3 Sheets—Sheet 1.

M. C. RICHARDS.

LIQUID-MEASURE.

No. 188,188. Patented March 6, 1877.

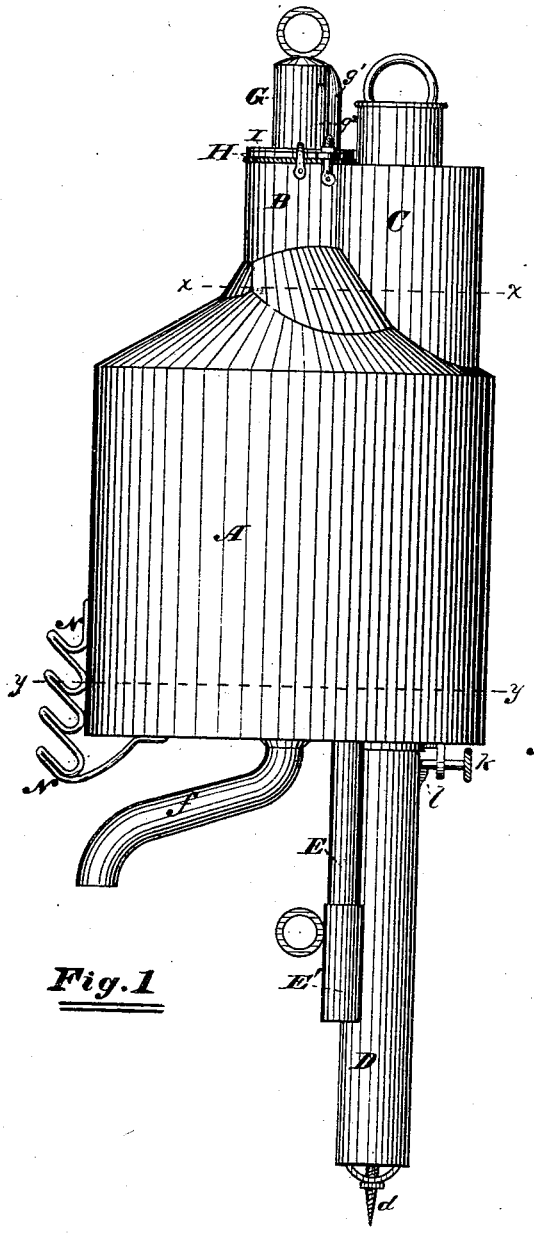

Fig. 1

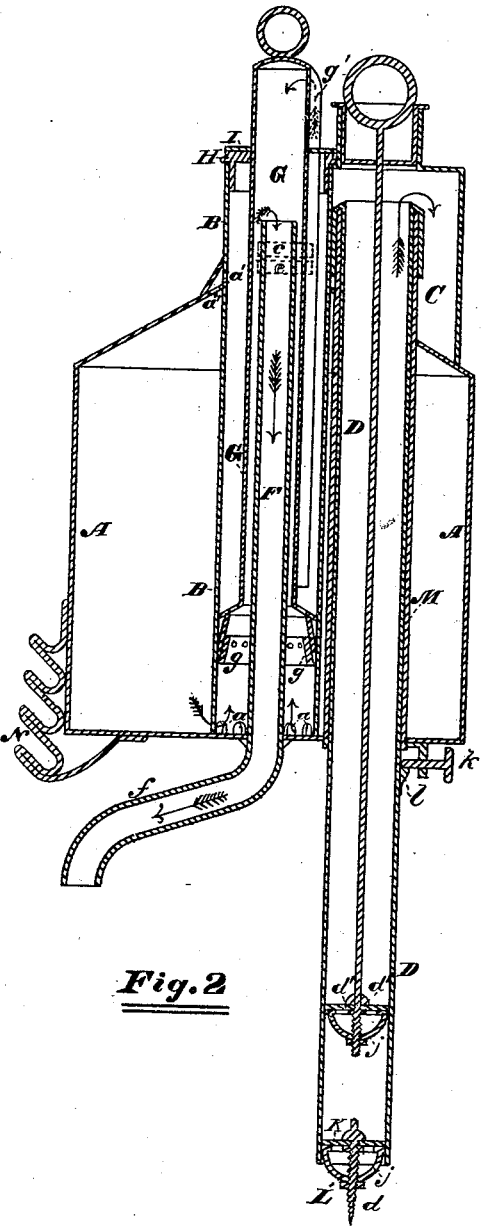

Fig. 2

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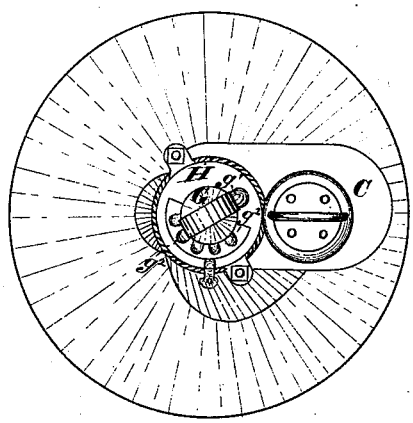

Fig.3

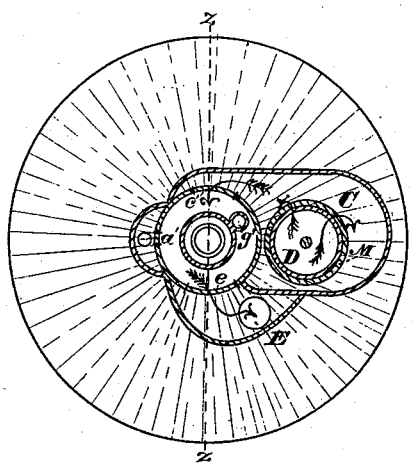

Fig.4

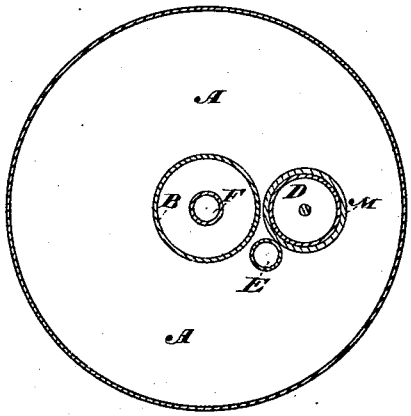

Fig.5

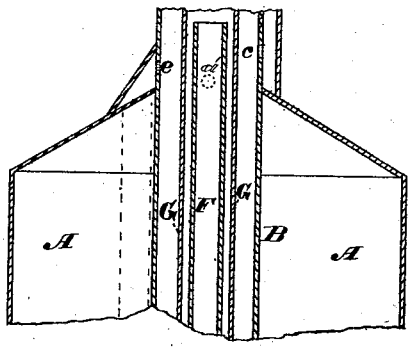

