed that on the side occupied by the discharge-pipe D the space is wider than on the opposite side. This is in conformity with Figs. 2 and 3, and this eccentric position of the guide-opening in the annular cover may be to any side of said cover desired. In Fig. 7 also the upper end of the piston-guiding cylinder is flared outwardly at E^7, as shown in Figs. 2 and 3, and not carried up vertically, as in Fig. 1. The bottom margin of the pressure-piston is also shown at F^7 as inturned, as in Figs. 1, 2, and 3; but in Fig. 7, to give increased lightness to the pressure-piston, I have shown this inturned part, the purpose of which is to assist in the easy entrance of said piston into said guide-cylinder, as bodily bent inward, so as to close to some extent the internal diameter of the said pressure-piston. I do not in this application specifically claim a pressure-piston having its lower free margin bent inward so as to partially close its caliber, and thereby make it more resistant against deformation. The specific form shown in Fig. 7 at F^7 is used for illustration as embodying the advantages claimed in this application, irrespective of the means of tapering the lower external margin of said pressure-piston. In Fig. 7 also there is a slight modification of the means of securing the barrel H of the regulating device to the under side of the annular cover E E′ E^2 by an inversion of the male and female screw-threaded attachments; but this is a mere matter of preference, as is well known in the arts. In other respects Fig. 7 conforms substantially to Fig. 1 of the drawings.

I do not confine myself rigidly to the specific forms shown and described, but vary the same according to special requirements, as would be done by any skilled mechanic, without departing from the principles of my invention as herein shown, described, and claimed.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a pneumatic discharging device for liquid-containing vessels, the combination of a jar-body having its upper end open, and provided with means for securing a detachable cover thereupon, a detachable annular cover, said cover provided with a vertical guide-opening, with substantially vertical walls, open above and below, into said jar, and a hollow vertically-reciprocable pneumatic pressure-piston having substantially vertical walls, and adapted to the interior of said guide-opening of said cover, said pressure-piston closed above and provided with an air-vent adapted to admit air when said piston is raised, and, when closed by the thumb of the operator, or other like means, and said piston is forced down, to compress said air and liquid within said jar-body, together with a suitable discharge-pipe leading from the bottom of said jar upwardly above the level of liquid contained therein, and externally to said jar, substantially as and for the purposes set forth.

2. In a pneumatic discharging device, the combination of a jar closed beneath and open above, a detachable annular cover adapted to the top margin of said jar, means for securing said cover air-tight to said margin, said cover provided with a large opening leading down vertically into the interior of said jar, together with a vertically-reciprocable pressure-piston adapted thereto and consisting of a correspondingly large vertical tube, open beneath into said jar-body, and closed above against the external air, said closed upper end provided with an air-vent communicating above with the open air and beneath with the interior of said jar, and a thumb-and-finger knob by means of which to operate said piston, and also a discharge-pipe extending from the bottom of said jar upwardly and externally thereto, substantially as described.

3. In combination with the jar, A, substantially as described, a detachable air-tight annular cover adapted to be secured upon the free margin of the open upper end of said jar, and removable from and replaceable for use thereupon, said annular cover provided with a large opening leading down into said jar, a vertically-reciprocable hollow cylindrical pressure-piston adapted in size and shape to said opening in said cover, and adapted to be reciprocated with a close but free contact therein, said piston-cylinder open beneath into said jar-body, and closed above, the closed upper end provided with an air-vent into the interior of said hollow piston, together with a discharge-pipe supported by said detachable cover and extending down within said jar-body to the bottom thereof, substantially as and for the purposes herein set forth.

4. A pneumatic discharging device for liquid-containing vessels, consisting of a jar-body open above and closed below, a detachable cover adapted to be secured air-tight upon the free upper margin of said jar-body, said cover provided with means, conjointly with means provided on said jar-body, for making a secure air-tight but detachable connection of said cover to said jar-body, and said cover provided also with a large opening leading down into said jar-body, and a smaller lateral opening for the passage of a discharge-pipe, in combination with a large reciprocable pressure-piston adapted to said large opening in said annular cover, and a discharge-pipe adapted to said smaller opening therein, said piston adapted to be freely removed from its seat in said annular cover, and said device provided with a manually-closable air-vent, substantially as described.

