H. BLATTNER & F. ADAM.

Hydrometer.

No. 216,304. Patented June 10, 1879.

FIG. 1.

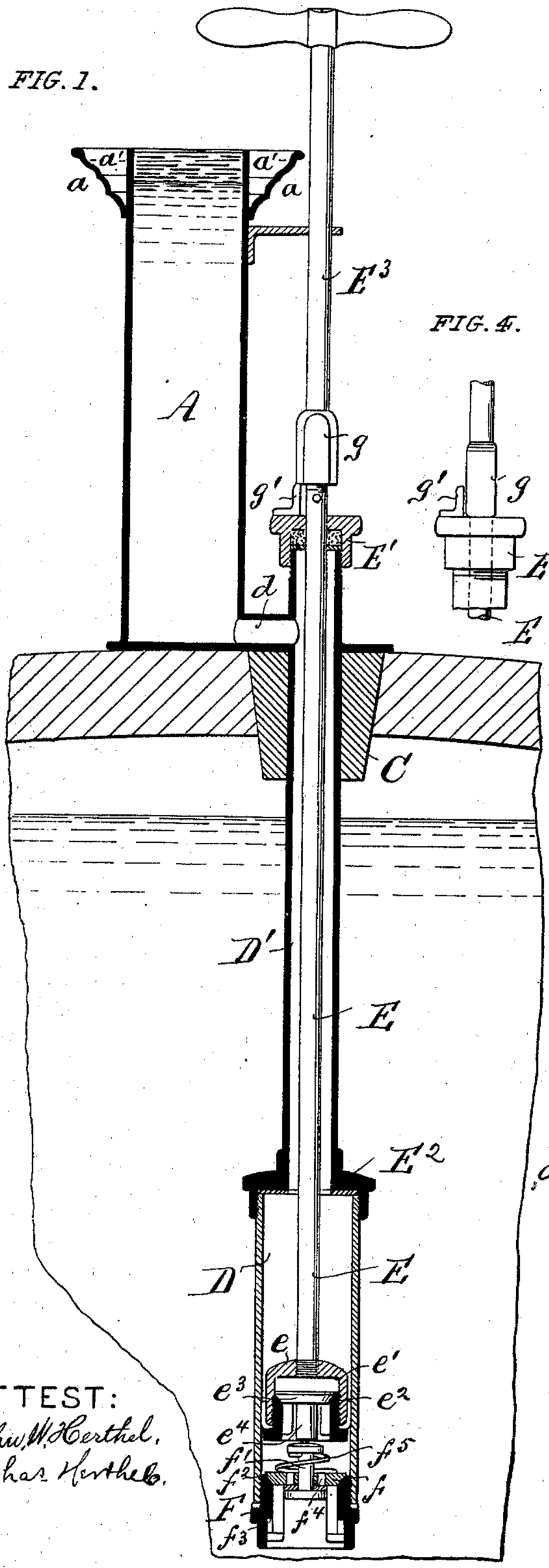


FIG. 4.

FIG. 2.