Fig.6

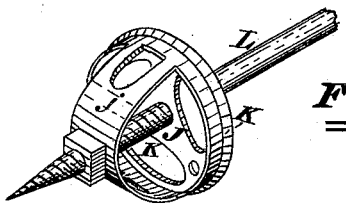

Fig.7

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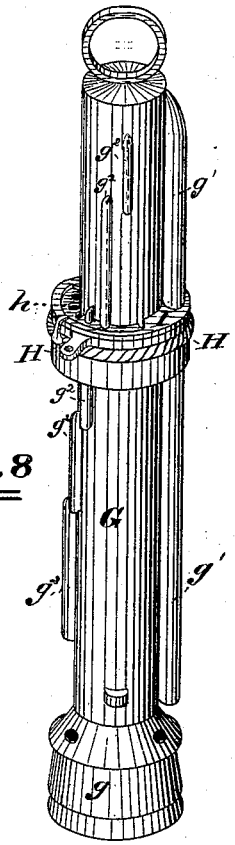


Fig. 8

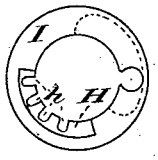


Fig. 9

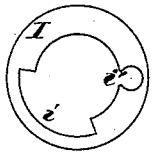
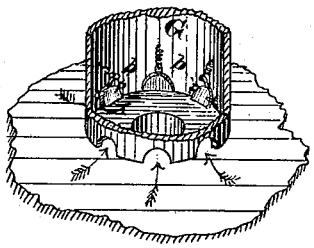


Fig. 10

Fig. 11



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UNITED STATES PATENT OFFICE.