5. In combination with a pneumatic discharging device consisting of a containing vessel open above, a discharge-pipe leading from

the bottom thereof upwardly and outwardly to the external air, an annular cover for said containing vessel, provided with a large opening in said annular cover leading down into said containing vessel, a detachable tubular pressure-piston adapted to be reciprocated in said opening in said cover, and to be removed for refilling the same, said device provided with a closable air-vent between said containing vessel and the external air, and with means whereby said piston may be operated, an adjustable nut and screw gage-stop secured to said annular cover adapted to be set at various positions and connected with said piston by a detachable connection, so as to regulate the ascent of said piston and the discharge of said liquid, substantially as described.

6. In a discharging mechanism for liquids having a containing-jar, provided with an annular cover, a tubular piston reciprocable therein, and a discharge-pipe for said liquid when forced out under pressure, said piston adapted by varying the length of the stroke to vary the quantity to be discharged, a regulating stop-gage detachably connected with said piston, and secured to said cover and operatively connected with said jar, consisting of a vertical rod one part thereof screw-threaded, a nut adapted to said screw-thread, a cylindrical passage-way for said rod, and an angular passage-way for said nut, said rod rotatable in said passage-way, and provided with means for detachably connecting the same with said piston, and adapted, by the rotation of said rod in said passage-way to screw up or down the screw-nut in its angular passage-way, and so limit the ascent of said piston when connected therewith, substantially as described.

7. In a device of the kind described, having a reciprocable piston and a tubular guide-cylinder having a lower free annular margin, and projecting into the jar-space of said device, a soft, flexible band of rubber, or like air and liquid resisting material, having its upper edge secured externally to the said annular margin of said cylinder by an air-tight connection, and its projecting lower edge in loose contact with the external surface of said reciprocable piston, and adapted to be forced, by interior pressure, when said piston descends, into air-tight contact therewith, substantially as described.

8. In a device for discharging liquids from or into jars by pneumatic pressure, a vertical jar-body, open at the top and closed below, a discharge-pipe leading from the bottom thereof above the level of said liquid and externally to said jar-body, an annular cover for said jar provided with a large opening therein leading down into said jar-body, a detachable connection between said annular cover and said jar-body, and a detachable tubular pressure-piston in combination therewith, adapted to be reciprocated vertically in said large opening in said cover, and adapted in size and shape thereto, said piston provided with an air-vent connecting the interior air-space of said jar-body with the external air, and closable at will, and a thumb-knob on said piston whereby the same may be manually operated when desired, substantially as and for the purposes described.

9. As an article of manufacture a detachable cover for liquid-containing vessels, adapted to discharge the contents of a vessel by pneumatic pressure, said detachable cover containing all the operative parts of said device, and having means for securing the same air-tight to the upper margin of the wall of said vessel, said cover provided with a large opening in the form of an open cylinder, a large reciprocable pressure-piston adapted to be reciprocated therein, and provided with a thumb-knob and an air-vent for the purposes described, and a discharging-pipe supported by said detachable cover and adapted to extend downward within said vessel and to be open externally and above, to the outer air, the whole constructed to operate substantially as and for the purposes herein set forth.

10. As an article of manufacture an annular jar-cover with means for securing the same to the ordinary screw-threaded glass jars sold in the market, a vertically-reciprocable tubular pressure-piston adapted to the opening in said annular cover, said opening being tubular in form to afford guidance to said piston when reciprocated, means whereby said piston may be manually operated in said guideway, and provided with an air-vent which may be left open or closed, and a discharge-pipe supported by said cover and adapted to extend downward within said jar, and, above said cover, bent transversely outward beyond the lateral bounds of said jar, substantially as described.

11. As an article of manufacture a pneumatic discharging device consisting of an annular cover, a discharge-pipe seated inside the margin of said cover and adapted to be within the periphery of a suitable jar-body, substantially as described and containing liquid to be discharged, means for securing said annular cover peripherally to said jar-body, said annular cover provided with a large opening leading vertically through the same, said discharge-pipe extending downward external to said opening, and beneath said annular cover, and opening outwardly above, a large reciprocable tubular pressure-piston, closed above, and adapted to occupy said large opening in said annular cover, and said device provided with an air-vent to admit external air to the interior of said jar-body to which said cover may be secured, during the ascent of said piston, the compression of said air by said pis-

ton adapted to discharge the liquid contents of said jar through said discharge-pipe, substantially as described.

