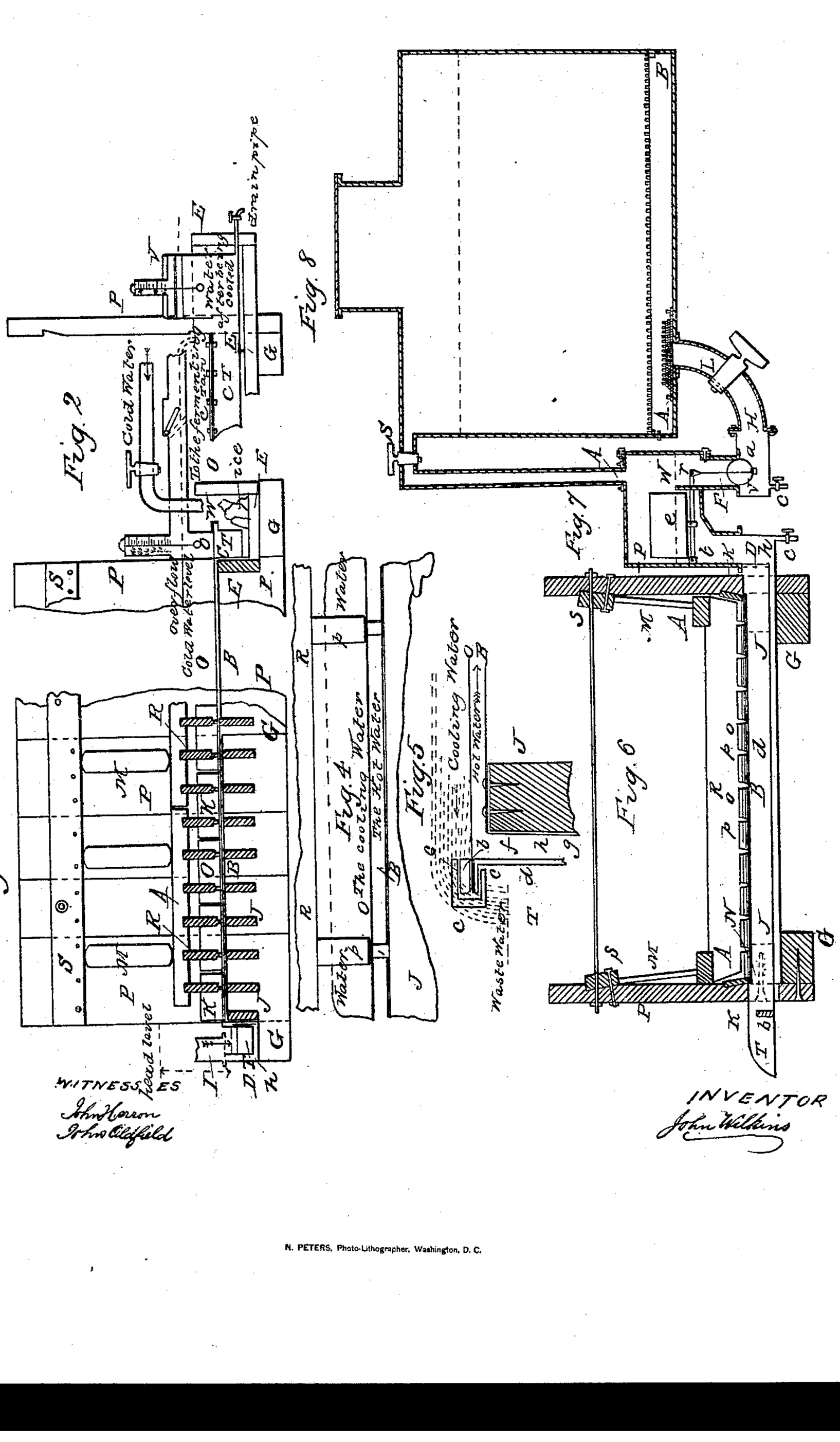
J. WILKINS.

Beer Cooler.

No. 21,915. Patented Oct. 26, 1858.