MARCIUS C. RICHARDS, OF OSWEGO, ILLINOIS.

IMPROVEMENT IN LIQUID-MEASURES.

Specification forming part of Letters Patent No. **188,188**, dated March 6, 1877; application filed June 24, 1876.

To all whom it may concern:

Be it known that I, MARCIUS C. RICHARDS, of Oswego, in the county of Kendall and State of Illinois, have invented a new and useful Improvement in a Liquid-Measuring Device, which is fully described in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a side elevation of the apparatus; Fig. 2, a vertical section of the same; Fig. 3, a plan view of the device; Fig. 4, a cross-section taken on the line *x x*, Fig. 1; Fig. 5, a cross-section taken on the line *y y*, Fig. 1; Fig. 6, a vertical section taken on the line *z z*, Fig. 4; Fig. 7, a perspective view of the pump-valve; Fig. 8, a perspective view of the plunger and regulating device; Figs. 9 and 10, detail views of the regulating-ring; and Fig. 11, a detailed view of the bottom of the stand-pipe, the casing being partly broken away to show the valves in the interior.

My invention relates to a device by means of which the liquid contents of the barrels, casks, and other vessels may be drawn out in measured quantities, so that any given quantity within a certain limit may be drawn from the same without the use of the ordinary measuring-vessels.

The invention consists in an arrangement of chambers and pipes, so that as the liquid is pumped from the vessel it fills the main chamber and the stand-pipe therein, from which the liquid is afterward drawn by forcing a plunger a certain fixed distance below the liquid in said stand-pipe, which produces a siphon-like operation, as hereinafter described, and also in various devices, in details of construction as will be hereinafter fully set forth.

In the drawings, A represents the main vessel or chamber, within which is placed a stand-pipe, B, which passes up through the cover of the vessel, and is open at the top. At the bottom of this stand-pipe are small holes *a*, which provide a communication between the stand-pipe and chamber A. These apertures are constructed by hinged valves *b* inside the stand-pipe, which are held open by suitable springs, except when sufficient pressure is applied inside of the stand-pipe to close them. Upon the top of the receiving-chamber A is a small supplementary chamber, C, from which a pipe, D, extends down through the chamber A, and projects below the bottom of the latter, so that it may be inserted in the bung-hole of the barrel or cask. A screw, *d*, is attached to the lower end of this pipe, which is secured into the bottom of the barrel or cask, so that the apparatus is held in place whenever the pump is worked. The pipe D is fitted with an ordinary valve piston and rod, *d'*, by means of which the liquid is raised from the vessel containing it into the chamber C. The pump-pipe D extends through a supplementary pipe, M, nearly to the top of the chamber C, so that the latter may be nearly filled without any return flow into the barrel. The opening into the chamber C at its top is closed by a suitable stopper, which is constructed so as to serve also as a drip-cup, through which the pump-piston rod projects.

The chamber C extends partially around the upper end of the stand-pipe B, and an opening, *c*, in the wall of the stand-pipe affords communication between the two, so that the liquid may flow from the pump-chamber into the stand-pipe, and then into the receiving-chamber A. It is obvious that the liquid flowing into the stand-pipe B and chamber A will stand at the same height in both. In the upper part of the stand-pipe B, a little below the opening *c*, and opposite thereto, is another aperture, *e*, which opens into a waste-pipe, E, by means of which the liquid flows back into the barrel when it reaches a height in the stand-pipe even with the top of the chamber A, so that the latter is filled. At this point there is also a small opening, *a'*, which establishes communication between the stand-pipe and receiving-chamber at the extreme top of the latter. The waste-pipe E passes out of the vessel A by the side of the pipe D, so as to be inserted in the bung-hole of the barrel with the latter. It is also provided with supplementary sections E', by means of which its length may be adjusted to suit vessels of different capacity.

