R. H. PFLUGFELDER.

DEALCOHOLIZING APPARATUS.

APPLICATION FILED FEB. 17, 1919.

1,396,232. Patented Nov. 8, 1921.

Fig. 1.

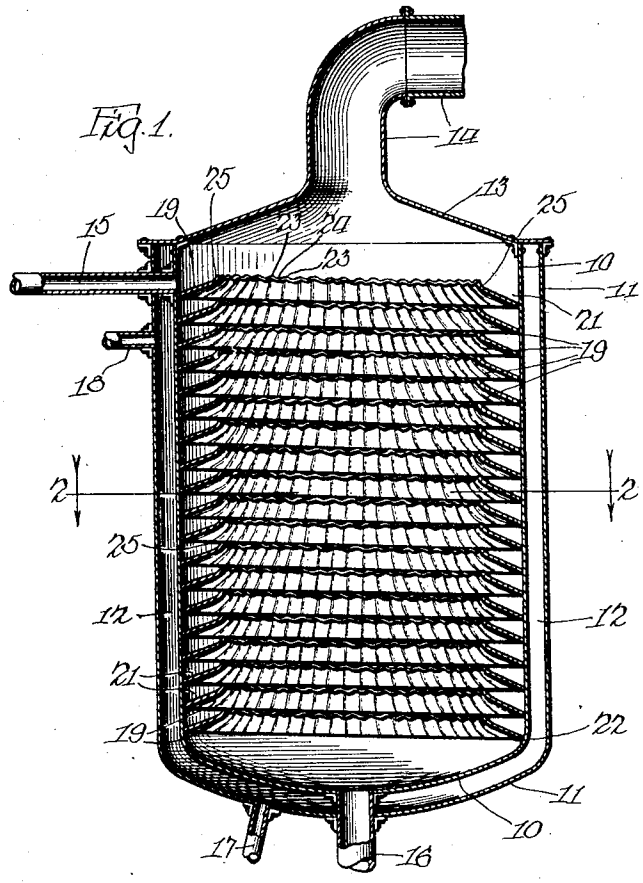
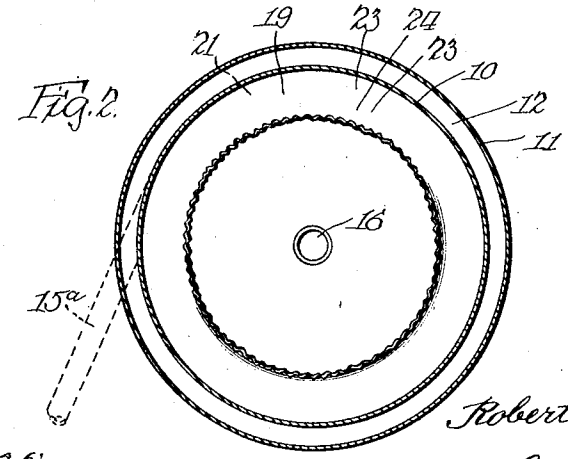


Fig. 2.



Witness:

Inventor:
Robert H. Pflugfelder
by
Atty.

UNITED STATES PATENT OFFICE.

ROBERT H. PFLUGFELDER, OF CHICAGO, ILLINOIS.

DEALCOHOLIZING APPARATUS.

1,396,232. Specification of Letters Patent. Patented Nov. 8, 1921.

Application filed February 17, 1919. Serial No. 277,416.

To all whom it may concern:

Be it known that I, ROBERT H. PFLUGFELDER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Dealcoholizing Apparatus, of which the following is a specification.

My invention relates to de-alcoholizing apparatus and has for its primary object the provision of apparatus of this character wherein the amount of heated area in contact with beer or other liquor being treated shall vary proportionately with the amount of such liquor passed through the apparatus. Another object is the provision of a very compact device of this kind so arranged as to provide an extremely attenuated heated path to be traversed by the liquor treated.

Other objects and advantages of the invention will appear from the following description, taken in conjunction with the accompanying drawings which form a part of this specification and illustrate the preferred embodiment of the invention.

In the drawings:

Figure 1 is a vertical central section through my improved apparatus.

Fig. 2 is a horizontal section thereof taken on line 2—2 of Fig. 1.

Reference numeral 10 indicates a tank, preferably in the form of an upright cylinder, in which the de-alcoholizing action takes place. Inclosing the sides and bottom of the tank and spaced therefrom is a hot water jacket 11, the latter forming, with the tank, a hot water chamber 12. The tank and chamber are sealed by a cover 13, conical in shape, communicating at its apex with the pipe 14 of an exhausting pump not shown. The pipe 14 may be any pipe in which a sufficient degree of vacuum is maintained to draw from tank 10 the alcohol evaporated from the liquor being treated.