12. In combination with a vessel closed beneath and open above, an annular cover for the same provided with a vertical piston-guiding passage-way, a vertically-reciprocable piston adapted to be reciprocated therein, provided with an air-vent adapted to admit air or to be closed at will, and a discharge-pipe extending vertically downward within the external walls of said vessel, the free upper end of said discharge-pipe extended laterally outward, beyond the lateral bounds of the external walls of said vessel, and then downward to insure downward delivery of the liquid contents of said vessel when forced out by the descent of said piston in said guide passage-way, substantially as described.

13. In a device for the discharge of liquids under pressure, from a liquid-containing vessel, an annular cover for said vessel provided with a large opening leading down into said vessel, a freely-detachable vertically-reciprocable piston adapted to occupy and be vertically reciprocated in said opening, and a discharge-pipe leading from the bottom of said vessel vertically upward, and outward therefrom, said discharge-pipe seated air-tight in said cover and vertically adjustable to different depths of the vessels with which it is adapted to operate, substantially as described.

14. In a device for discharging liquids from vessels by internal pneumatic pressure, a liquid-containing vessel having its bottom gradually sloped to form a gravity-filled recess, and a discharge-pipe opening externally upward, the lower end thereof occupying said recess, and said discharge-pipe contained within the vertical walls of said vessel, and extending upwardly and outwardly above the level of the same, in combination with an annular cover for said vessel, provided with a large vertical opening, a correspondingly large piston reciprocable in and adapted to said opening, and means whereby the same may be reciprocated and at the same time, by the upward movement of said piston, air may be introduced into said vessel, above said liquid, and when said piston has been raised, the downward movement thereof adapted to compress said air, and force said liquid, through said discharge-pipe, from said vessel, said piston being tubular, of hard material, closed above, and freely communicating beneath with the air-space above said liquid in said vessel, substantially as described.

15. In combination with a liquid-containing jar provided with an annular cover having a large vertical opening therein and a discharge-pipe, and a vertically-reciprocable hollow, tubular piston, detachably reciprocable and fitted to operate in said opening in said annular cover, and freely removable by withdrawal therefrom, suitable means secured to the side or sides of said jar whereby the same, with its attachments, may be carried about, or removed from positions in which said jar is adapted to be supported, substantially as described.

16. A pneumatic discharging device for a liquid-containing jar or the like, consisting of a vertical jar-body, having its upper part screw-threaded, an annular cover provided with a screw-threaded portion to engage therewith, means for making said joint air-tight, an open, vertical, tubular piston-guiding passage-way in said cover, a reciprocable tubular piston fitted to and adapted to be vertically reciprocated within said passage-way, said tubular piston open beneath into said jar-body, and closed above, and provided with a projecting ledge around its periphery, said piston adapted, when closed down to be supported, by said projecting ledge, upon the upper margin of said tubular passage-way, and provided with a thumb-and-finger knob on the top of said covered piston, said knob provided with a manually-closable air-vent, together with a discharge-pipe extending downward within said jar-body to the bottom thereof, and its upper portion, above the surface-level of the liquid contained therein, deflected laterally outward beyond the lateral bounds of the external surface of said jar.

17. In a pneumatic discharging device having a jar provided with an annular cover, a large, detachable, vertically-reciprocable pressure-piston, its lower portion tubular and open beneath, and its upper end closed and provided with an air-vent closable at will, and a vertical tubular guiding passage-way for said piston in the annular cover of said jar, said piston and said passage-way mutually fitted to each other, and said piston adapted to be entirely removed from said passage-way, so as to enable said jar to be refilled through the temporary opening thus provided, and an inturned bevel at the lower free margin of said tubular piston, substantially as described.