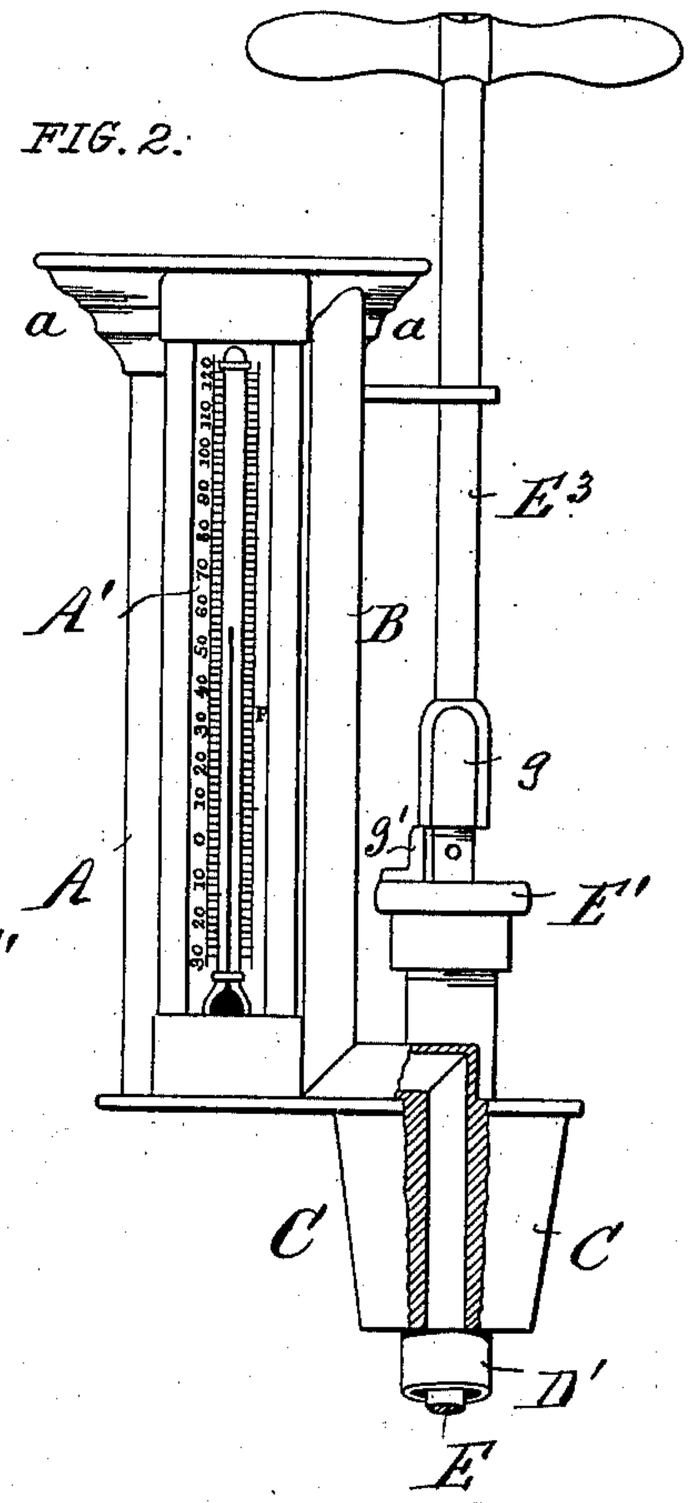
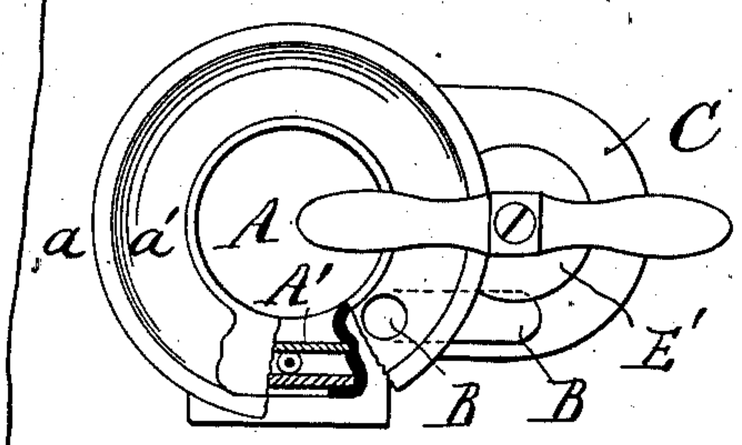


FIG. 3.



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HENRY BLATTNER AND FRANK ADAM, OF ST. LOUIS, MISSOURI.

IMPROVEMENT IN HYDROMETERS.

Specification forming part of Letters Patent No. **216,304**, dated June 10, 1879; application filed March 29, 1879.

