

W.H. Ware Process of & Apparatus for Rectifying Spirits.

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PATENTED AUG 8 1871

Fig. 1.

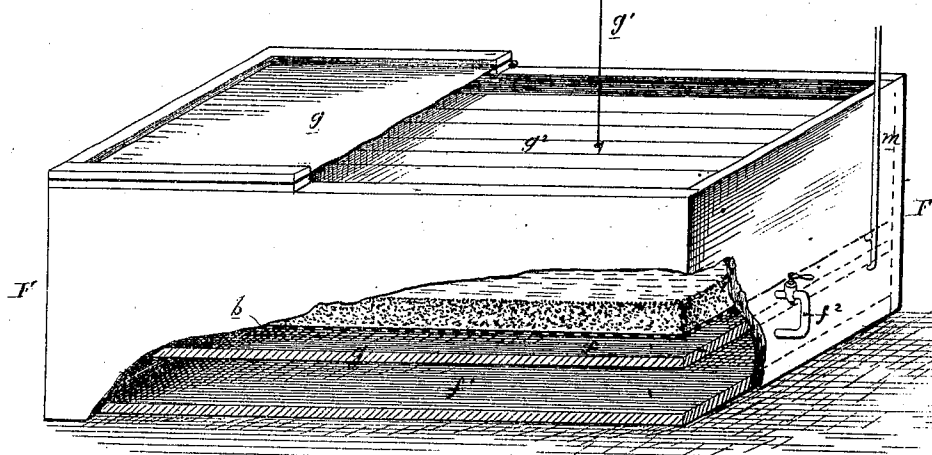


Fig. 3.

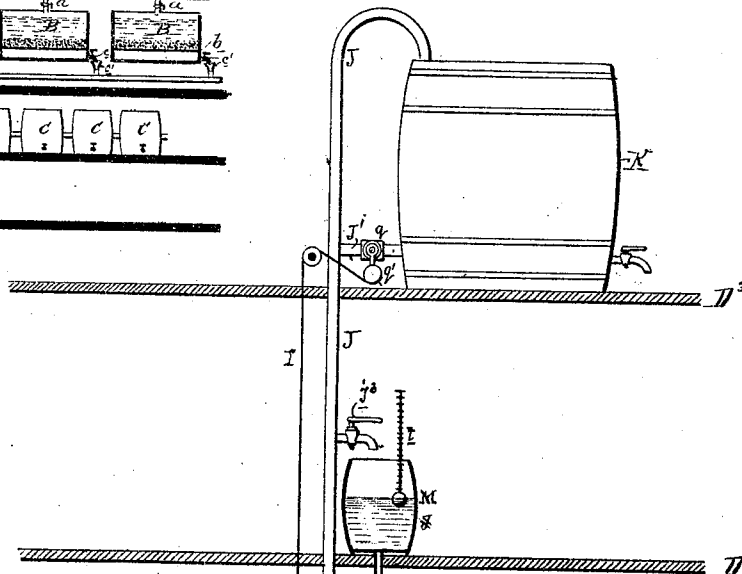
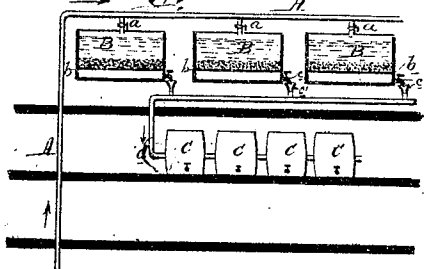
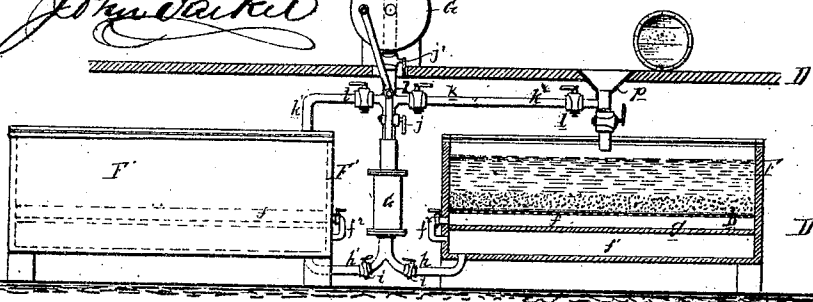


Fig. 2.

WITNESSES

W. H. Ware
by his Atty
Sturges and Son

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by his Atty
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UNITED STATES PATENT OFFICE.

WILLIAM HARRISON WARE, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN APPARATUS FOR RECTIFYING SPIRITS.

Specification forming part of Letters Patent No. 117,836, dated August 8, 1871.