18. In a device for discharging the contents of liquid-containing vessels by pneumatic pressure, applied above the same, an annular cover for said vessel provided with a discharge-pipe supported by said cover, extending downward within said vessel, and opening at its upper end to the external air above the level of the liquid contained therein, a tubular piston-guiding passage-way in said annular cover open at the ends and leading down into said vessel, and a large tubular piston, vertically reciprocable in and removable from said passage-way, said piston open beneath and closed above, the marginal space between said passage-way and the edge of said annular cover being greater at one side thereof than at the others, substantially as shown and described.

19. In a pneumatic discharging device for liquid-containing vessels, consisting of a closed jar provided with an externally-opening dis-

charge-pipe, leading from the bottom of the same, and a large, tubular, vertically-reciprocable piston adapted to be reciprocated, a tubular, open piston-guiding passage-way in the annular cover of said vessel, said passage-way and said piston adapted to each other, an external projection around the upper portion of said vessel adapted to limit the downward movement of said vessel, in a recessed cover of a suitable cooling-chamber, the operative parts of said device being exposed above the same, substantially as described.

20. In a pneumatic discharging device having a jar-body and an annular cover, an externally-open discharge-pipe leading down beneath the surface-level of liquids contained in said jar-body, a tubular piston-guiding passage-way in said annular cover, open above and below, a reciprocable tubular piston open below and closed above, means whereby said piston may be reciprocated, and lateral projections, K K on opposite sides of said device, substantially as and for the purposes set forth.

21. In combination with a pneumatic discharging device consisting of a jar-body closed beneath, and provided with means whereby the same may be suspended within a heating or cooling chamber, so as to expose said jar-body directly to the temperature of said chamber, the upper portion of said jar-body extending upward above said chamber and provided with annular cover and a discharge-pipe external to the opening in said cover, a large tubular, vertically-reciprocable, and detachable piston adapted to be vertically reciprocated in said opening in said annular cover, and means whereby air may be admitted during the ascent of said piston, and a pneumatic pressure produced by the descent of said piston so as to force the contents of said jar-body through said discharge-pipe, said pressure-piston adapted to be lifted from the opening in said annular cover so as to present a large opening directly into said jar-body through which said jar may be refilled while said jar-body remains in place, and seals said opening in said chamber, together with said closed chamber maintained at a different temperature from the surrounding air, and provided with an opening in its upper surface or cover adapted to receive said jar-body, and to be sealed thereby against entrance of external air or escape of the contents of said closed chamber while said jar-body is being refilled, substantially as described.

22. As an article of manufacture, a pneumatic discharging device consisting of a jar-body open above and provided with an annular cover having a large piston-guiding opening therein, a discharge-pipe leading from the bottom of said jar-body, up through the interior of the same, and thence externally above the level of liquid contained in said jar, a correspondingly large tubular reciprocable pressure-piston adapted to be manually reciprocated in said opening, said device provided with an air-vent whereby air may be admitted into and beneath said piston during the ascent of the same and operatively shut off during the descent of said piston, means to enable said piston to be vertically reciprocated in said opening in said annular cover, and said piston adapted to be removed by simple withdrawal from said opening, leaving said annular cover in place, and said opening adapted to enable said jar to be filled or refilled as desired, with suitable liquid through the same, and without removing the jar from its accustomed place, substantially as and for the purposes herein shown and described.

23. In a pneumatic discharging device consisting of a containing vessel for liquids, an annular cover provided with a large guide-opening therein, a reciprocable tubular piston adapted to be vertically reciprocated in said guide-opening in said annular cover, and a discharge-pipe for the liquids contained in said vessel, an outward flare at the top of said guide-opening in said annular cover, adapted to form an annular recess around said piston when the same is raised from its seat, substantially as and for the purposes described.

24. In combination with a discharging device having a fixed base, for liquids under pressure, the quantity of liquid discharged at each stroke varying with the length of travel of a reciprocable piston, a regulating stop-gage secured at one end to said fixed base, and at its opposite end to said reciprocating piston, said regulating stop-gage adapted to be set at different distances relatively to said piston, and consisting of a rod having one part thereof cylindrical and another part provided with a screw-thread, and a screw-nut adapted to said screw-threaded part of said rod, the external margins of said nut non-cylindrical in cross-section, and an elongated passage-way for said rod and said nut, one portion thereof adapted to permit rotation of said rod therein, and another part of said passage-way non-cylindrical, and adapted to said screw-nut, the free end of said rod adapted to make a detachable connection between said reciprocable pressure-piston and the fixed part of said discharging device, so that said rod can be rotated on its axis, and so screw up or down said rod to variable distances in said non-cylindrical passage-way so as to thereby limit the stroke of said reciprocable piston at corresponding distances, and so vary the quantity of liquid dischargeable at each stroke as desired, substantially as described.

