

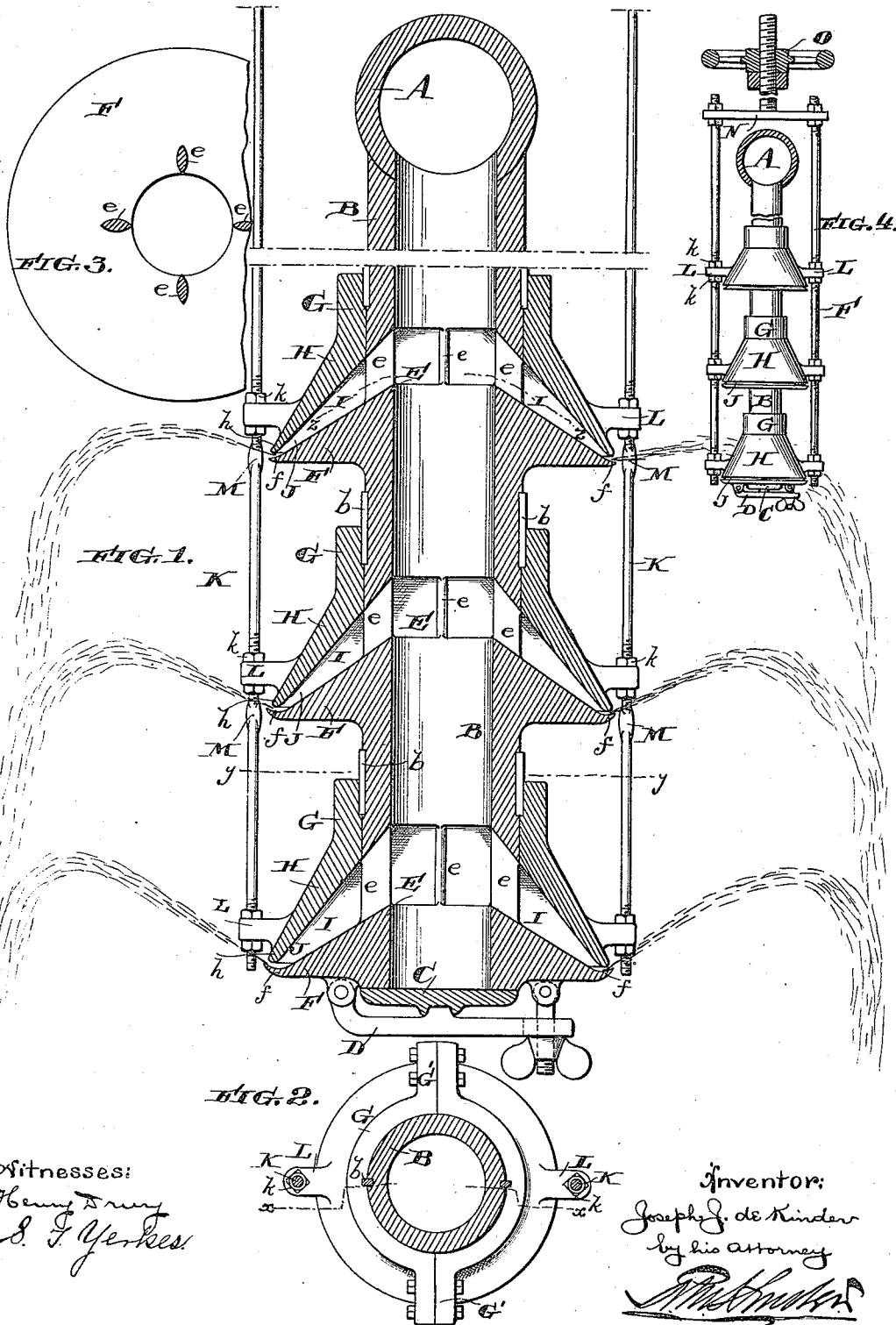
(No Model.)

J. J. DE KINDER.

APPARATUS FOR SPRINKLING AND COOLING LIQUIDS.

No. 441,365.

Patented Nov. 25, 1890.



Witnesses:

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UNITED STATES PATENT OFFICE.

JOSEPH J. DE KINDER, OF PHILADELPHIA, PENNSYLVANIA.

APPARATUS FOR SPRINKLING AND COOLING LIQUIDS.

SPECIFICATION forming part of Letters Patent No. 441,365, dated November 25, 1890.