UNITED STATES PATENT OFFICE.

JNO. WILKINS, OF TROY, NEW YORK.

APPARATUS FOR COOLING WORTS.

Specification of Letters Patent No. 21,915, dated October 26, 1858.

To all whom it may concern:

Be it known that I, JOHN WILKINS, of Troy, in the county of Rensselaer, in the State of New York, have invented a new and Improved Apparatus for Cooling Brewers' Worts and Various other Fluids; and I hereby declare the following to be a full and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon.

The nature of this apparatus is such that any fluid which is of a higher temperature than is required can be reduced in temperature as much as may be required by being passed through the interior thereof under the circumstances described, and firstly, the apparatus consists of a thin horizontal, metallic plate, termed the operating plate and marked O. The metal employed should be a good conductor of heat, and I prefer copper or tin plate. Care must be taken that air may not lodge under this plate so as to prevent close contact between the fluid and the metal. The width of the plate must be according to the intended magnitude of the quantities which are to be cooled in any given time but its length must never be less than 20 or 30 feet, as from D T to C T Figs. 1–2, if it is at all desirable to economize the use of the cooling water or ice when the latter is required.

Secondly. At about a quarter or half-inch below the operating plate I place another water tight plate or flooring of any suitable material so that the two plates will form a shallow channel in which only a thin stratum of hot liquid can flow in the direction from D T, the distributing trough, (Figs. 1–2,) to C T, the collecting trough which is to receive the liquid after it has been cooled. Along under the side edges of the plate O and on the bottom plate I lay narrow slips of vulcanized rubber or other suitable packing so that when the two plates are pressed together that part will be water-tight without any permanent joint, and I cause this pressure by the insertion of the narrow slips or keys K in Figs. 1 and 6, which being only jammed into their position can be easily removed.

Thirdly. As plate O will be subject to a strong internal pressure, which however I am aware might be counteracted simply by deepening the body of cooling-water which is to pass over its upper surface, I provide a framework of ribs R R in Figs. 1 and 6 and on the model which are united in groups of 6 to 12 each by connecting pieces A, A. These cover the whole plate at small distances of about 6 inches apart, and the ribs by means of pegs projecting from them, also at distances of about 6 inches, (see *p*, *p* in Figs. 4 and 6,) touch and press down the operating plate in uniform small sections so that cold water can flow freely all over the operating plate.

Fourthly. I cause the joists J, J, Figs. 1 and 6 and in the model to be placed at such distances apart that a bearing point will fall directly under each of the rows of pegs over the operating plate.

Fifthly. The operating plate is kept from close contact with the bottom by longitudinal ribs or ridges 6 inches apart placed between the plates so as to come under each row of pegs, thus allowing the plate to sustain the pressure of the pegs without being positively fastened and without interrupting the flow of hot fluid passing within.

I provide, sixthly, a cold-water trough E, Fig. 2 and in model, in which may be placed lumps of ice, if the cooling water is not cold enough without it. This trough may be made of wood and it surrounds or partly submerges the collecting-trough C T so that its cold contents may abstract the last remains of heat from the material operated on, and a thermometer should be placed in the discharge channel shown in Figs. 2 and 3. From this trough cold water will flow in a thin stream all over the operating plate from the edge W, Fig. 1, into the trough T, Fig. 6, to be used or wasted as required; but when this cold water has arrived at the hot end D T it will be found to have become so hot as to be useful for many purposes without further heating. And in the trough T, Fig. 6, at *b*, I place a small dam to cause that trough to hold the waste water till nearly full, thus allowing it to abstract the heat of the distributing trough to the utmost.

Seventhly. I fasten the end edges of the operating plate to the troughs D T and C T in the manner shown best in Fig. 5, which is a full size section of that part, *d* being a side of the trough with a lip *e* doubled upon it. A stiffening bar of metal *b*, is placed along the edge of O and the two parts are then clamped down on *e* by the clamps *c*, *c*, *c*, Fig. 3, at short distances apart, that part in the model being soldered. The distributing

trough D T is for the purpose of spreading the hot liquid which may come from pipe I, Fig. 7, along the edge of the operating plate and the transverse section shows the trough to be composed of one trough T (in which the heated cooling water is received) lying within another trough, forming a hollow space in which flows the hot material before it passes up and under the operating plate.