At 15 is shown a horizontally disposed beer inlet pipe which traverses the hot water chamber and discharges into the tank 10 near the top thereof, and at 16 is seen the outlet for the de-alcoholized beer, this outlet traversing the hot water chamber 12 and draining outside the jacket 11. Hot water enters the bottom of the water chamber 12 through an intake pipe 17, and passes out of the chamber through a waste pipe 18 positioned near but slightly below the upper end of the chamber.

The tank 10 is provided interiorly with an attenuated helical shelf 19 the upper end of which is substantially flush with the bottom of the beer inlet pipe 15. This shelf is secured in any suitable manner to the vertical cylindrical wall of tank 10 and projects inwardly and upwardly into the tank, forming, with the wall of the tank, a long gently sloping channel 21 through which the beer passes. From inlet pipe 15 near the top of the tank shelf 19 follows a helical path downward, and terminates as at 22 at the bottom of the vertical cylindrical portion of the tank wall. Throughout its extent the shelf 19 is transversely corrugated from its outer to its inner edge to provide ridges 23 and depressions 24 throughout the extent of the shelf. The shelf 19 is preferably straight in cross section from its outer edge where it is joined to the tank wall 10 to a point adjacent its inner edge, and the inner edge 25 is preferably curved sharply upward in order to increase the holding capacity of channel 21. It will be noted that the width of the channel formed by wall 10 and shelf 19 is considerably greater than the diameter of the beer inlet pipe 15, and that in depth channel 21 is approximately equal to the diameter of the inlet pipe 15. Inlet pipe 15 may enter tank 10 radially of the tank, as indicated in full lines in Fig. 1, or it may communicate with the tank tangentially, as indicated in dotted lines at 15^a in Fig. 2. Obviously there will be less liability for the incoming beer to spill over the inner edge of shelf 19 if the beer inlet pipe communicates tangentially with the interior of the tank and channel 21.

In the operation of my invention beer is supplied to channel 21 from the beer inlet pipe in any desired quantity while chamber 12 is kept filled with hot water and the pressure within the tank lowered by the evacuating action of the alcohol exhaust pipe 14. The incoming beer flows around and around the interior of the tank from top to bottom thereof through channel 21 and is continuously in contact with the heated wall of the tank, the heat of this wall being sufficient to evaporate the alcohol from the beer, and the evaporated alcohol being drawn off through pipe 14. The residual liquor is drained off through the liquor discharge pipe 16. In its movement along channel 21, the beer constantly rises over the ridges 23 and falls into the depressions 24 whereby its progress

through the tank is delayed so greatly as to insure the evaporation of all the alcohol. It will be noted that channel 21 is in the shape of a V with its apex pointing downward. The beer supplied through the channel in any given quantity will of course traverse the bottom of the channel and contact with the heated wall 10 throughout a given area of that wall and throughout a given area of the shelf 19. Thus, if the inflowing beer is increased in volume, the area of contact between the beer and the heated wall 10 is also increased, so that, regardless of the amount of beer supplied to the channel, the rate of evaporation of alcohol remains practically constant, providing of course that sufficient heat is applied to the outer side of wall 10. By joining shelf 19 directly to the heated wall 10 of the tank, the conduction of heat to the beer is facilitated, as a very appreciable amount of heat passes from the wall to the shelf and thence into the beer. By the arrangement of a helical shelf within a tank I attain an extremely compact structure and a greatly attenuated channel for beer; also, by using the heated wall 10 as one side of a down-pointed, V-shaped evaporating channel, I provide that the area of contact between beer to be treated and the heated surface shall vary in direct proportion to the amount of beer passed through the channel.

While I have illustrated and described the preferred embodiment of my invention, it will be obvious that one skilled in the art may make modifications thereof without departing from the spirit of the invention. I wish, therefore, not to be restricted to the precise embodiment shown, except as the same is limited in the appended claim.

I claim:

An apparatus of the character described, comprising a tank having upright walls and a shelf secured at its outer edge along a helical line to the inner surface of said walls, said shelf being provided with transverse corrugations extending from edge to edge thereof, and having its inner edge disposed above its outer edge to provide in conjunction with the tank walls a substantially V-shaped channel the corrugated wall of which formed by said shelf serves to agitate and delay the liquid flowing along said channel to thereby facilitate the evaporation of a desired portion thereof.

In testimony whereof I have affixed my signature.

ROBERT H. PFLUGFELDER.