Application filed August 21, 1890. Serial No. 362,584. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH J. DE KINDER, of the city and county of Philadelphia and State of Pennsylvania, have invented an Improvement in Apparatus for Sprinkling and Cooling Liquids, of which the following is a specification.

My invention relates to apparatus for sprinkling and cooling liquids; and it consists of certain improvements, which are fully set forth in the following specification and shown in the accompanying drawings, which form a part thereof.

In many manufactures it is necessary to cool or reduce the temperature of highly-heated liquids, either because in subsequent manipulations they must be treated in a cool state and too much of time would be consumed in allowing them to cool slowly, or because the cooling process is one of the necessary steps in the process of manufacture. Particularly in the brewing of malt liquors it is necessary that the heated liquids should be cooled, and it is especially necessary that this cooling process should be performed with rapidity.

My invention has for its object the cooling of these highly-heated liquors with the proper rapidity and completeness, and while it is particularly adapted to use in the process of brewing malt liquors it is not necessarily limited thereto, but may be used in any process in which the rapid and effective cooling of hot liquids is required.

In carrying out my invention I employ a supply-pipe for the hot liquor, having one or more narrow outlets for the escape of liquor, through which by its own pressure it is forced out in a spray of finely-divided condition and falls through the air into a receptacle. These outlets through which the liquor passes from the supply-pipe are preferably made inclining downward and tapering to a fine annular opening, the breadth of which may be adjusted, as desired, to regulate the size of the spray. When a series of these liquor-outlets is employed, they are located one above the other, and the narrow annular openings through which the liquor escapes are arranged at different angles in the different outlets, so that the liquor from the several outlets emerges at

different angles, according to the altitudes of the outlets. By this means the passage of the liquor through the air may be regulated so that the liquor of each spray occupies the same length of time in passing through the air. The passage of the liquor through the air in an atomized or finely-divided condition causes it to become cooled with great rapidity, so that by the time it reaches the receptacle it has been materially reduced in temperature.

My invention also relates to certain peculiarities in the construction of the parts and to certain novel combinations and arrangements, which are hereinafter set forth and claimed.

In the drawings, Figure 1 is a vertical sectional side view on the line $x x$ of Fig. 2 of my improved apparatus for atomizing and cooling hot liquids. Fig. 2 is a horizontal sectional view of the same on the line $y y$ of Fig. 1. Fig. 3 is a similar view on the line $z z$ of Fig. 1, and Fig. 4 is a side elevation of the apparatus upon a reduced scale.

A is the liquor-main from which the supply-pipe B leads. This pipe is closed at the bottom, preferably by means of a cap C and clamp D, so that the cap may be removed when it is desired to clean or flush out the pipe B.

E E E are annular openings formed in the pipe B, of which there may be one or more, as desired. The pipe B is formed with annular disk-like ledges F upon its outer surface located immediately below the openings E and having their upper faces inclined downwardly. In practice the pipe B is preferably formed of single pieces, being held together by means of ribs $e e$, connecting the parts through the openings E. These ribs are preferably made oval or flattened in cross-section, as shown in Fig. 3, so as to present the smallest obstruction to the passage of the liquor through the openings E.

G G are tubular pieces located upon the pipe B—one above each of the ledges F—having flaring or funnel-shaped portions H, the edges h of which are adapted to come in contact with the rims of the ledges F. These rims of the ledges F are formed with angular annular lips f . The tubular pieces G are movable

upon the pipe B, being guided therein by means of feathers *b*. The flaring or funnel-shaped portion H of the tubular piece G forms with the inclined surface of the ledge F an annular tapering passage-way I, leading from the annular opening E in the pipe B to the annular orifice J between the edges *h* of the parts G and the lips *f* of the ledges F. By adjusting the parts H to and from the ledges F the size of the annular opening or orifice J may be adjusted. To enable the tubular pieces G to be fitted upon the pipe B above the ledges F, they are preferably made in two parts, provided with flanges G' and bolted together, as shown in Fig. 2.

For the purpose of supporting and adjusting the tubular pieces G and their parts H, I prefer to employ rods K K, which pass through lugs L upon the parts H. The rods are threaded adjacent to the points at which they pass through these lugs L, and by means of nuts *k* the tubular pieces G are supported upon the rods and may be adjusted thereon to regulate the size of the annular orifices J. The rods K are preferably flattened or made oval in section, as indicated at M, at those points which come adjacent to the orifices J, so as to present the least obstruction to the liquor which issues therefrom. For the purpose of better support I prefer to employ two rods K on opposite sides of the apparatus, and for the purpose of adjusting all of the tubular pieces G simultaneously and in equal degree I connect these rods K K by a yoke N, which is provided with an adjusting-screw O, whereby the yoke and the rods K K may be raised or lowered, moving all the pieces G simultaneously.