G and P are parts of the framework by means of which suitable footing is provided for the pieces K and M which are used to keep down the rib frames above described and the edges of the plate O.

The planks P on opposite sides of the apparatus are held together as shown by tie-rods.

Eighthly. Fig. 3 is a transverse section of Fig. 2. The cooled liquid in C T is not to pass off at the same level, but should rise about 6 inches above O and then pass off. This subjects it while under the operating plate to a small pressure which makes it give out its heat more readily. A loose valve which opens to the flow of fluid is placed at V and it shuts also spontaneously when no liquid is passing. It thus prevents air or other gases from circulating back through the cooler. At the end of each process the residue of liquid which would lodge in the trough C T may be drawn out at E, Fig. 3, and similar cocks for similar uses are seen in Fig. 7, which I now describe, because, ninthly, it being absolutely necessary both to regulate the rate at which fluid is to pass under the plate, and to limit the degree of pressure thereon I employ a regulating valve box which accomplishes both purposes by keeping the level of the hot fluid steadily at W, Fig. 7, about 12 inches above O. When liquid in the valve box rises to W it lifts the float which shuts the valve V. That float is hinged at *e* to the bar *t*, *r*, and the bar is also hinged at the other end to the box at *t*. A rod hangs down the pipe F from *t*, and takes hold (also by hinge joint) of one side of a valve V which turns on two arms like a common throttle valve, so that it can close the entrance to the pipe F. On this valve, opposite the rod-hinge, a small projection prevents it turning too far by the rise of the float. When the level in the box subsides the fall of the float reopens the valve.

I attach much importance to means of regulating the pressure because it permits the use of a very thin operating plate and the value of my invention depends much but not solely on the thinness of the plate as rapidity of cooling is proportional thereto as well as to the goodness of the conducting power of the kind of metal used.

Lastly. In reference to the manner of using and taking care of this apparatus, when it is thought that the operating plate requires to be cleaned, I remove all the movable ribs, clamps, keys, &c., and take any suitable roller of wood of a foot or 18 inches in diameter and of a length nearly equal to the width of the operating plate, and begin at either end to fold over and roll the plate upon the same, cleaning its inside as it comes within reach and replacing by a similar process. But to prevent the necessity of cleaning in this manner more than once in two or three months I recommend that immediately after every day's use of the cooler is over, and as soon as the flow of cold water has been stopped, a few barrels of clear boiling water should be passed through it to keep it pure, care being taken not to let this water flow into the receptacle of the cooled goods.

The only mode of using this cooling apparatus will consist of letting the hot material into the proper pipe and causing a steady flow of sufficiently cold water to pass over the operating plate in a contrary direction to that in which the hot liquid passes under it, as long as may be required, the thermometer being the guide as to the quantity of cold water being too much or too little.

I do not claim merely some apparatus in which a current of cold water flows in a direction contrary to that of the materials which are to be cooled, where the channels containing the hot materials are otherwise arranged than as above specified nor where they are made to be operated on by flowing through spaces which cannot be opened to be cleaned, nor do I claim any regulating apparatus without reference to its application to the above specified uses, but

What I claim is,

1. The cooling apparatus as described with the thin metallic operating plate placed horizontally and fastened so as to be easily removed for the purpose of cleaning, together with the specific arrangement of ribs and joists, or their equivalents operating as and for the purposes set forth.

2. I claim the distributing and collecting troughs with their respective ice-water and waste-water troughs at the ends of the operating plate.

3. I claim the combination of the said parts, namely the operating plate with its joists, ribs, modes of fastening, troughs at each end, and regulating valve as described, or of parts substantially the same, when they are employed as a cooling apparatus in the manner set forth.

JOHN WILKINS.

Witnesses:
JOHN HERRON,
JOHN OLDFIELD.