Within the stand-pipe B is another pipe, F, which extends up within the stand-pipe to a point a little above the opening into the chamber C. The lower end *f* of this pipe passes

through the bottom of the vessel A, so as to form an outlet-pipe, and is bent outward, as shown in the drawings, so that the receiving-vessel may be conveniently placed underneath it to catch the outflowing liquid. Within the stand-pipe, and fitting over the outlet-pipe F, is still another pipe or cylinder, G, which is closed at its upper end, and at its lower end is provided with a piston, *g*, which fits the stand-pipe B. The piston *g* is provided with a slightly-flaring yielding packing at its lower end, so that when it is pushed downward in the stand-pipe the packing will be forced outward to fit the stand-pipe tightly. In the top of the piston are a few small holes, as shown in Fig. 8 of the drawings. On one side of this plunger-pipe G is attached a small tube, g^1, which communicates with the interior of the pipe G at the extreme top of the latter, and extends down upon the outside thereof to a point just above the piston *g* inside of the stand-pipe. The plunger G passes up through a ring-cap, H, which closes the top of the stand-pipe B, and is secured thereto in any suitable manner. The plunger G is provided with a series of ribs, g^2, upon its periphery, arranged spirally, as shown in Fig. 8 of the drawings. In the cap H is a series of recesses, *h*, of such size that the ribs g^2 may pass down within them. Just above the cap H is placed a loose ring, I, held to the cap by lugs on the latter, as shown in Fig. 8 of the drawings. This ring I has a large recess, *i*, somewhat wider than the space occupied by the recesses *h* in the cap H. It also has another smaller recess, *i'*, within which tube g^1 is fitted. The tube g^1 prevents the ring I from turning; but the cap H is recessed where the tube g^1 passes through it, so that when freed from the ribs g^2 the cap may be turned back and forth a limited distance. This adjustment of the cap is effected by pulling up the plunger until the ribs g^2 are above the ring, where it may be adjusted in relation to the ring I, so as to leave one or more of the recesses in the cap exposed, as may be desired.

The ribs g^2 on the plunger operate as a kind of graduated scale, for by the construction and arrangement of devices above described it will be seen that if but one notch in the cap H is left exposed only the lower rib of the series can pass through the cap H, the next rib above acting as a stop to prevent the further depression of the plunger; but the plunger being free to turn within the cap, and carrying the ring I around with it, if it is turned so as to expose two notches in the cap H, then the plunger may be forced down within the stand-pipe a distance represented by the two lower ribs g^2, and so on, until, if the entire series of notches is exposed, the plunger may be depressed within the stand-pipe to its utmost extent.

The pump-valves which I use are of peculiar construction, as shown in Fig. 7 of the drawings. A perforated disk, J, is provided upon its lower face with a yoke or loop, *j*. The valve-disk K, which may be of leather or any other suitable material, is placed just above the disk J, and a holding-rod, L, passed down through both disks and the yoke *j'*. The lower end of the rod is threaded, and the valve is secured thereon by a nut turned up tightly against the yoke. When this construction is used for the piston-valve the attachment is made directly to the piston-rod, as shown in Fig. 2 of the drawings; but for the stationary valve at the lower end of the pump-stock a separate bolt, L, must be used, the lower end of which is extended some distance below the yoke, and, being threaded, forms the means of attaching the pump to the bottom of the barrel, as heretofore described. The pump-pipe D is held in place by means of a set-screw, *k*, on the vessel A, which engages with a projection, *l*, on the pipe, as shown in Figs. 1 and 2 of the drawings.

The pump-pipe may be entirely removed, if desired, by withdrawing it through the opening on the top of the chamber C.

Upon the outside of the vessel A, near the spout of the outlet-pipe F, is fastened a series of hooks, N, for the support of vessels underneath the spout, if desired.

