UNITED STATES PATENT OFFICE.

THOMAS BEHAN, OF NORWICH, NEW YORK.

IMPROVEMENT IN BREWING BEER AND ALE.

Specification forming part of Letters Patent No. **868**, dated August 1, 1838.

To all whom it may concern:

Be it known that I, THOMAS BEHAN, of Norwich, in the county of Chenango and State of New York, have invented certain Improvements in the Art or Process of Brewing Beer and other Fermented Liquors, by means of which the quantity of fuel used in the process is much diminished, the risk of failure avoided, and the liquor greatly improved in its flavor; and I do hereby declare that the following is a full and exact description thereof.

In carrying on the process of brewing in my improved mode the apparatus used, and particularly the boiler, has to be modified so as to adapt it thereto. In introducing these modifications of the apparatus I do not claim to have discovered any new kind of instrument to which I make claim as an invention, but to have adapted and applied well-known principles and modes of operation, so as to improve the manufacture of beer and other analogous liquors obtained by the operation of brewing.

The main feature of my improvement is the regulating the temperature of the liquor after the wort has been sufficiently boiled and the hops have been added thereto, and this I effect by means of a closed copper or boiler, from which the aroma or essential oil which is disengaged in the process is prevented from escaping into the atmosphere, but is confined and retained in the liquid, the goodness of which is essentially dependent upon its presence.

Instead of exposing my boiler or brewing-kettle to the open fire, I insert it in a second kettle or water-bath, which is to surround and embrace it, reaching nearly to its upper edge, allowing sufficient space between the two for a reservoir for water and steam.

The interior and exterior boilers are to be so closely fitted and connected as to confine the water and steam between them, so that they cannot escape excepting through those cocks or tubes which are inserted for drawing them off or conveying them where they may be required. Double boilers of this description are well known to those conversant with the various chemical processes and manufactures in which stills and boilers of other kinds are used.

To economize the heat I usually carry a tube, which forms a part of the flue of my furnace, through the water contained in the outer boiler, giving it two or three turns therein, or otherwise constructing it in any of the known ways, so as to impart the greatest possible quantity of heat from the fire to the boilers. Around the upper edge of the interior boilers, in which the wort is contained, I raise a rim, which may be a foot, or more or less, in height, according to the size of the boiler, and this I cover with a dome or with a flat cover, as may be preferred, leaving in the center or other part of this dome or cover an opening, which I call a "man-hole," as this also is to have a cover, which may be applied or detached at pleasure, in the manner of the man-hole of a steam-engine boiler. When this cover is put on and secured in its place the boiler becomes a close one, like that of a steam-engine. This upper part may, if desired, be made of wood and removed at pleasure, and it will, if properly constructed, answer the intended purpose very well, as when the boiler is closed the temperature is never intended to be raised to a point equal to that of boiling water. This top will of course be more permanent if made of copper or other suitable metal.

The wort is to boiled and managed in all respects in the usual manner until it is prepared for the receiving of the hops. These are then to be put in, the fire being somewhat damped, by which means and by the putting in of the hops the temperature of the liquid will be brought down several degrees below the boiling-point. The cover is then to be put upon the man-hole and secured down, after which the liquid is to be kept at a temperature varying as little as possible from 200° of Fahrenheit's scale, rather keeping below than rising above this point, as at and about this temperature the essential oil or aromatic portion of the hops will be disengaged without being driven off when the operation is performed in a close vessel, as above indicated. The temperature should during this part of the process be carefully observed by means of a thermometer, which is to be so applied to the boiler as to enable the operator to examine it readily. One may for this purpose be attached to the outside of the boiler in such a way as to be kept in contact with the part containing

the liquid, and consequently pointing out its temperature. Sometimes I intend to insert a tube open at both ends into the boiler vertically, or nearly so, the lower end reaching to some distance below the surface of the liquid, and the upper end projecting out of the boiler and rising above the surface of the liquid contained in it, in which case the bulb of a thermometer may be dipped into it and its precise temperature observed. There are other known modes of applying a thermometer which may be resorted to, if preferred, which need not be pointed out, the foregoing being sufficient for the purpose, and it not being my intention to make any claim to the using a thermometer in any particular mode.

Above the before-described double boiler I place a boiler or reservoir of wood, which may contain water or any other liquid which it is desired to heat, and into this a steam-pipe is to be carried from the space between the two boilers first described, by which means the water or other liquid may be brought to and kept at the boiling-point by the waste steam. From this reservoir supply-pipes lead into the inner boiler and into the space between the two boilers, or wherever else it may be desirable to supply liquid therefrom.

The tubes will of course be regulated by means of cocks and valves in the ordinary way, and such other openings, cocks, and conduit-pipes may be used as convenience may dictate.

What I claim as constituting my invention, and which I desire to secure by Letters Patent, is—

The improvement above pointed out in the brewing or manufacturing of malt liquors by macerating the ingredients, after the addition of the hops thereto, in a closed vessel, in which the liquid is to be kept at a temperature below that of the boiling-point of water, as above fully set forth, not intending to limit myself to any particular construction of the apparatus employed, but to vary this as I may think proper, while the end is attained by means substantially the same with those described.

THOS. BEHAN.

Witnesses:

W. THOMPSON,

LINTON THORN.