To all whom it may concern:

Be it known that I, WILLIAM HARRISON WARE, of Philadelphia, county of Philadelphia, State of Pennsylvania, have invented a Process of and Apparatus for Rectifying Spirits, of which the following is a specification:

My invention consists of a certain apparatus for rectifying spirits, too fully explained hereafter to need preliminary description; the object of my invention being to produce thoroughly-refined liquor, to prevent loss by evaporation during the filtering and conveying of the latter, and to save labor in the handling and pumping of the liquor.

Figure 1 is a perspective view of my improved filtering or rectifying-vessel, with a portion of one side and of the top removed to show the interior; Fig. 2, a sectional view, illustrating the arrangement of the complete apparatus within a building; and Fig. 3, also a sectional view, showing the usual method of rectifying.

Raw whisky and other spirits, as received from the distilleries by the rectifiers, contain a great many impurities, and are usually several degrees above "proof," so that they require to be both diluted with water and purified or refined by filtering them through vegetable charcoal. In large establishments the usual process of rectifying is as follows: The raw spirit is brought into the first story of the building in barrels, from which it is discharged, through a funnel in the floor, into a receiver in the cellar or basement. From the latter it is pumped upward through a pipe, A, Fig. 3, to the third or fourth story of the building, whence it is forced through a horizontal pipe, A', furnished with cocks *a*, to the several rectifying-vessels B. The object in placing the latter in an upper story is to enable the spirit during its subsequent treatment to flow downward by its own gravity, and thus save further pumping. The rectifying-vessels are usually of small capacity, and consist of simple vats or boxes, each provided with a perforated false bottom, *b*, which supports a mass of charcoal, through which the spirit is filtered. The latter passes through the perforated false bottom of the vessel into the space beneath the same, and thence through a cock, *c*, with which each vessel is provided, into a funnel, *c'*, arranged on a pipe, *d*, which conducts the rectified spirit from all of the vessels

into stand-casks C arranged in the story beneath.

The objections to the above process and apparatus may be briefly enumerated as follows: First, there is a great loss of spirit by evaporation, especially in the summer season, owing to the arrangement of the vessels in an upper story of the building, and to the exposure of the liquid both while in the vessels and while passing in continuous small streams or drops from the cocks *c* into the funnels *c'*. Second, close watching and testing of the liquor in all of the vessels, by means of a hydrometer, are required, as it is customary to dilute the liquor in each vessel separately before it is passed through the charcoal.

In Fig. 1, F represents my improved rectifying-vessel, which is of much greater capacity than those heretofore used, and is made by preference of a rectangular shape, although it may be of any form. It has the usual perforated partition *b* and space *f* beneath the same; but there is also, in addition to the latter, between the bottom of the vessel and a partition, *g*, a reservoir, *f'*, which communicates with the said space *f* by means of a bent pipe, *f''*, situated outside of the vessel, and provided with one or more cocks. The filtered spirit passes through this pipe from the space *f* to the reservoir *f'* without loss by evaporation, and the spirit may be drawn off from the said reservoir from time to time as it accumulates therein. Evaporation is also prevented by a hinged lid, *g*, (of canvas stretched upon a frame,) with which the vessel is provided, and the height of the liquor in the latter above the charcoal can at any time be determined by means of a gauge controlling a cord, *g'*, attached to a wooden cover, *g''*, which rests upon the surface of the liquor, a knot or pointer or any mark on the cord, arranged to pass a graduated plate, Fig. 1, or other stationary object, indicating to the attendant at any part of the room the height of the liquor in the vessel. Two pipes, *m*, or a single pipe with two branches, communicate with the interior of the chambers *f* and *f'*, and conduct the air out of the same to make way for the spirit.

It will be evident that the vessel may be placed in any suitable position, and used either singly or in connection with other similar vessels. I prefer, however, in rectifying on a large scale, to arrange two or more of the said vessels in the cellar or basement of a building, and to connect them

together by pipes leading to a pump, by which their combined products may be withdrawn from the reservoir f^1 and be elevated to any of the stories above. This arrangement is clearly shown in Fig. 2, where D represents the basement or cellar of a building, and D^1 , D^2 , and D^3 the first, second, and third floors, respectively; but two rectifying-vessels, F and F' , are shown. These are connected by pipes h and h' , furnished with cocks i , to a pump, G, operated by a crank-wheel, G' , and connected to a vertical pipe, J, leading to the stories above, furnished with cocks j , j^1 , j^2 , &c., and terminating at its upper end in a large stand-cask, K. There are also two pipes, k and k' , having cocks l , both connected to the pipe J above the pump, and the former being also connected to a funnel, p , in the floor directly over the vessel F, while the latter pipe k' communicates with the vessel F' .