The operation of my invention is as follows: The liquid is pumped from the cask or barrel until the vessel A is full, and as the stand-pipe B communicates with the vessel the liquid will stand at the same height within the latter. The plunger G is drawn up until the piston is above the liquid within the stand-pipe. When it is desired to draw from the vessel A the plunger is depressed within the stand-pipe to such a distance as the graduation heretofore described will permit. This movement closes the valves at the bottom of the stand-pipe, and forces the liquid within said pipe up the small annular space between the plunger G and the outlet-pipe F until it reaches the top of the latter, when it flows over into the pipe F and out at the spout. At the same time a small portion of fluid will be forced up in the stand-pipe, above the piston *g*, through the holes in the top of the latter, and by this means the lower end of the air-tube *g'* is closed, so that no air can reach the upper portion of the plunger-pipe, and the air having been nearly all forced out in advance of the fluid by the depression of the plunger, it is obvious that a siphon is obtained, the lower end of the outlet-pipe being below the lower end of the stand-pipe.

The operation will continue so long as liquid stands above the piston in the stand-pipe, the flow being in the direction of the arrows from the vessel A into the stand-pipe, through holes at the bottom of the latter, up through the plunger-pipe G into the pipe F, from which it is emptied at the spout. The liquid in the stand-pipe will be at the same height as it is in the vessel A, so that as it is drawn from the latter it will also settle in the former, until finally the lower end of the air-tube g^1 is exposed, through which air is immediately ad-

mitted to the top of the pipe G, when the operation of the siphon is immediately stopped, and the outflow of the liquid ceases.

The ribs g^2 on the plunger are arranged so that the latter is graduated for pints, quarts, gallons, or any desired measure, and if the graduation is accurate, only the quantity indicated by the number of ribs passing through the cup in the depression of the plunger will be drawn out from the vessel A. If the vessel A is not emptied by the first draft a second one may be made at any time thereafter by simply pulling up and turning the plunger, so that an additional gage rib or ribs will pass down through the cup.

I have shown and described my invention in connection with a pump; but it is evident that the measuring device may be used in any other connection, without a pump, if desired, the liquid being introduced into the vessel A by any suitable means.

It is evident that the construction and arrangement of pipes for producing a siphonic action may be changed without departing from the principle of my invention; for instance, the stand-pipe may be enlarged so as to serve as the receiving-vessel, the piston on the plunger being correspondingly increased in size, and the plunger-pipe may be prolonged and bent to form a regular siphon-pipe, in which case an independent outlet-pipe would be unnecessary. These modifications, however, would not be so convenient to operate as the construction and arrangement heretofore shown.

The air-tube g^1 at the side of the plunger may also be dispensed with, if desired, for it is evident that when the liquid in the stand-pipe falls below the piston on the plunger air will be admitted at the top and sides of the piston, and thus the action of the siphon suspended.

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

1. In a liquid-measuring apparatus, the combination of a pipe in which the liquid stands, and a siphon-pipe which is operated by submerging a piston thereon in the liquid contained in the former, substantially as described.

2. The combination of the stand-pipe, plunger-pipe, provided with a piston, and outlet-pipe, so as to produce a siphonic action by forcing the piston below the surface of the liquid in the stand-pipe, substantially as described.

3. The combination of the receiving-vessel A and stand-pipe B, having communicating apertures, substantially as and for the purpose set forth.

4. The combination of the stand-pipe B, having apertures *a* at its bottom, and spring-valves *b*, one for each aperture, substantially as described.

5. The combination of the plunger G, stand-pipe B, pipe F, and air-tube g^1, arranged to admit air to the siphon when the liquid falls below a certain point in the receiver, substantially as and for the purpose set forth.

6. The graduating-ribs g^2, arranged upon the plunger G, substantially as and for the purpose set forth.

7. The combination of the ribs g^2 on the plunger, recessed cap H, and recessed ring I, substantially as described.

8. The combination of the stand-pipe B, chamber C, communicating therewith, and pump D, substantially as described.

9. The combination of the chamber C, stand-pipe B, having apertures *c* and *e*, and waste-pipe E, substantially as described.

10. The pump-valve consisting of the perforated metal disk J, yoke *j*, flexible disk K, and fastening bolt or rod L, substantially as described.

11. The valve-fastening bolt L, constructed with its lower end projecting below the valve, and provided with a screw-thread, substantially as and for the purpose set forth.

MARCIUS C. RICHARDS.

Witnesses:
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JOHN S. SEELY.