To all whom it may concern:

Be it known that we, HENRY BLATTNER and FRANK ADAM, both of St. Louis, Missouri, have invented an Improved Hydrometer Cup and Pump, of which the following is a specification.

This invention relates to the class of hydrometer cups or instruments for extracting and holding spirits or liquid for purposes of inspecting, gaging, and proving same.

We will first fully describe the construction and operation of our improvements, and hereinafter point out the novel features thereof, also the important results and advantages to be derived from its use.

Of the drawings, Figure 1 is a sectional elevation. Fig. 2 is a side elevation of the hydrometer-cup and parts of the pump. Fig. 3 is a plan view, and Fig. 4 is a detail elevation.

A is the hydrometer-cup. It consists of the combination, with the cup A proper, of a mercurial thermometer, A′. The cup is for the purpose of containing the drawn spirits or liquid; the thermometer to indicate the temperature of said spirits. (See Figs. 1, 3.)

The thermometer has its back made to form part of the interior of the cup. (See Fig. 3.) Surrounding the top of the cup is a flange, *a*, forming the chamber *a′*, to receive the overflow from the cup.

B is the overflow-tube, communicating at top to the overflow-chamber, and at bottom it branches through the metallic bung C. Thus the liquid overflowing is returned again to the source or supply.

We combine with the hydrometer-cup aforesaid a pump of improved construction so far as the valve-gear is concerned, by means whereof the spirits or liquid to be tested can be quickly pumped into the hydrometer-cup, and when the test is completed can be returned through the same means back again to the supply cask or barrel.

D is the pump-barrel; D′, the ascending tube, and *d* is the branch tube connecting D′ with the hydrometer-cup. (See Fig. 1.)

E is the piston-rod, passing through the packing-joint at E^1, and also the screw-cap at E^2. (See Fig. 1.)

e is the piston, having shoulders or valve-seats at e^1 e^2 to control the opening and closing action of its contained valve.

e^3 is a puppet-valve contained in the piston. This valve e^3 opens on the descent of the piston, and closes on its ascent. When open this valve rests against the top shoulder, e^1, and permits the rise of the liquid to pass above the piston. Said valve is closed when it rests against the lower seat, e^2, as shown.

It will be noted that the valve e^3 carries a vertical stem, e^4, (see Fig. 1,) in order to engage the valve below, that controls the return flow of the liquid to the barrel, and as will hereinafter appear.

The pump-barrel at bottom we provide with the screw-tube F, which contains the two further valves f f^1.

The valve f is a similar one to that of e^3, and when closed said valve rests upon the top shoulder at f^2. (See Fig. 1.) When open, said valve f can rise above its seat, being estopped by its vertical stems engaging the shoulders at f^3. (See Fig. 1.) Said valve f is always open when the piston is elevated, and closes on its descent. The action, therefore, of both the upper and lower valves, e^3 f, is similar to that of any ordinary lift-pump. We, however, lay stress upon the addition to the lower valve of the third valve f^1. As stated, the liquid that has been tested is to be restored again to the supply through the same tubes and barrel parts. For this purpose the third valve, f^1, exists, with relation to the operation of the piston and its parts, as follows: The valve f^1 controls the openings f^4, seen in the top of the valve f. (See Fig. 1.) The said valve f^1 passes through the top of the lower valve, and is kept automatically seated by a spring, f^5, to close the openings f^4.

On the complete descent of the piston the stem e^4 comes in contact with the valve f^1, opens this by pressing it downward away from its seat, and freeing the openings f^4. At the same time the piston-valve e^3 is opened, (being raised to its top seat,) and thus a complete and free communication is established from the hydrometer-cup to the supply, or cask, or vessel containing the spirits or liq-

uid. In this wise the return of the liquid that has been subjected to test takes place without loss to the barrel.

The stem is made, preferably, of two sections, that of E and E^3, the latter having a socket at *g*, and at top carrying the handle or T-head.