In using the above apparatus the raw spirit is brought in on the first floor of the building in barrels, as usual, and is emptied directly into the rectifying-vessels through the funnel p in the floor. The latter is furnished with a cock which is opened when the vessel F is to be supplied with raw spirit; but when the vessel F' is to be filled the cock in the funnel is closed, as are also the cocks j and j^1 of the pipe J, while the cocks in the pipes k and k' are opened in order to allow the liquor to flow freely through the same from the funnel into the vessel F' . The high-proof spirit thus introduced into the vessels F and F' is diluted to the required degree by mixing water with the same before filtration. The rectifying is conducted as before described, and when a sufficient quantity of the refined spirit has accumulated in the reservoirs f^1 it is withdrawn from the same by means of the pipes h and h' and pump, and is forced by the latter through the pipe J to the first or upper stories, where it is discharged into stand-casks or barrels. I prefer in most cases, however, to conduct all of the liquor as it is rectified into a large stand-cask, K, in the upper story of the building. This stand-cask communicates at the bottom, through a branch, J' , with the pipe J, and the said branch has a cock, q , which ordinarily remains closed, owing to the action of its weighted arm q' , but which can be opened by raising the said arm by means of a cord or wire, r , extending downward into the lower stories, adjacent to the pipe J. When the cock q is opened, by means of this cord, there will be a downward flow of liquor through the pipe J, from which it may be withdrawn at any point through one of the cocks j^2 , j^3 , &c. By this arrangement the constant pressure of a column of liquor on the pipe J, and the consequent danger of the bursting of the same, is avoided.

For the purpose of measuring the liquor as it is withdrawn from the cocks of the pipe J, I sometimes employ a vessel, M, Fig. 2, which may be gauged so as to indicate the exact quantity of liquor contained in it at any time, or be furnished with an indicating-rod, t , attached to a float which rests upon the surface of the liquor in the vessel. The latter also serves as a funnel, it being pro-

vided at the bottom with a pipe, t' , to which a hose can be attached for conveying the measured liquor into barrels, &c.

The process of rectifying by filtration through charcoal is necessarily slow, but may, when required, be facilitated in my apparatus by producing and maintaining a partial vacuum in the reservoir f^1 and space f beneath the charcoal, thus forcing the liquor through the latter by atmospheric pressure. This partial vacuum is produced by means of the pump G, which, without changing the arrangement of the apparatus, can be readily made to perform this duty, as well as its usual duty of emptying the reservoirs. When spirit which has been already rectified is brought into the lower story of the building in barrels, and it is desired to elevate it into the stand-cask K, it may be poured through the funnel p into the pipe k , and through a branch of the latter into the reservoir f^1 of the vessel F, from which it can be readily pumped up into the stand-cask.

It is a well-known fact that after charcoal has been used for a time it becomes clogged with impurities, and will not thoroughly refine the liquor which is passed through it. In such case it is usual to wash the charcoal with water, so as to recover as much as possible of the spirit with which the charcoal is saturated, and to then throw the latter away as useless.

In my apparatus I can economize new charcoal and obtain a superior spirit by first passing the liquor through old charcoal contained in one vessel, and thus partially refining it, and afterward passing it through the new charcoal contained in an adjoining vessel. For instance, if the vessel F contained old charcoal the liquor after passing through the same would be pumped through the pipes h and h' into the vessel F' , containing fresh charcoal.

It will be seen that the pipe J, in connection with the cocks j^2 , j^3 and the connecting-pipe J' and its cock q , serves both as a means of conducting the liquid upward to the reservoir and for withdrawing it from the latter and distributing it at any floor of the building.

I claim—

1. The combination and arrangement of a rectifying-vessel or vessels, F, arranged in a basement room, a reservoir, K, arranged in a room above said vessel, a pipe, J, communicating with the reservoir and with the rectifying-vessel, and a pump, G, or its equivalent, by which the liquor after being refined is elevated through the pipe to the reservoir above, all as set forth and shown.

2. The combination, with the rectifying-vessel, of a pipe, J, extending to a reservoir, K, and communicating with the lower part of the latter through a pipe, J' , the said pipes J and J' being provided with cocks j^2 , j^3 , and q , and the whole being arranged and operating as set forth.

3. The rectifying-vessel, consisting of the tank F, perforated partition b , and partition g , and chambers f f^1 , communicating with each other, as specified.

4. The combination, with the rectifying-vessel, of a gauge operated by a float, g^2 , through

the medium of a cord, g^1 , substantially as described.

5. The combination, with the said rectifying-vessel, of a close-fitting hinged cover, g , consisting of canvas or other fabric stretched upon a frame, as specified.

In testimony whereof I have signed my name

to this specification in the presence of two subscribing witnesses.

W. H. WARE.

Witnesses:

WM. A. STEEL,
F. B. RICHARDS.