25. In combination with a discharging device for liquids under pressure, having a fixed hollow base and a reciprocable piston operating to compress said liquid in said hollow base and discharge the same, at each stroke

of said piston, through a suitable discharge-pipe, a rod adapted to be rotated on its axis, and provided at one end with means whereby the same may be rotated, and with means whereby said rod may be detachably connected with said piston, one part of the length of said rod screw-threaded, a nut adapted to the screw-threaded part of said rod, the exterior of said nut angular, a passage-way having one portion of its length angular in cross-section to prevent rotation of said nut therein, and another part thereof constructed and adapted to permit said rod to be axially rotated therein, said passage-way sealed against contact with the liquids contained in said hollow base, and operatively connected with said base, substantially as described.

26. In a pneumatic discharging device for liquids, by means of pressure applied above the level of said liquid to a body of contained air, a reciprocable piston of large size and tubular in form, said piston open below and closed above, a liquid-containing vessel in operable connection with said piston, said device provided with an air-vent whereby air may be admitted into the air-space of said vessel, and may be shut off during the forcible descent of said piston, and means whereby said piston may be reciprocated, a discharge-pipe, an annular cover for said vessel provided with an opening therein for said piston, the sides of said opening prolonged, beneath the level of said annular cover, downward into said vessel, and having free tubular margins at its lower end, and a tubular surface external to said tubular space within, said reciprocable piston adapted to be reciprocated in said tubular guiding-passage so as to produce compression of the contained air and liquid within said vessel, and the tubular walls of said piston extending down below the free margins of said tubular guide-passage, together with a flat band of soft material, impervious to air and water, secured, in the upper part of its width, around the lower part of said tubular guide-passage, and having the lower part of its width projecting below said free margin, and in sliding contact with the external wall of said tubular piston, substantially as and for the purposes set forth.

27. A pneumatic discharging device consisting of a liquid-containing vessel, provided with an annular cover, and with a large guide-opening in said cover, and a reciprocable tubular piston, open beneath and closed above, and provided with an operating-handle and an air-vent adapted to be left open or closed at will, said piston adapted to be reciprocated in said guide-opening so as to compress the air and liquid contained in said vessel, a discharge-pipe extending from the bottom of said vessel externally above the level of the liquid contained therein, and projecting outwardly from said vessel, the free extremity of said tube adapted to receive and retain a flexible extension-tube applied thereto, substantially as described.

28. In a device for moving liquids under pneumatic pressure through a suitable discharge-pipe, one end thereof external to said device and above the level of liquids contained in a suitable closed vessel, and the other end of said discharge-pipe opening within and beneath the surface-level of liquids contained in said vessel, a liquid-containing vessel provided with an air-tight annular cover, having therein a large guide-opening leading down into the interior of said vessel, a vertically-reciprocable tubular piston conforming thereto, and reciprocable with free but close contact, within the said guide-opening, means whereby said piston may be reciprocated, said piston open beneath into said vessel and closed above, said device provided with an air-vent whereby air may be admitted beneath said piston during the upward movement thereof, and may be shut off during its forcible descent within said guide-opening, a discharge-pipe as described, the free external end of said discharge-pipe adapted to be connected with an ordinary rubber suction or forcing tube, the whole so constructed that when said piston is raised in said guide-opening and said air-vent closed air or water, as may be in contact with said discharge-pipe externally, will be drawn into said vessel by external pneumatic pressure, the air-vent when opened during the descent of said piston allowing the excess of said contained air to escape, or, if the process be reversed, and the air-vent left open during the ascent of said piston, and closed during its descent, the liquid contents of said vessel will be forcibly expelled therefrom, through said discharge-pipe, substantially as shown and described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ISAAC W. HEYSINGER.

Witnesses:
MICHAEL B. FENNINGER,
ERNEST W. HEYSINGER.