The socket can be readily screwed on or off from the lower stem for purposes of repair, operating the pump, &c. More especially, the socket *g*, together with a stop at *g'*, (see Fig. 1,) is to serve the function of enabling the stem or rod carrying the piston to be limited in its stroke, or operated so as to come in contact with the lower valve, f^1, or not come in contact with same. Thus, for simply pumping the liquor or spirits into the cup, the lower valve, f^1, remains inactive. Hence, in order that the stem of the upper valve shall not touch the lower valve, f^1, the pump-stem is turned so that its socket *g* assumes the position shown in Fig. 1, the stop *g'* limiting the descent of the piston-rod. This latter can, therefore, be reciprocated the same as an ordinary pump for elevating the liquid.

When the test has been made, or the liquid that has been elevated is to be returned back again to the supply, a quarter-turn is imparted to the pump-stem, causing the socket to assume the position shown in Fig. 4, which permits it to slide by the stop; consequently the complete descent of the piston is had to operate this valve f^1 to open, for the purpose before stated.

The operation and the test are made as follows: As seen in Fig. 1, the instrument is applied to the cask containing the spirits so that the pump-barrel shall extend to the center of the cask. In this manner the same temperature of spirits and average strength of same are obtained in the cup for all tests, and these can, therefore, be more accurately and uniformly made. The instrument so applied, the pump is next operated quickly, to completely fill the hydrometer-cup, and to obtain the same temperature for the cup as that of the extracted spirits, also the same temperature of spirits in the cup as exists in the barrel. These results are important, and are due to the quick action of the pump, also to the fact that the same can be operated until the required "proof" is had in the cup. It is the suction or lifting of the spirits in the cup, and, further, as we are enabled to return the so lifted spirits back again, the pumping can therefore be continued until a complete agitation of the spirits in the cask is had to equalize the proof. When the cup is filled a continuous column of liquor exists from same to the contents in the barrel.

When these results have been achieved the ordinary hydrometer (government hydrometer) is applied to the spirits or the sample in the cup in the usual manner to determine the proof.

In using our improvement the same conditions and rules govern all tests; hence these can be more accurately made, the true proof readily determined, and a more uniform system of tests is achieved.

The old hydrometer-cup (and in connection with same the "wine-thief") does not extract the spirits at all times from the same place. Further, the drawn liquid is subject to the varying temperatures in the very act of pouring it into the cup.

Other advantages for our instrument are that the mercury in the thermometer does not separate by the action or from the operation of the pump; also, there is in our case no waste of spirits, the overflow as well as the tested spirits can be returned, and otherwise our invention possesses advantages of reliability specially important for internal revenue purposes, distillers' uses, &c.

What we claim is—

1. The combination of a hydrometer-cup having a branch tube communicating with a pump, consisting of a pump-barrel and its moving piston, by means whereof the said cup and barrel can be secured stationary during the operation of the pump, as and for the purposes set forth.

2. The improved pump consisting of a barrel, D, outlet-tube D', piston-rod having the socket *g*, the cap having the stop *g'*, the piston-valve having the stem e^1, the screw-tube F, containing the valves $f f^1$, the former having openings, the latter automatically closing said openings, by means whereof the elevated liquid can be returned through the same tubes back again to the source or supply.

3. The combination of the piston-rod having the socket *g*, the cap having the stop *g'*, by means whereof a greater or less descent of the piston-rod is had, as and for the purpose set forth.

4. The hydrometer cup and pump consisting of the combination of the cup A, thermometer A', the barrel D, tubes D'*d*, stems E E^3, stop *g'*, socket *g*, the piston-valve having stem e^4, the lower valves, $f f^1$, the former having openings, the latter automatically closing said openings, all said parts being arranged to operate in the manner and for the purpose set forth.

In testimony whereof we have hereunto set our hands in presence of witnesses.

HENRY BLATTNER.
FRANK ADAM.

Witnesses:
PHILIP NUERNBERGER,
WILLIAM W. HERTHEL.