The lips *f* on the several ledges F are preferably arranged at different angles, so as to impart to the liquor emerging from the different orifices J different directions, the lips of the lower parts being at a greater angle from the horizontal than the upper. The liquor from the several orifices may thus be made to traverse paths of equal length in falling to the floor or receptacle thereon.

While I have shown a series of the annular orifices J for spraying the liquor, formed by the parts F and H, it will be understood that a single one may be employed, if desired, as these and other details of construction which have been shown may be varied in many ways without departing from the spirit of the invention.

The operation of the apparatus is as follows: The highly-heated liquor is fed from the main A into the supply-pipe B, and, passing through the openings E and passage I, is forced by the pressure of the liquor through the annular orifices J in the form of a fine spray or in an atomized condition, the minuteness of which may be regulated by size of the orifice J, as it is obvious that a narrower orifice will produce a correspondingly finer spray. The liquid in falling through

the air in a finely-divided condition is rapidly cooled, and reaches the receptacle with a materially-reduced temperature, so that it may be used in subsequent manipulations.

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

1. In an apparatus for atomizing and cooling heated liquors, the combination of a liquor-pipe provided with a rigid inclined ledge extending continuously about its outer surface, said pipe being formed with an opening adjacent to said rigid inclined ledge to permit the liquor to flow upon said ledge, and a tubular piece carried by the pipe and movable thereon to bring its edge adjacent to the inclined surface of said inclined ledge to form a continuous orifice for the liquor between the two parts.

2. The combination, in an apparatus for atomizing and cooling hot liquors, of a supply-pipe having an annular opening and an annular inclined ledge adjacent to said opening upon the outside, and a tubular piece carried by the pipe and having a downwardly-inclining projecting annular portion extending toward the surface of the inclined ledge, said inclined ledge and tubular piece forming between their adjacent inclined surfaces an annular tapering passage-way leading from the opening of the pipe and terminating in a narrow continuous orifice for the liquor.

3. The combination, in an apparatus for spraying and cooling hot liquids, of a liquor-pipe provided with an opening for the liquor, an annular inclined ledge upon the outside of the pipe adjacent to and below said opening, and an annular inclined ledge adjacent to and above said opening, said ledges forming between their adjacent surfaces a narrow annular passage-way for the liquor leading from the opening in the pipe.

4. The combination, in an apparatus for spraying and cooling hot liquids, of a liquor-pipe provided with an opening for the liquor, an annular inclined ledge upon the outside of the pipe adjacent to and below said opening, an annular inclined ledge adjacent to and above said opening, said ledges forming between their adjacent surfaces a narrow annular passage-way for the liquor leading from the opening in the pipe, and means to adjust the upper ledge to regulate the breadth of said passage-way.

5. In an apparatus for atomizing and cooling hot liquids, a pipe for the liquor, provided with a series of openings for the liquor and with a series of fixed projecting ledges arranged adjacent thereto, in combination with a series of movable pieces arranged adjacent to the fixed projecting ledges and forming therewith passage-ways for the liquor leading from said openings and adapted to be moved toward said ledges to form contracted orifices to said passage-ways, and a

connection between said movable parts, where-
by they may all be moved simultaneously and
equally.

6. In an apparatus for atomizing and cool-
5 ing liquors, the combination of a pipe B for
the liquor, provided with an aperture E, and
with the inclined annular ledge F on the out-
side adjacent to the aperture E, the movable
collar G, provided with the outwardly-flaring
10 portion H, and means to move the collar G
upon the pipe B, said portions H and F form-
ing between their adjacent faces a passage-
way I, leading from the aperture E and termi-
nating in a contracted orifice J.

15 7. In an apparatus for atomizing and cool-
ing liquors, the combination of a pipe B for

the liquor, provided with an aperture E, and
with the inclined annular ledge F on the out-
side adjacent to the aperture E terminating
in an angular lip f, the movable collar G, pro- 20
vided with the outwardly-flaring portion H,
and means to move the collar G upon the
pipe B, said portions H and F forming be-
tween their adjacent faces a passage-way I,
leading from the aperture E and terminating 25
in a contracted orifice J.

In testimony of which invention I have here-
unto set my hand.

JOSEPH J. DE KINDER.

Witnesses:

R. M. HUNTER,
GEO. W. REED.