Nov. 2, 1937. H. E. SCHULSE 2,098,211

ART OF BREW COOLING

Filed July 18, 1936

Fig. 1

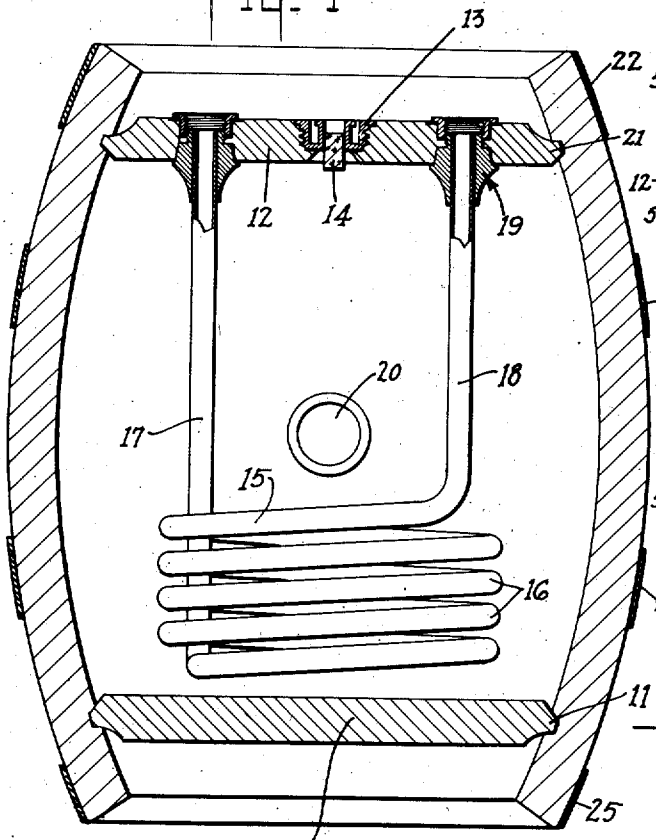


Fig. 3

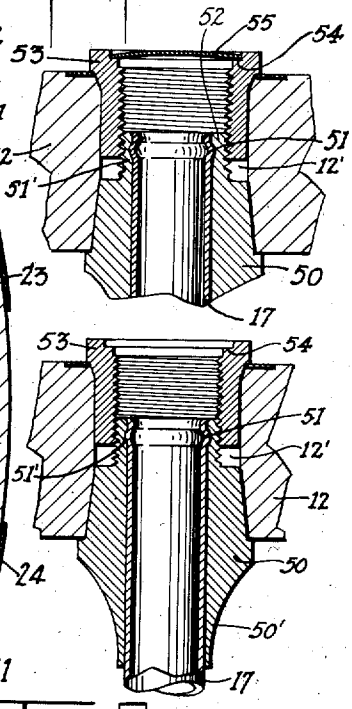


Fig. 2

Fig. 5

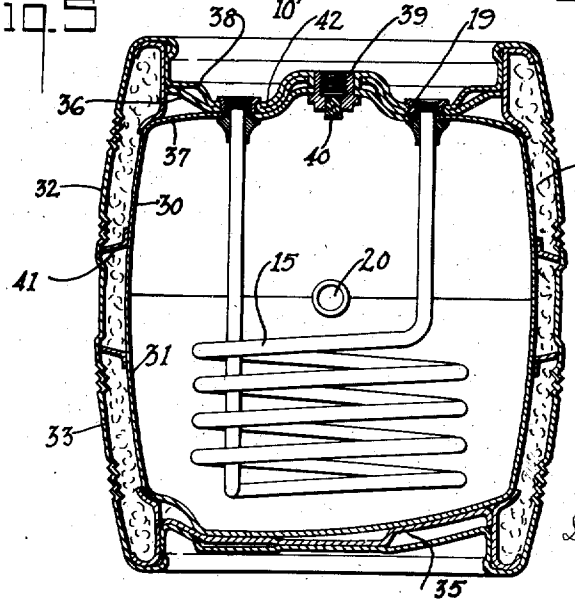
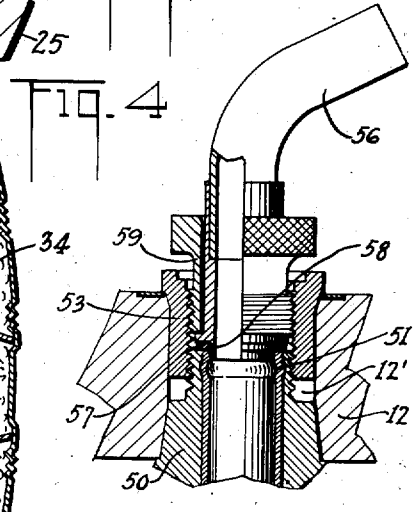


Fig. 4



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UNITED STATES PATENT OFFICE

2,098,211

ART OF BREW COOLING

Herman E. Schulse, East Orange, N. J.

Application July 18, 1936, Serial No. 91,333

28 Claims. (Cl. 257—15)

My present invention relates primarily to the art of beverage conditioning and dispensing and is more especially concerned with the cooling and dispensing of beer and kindred beverages including the brews commonly known as ale, porter, Weissbier, saki and the like.

Among the objects of the invention are to provide a brew keg or barrel which may be substantially conventional in external form or appearance whether made of wood or of metal, which admits of being filled or charged by conventional brewers' racking apparatus, of being tapped by conventional draft apparatus and of being cleaned or pitched by conventional apparatus for that purpose, which is devoid of any delicate parts apt to become injured in the usual rough handling of such units during shipment from or return to the breweries, and which is of particular utility in the operation of the cooling and dispensing method, and as a constituent element of the installation disclosed and claimed in my copending application, Serial No. 759,440, filed December 28th, 1934, and patented August 11th, 1936 under No. 2,051,013.

Another object is to provide a barrel or keg unit of the above character the features of which may be embodied in units of conventional overall dimensions without reduction in the brew containing capacity thereof, despite the presence of the cooling instrumentality built thereinto, and without in anywise increasing the likelihood of impairing the brew within the barrel by undesirable escape of gas or brew therefrom or entry of air or foreign matter thereinto.

Another object is to provide a barrel or keg of the above type, which admits of being readily connected up by the bartender as a constituent element of the installation of my patent above identified for performing the method thereof, without the use of tools for the purpose and which may as readily be disconnected for replacement after the barrel is empty.

Another object is to provide a unit of the above type from which properly cooled brew may be dispensed relatively promptly, even while the major content of the barrel if delivered relatively warm from the brewery, has not been effectively cooled.

Within the scope of certain of the claims of the present application are numerous specific embodiments, some of which are disclosed in my prior copending application, Serial No. 688,779, filed September 9, 1933, and others of which are disclosed in my copending application above identified, of both of which prior applications, the present application is a continuation in part.

A feature of the invention is the incorporation of a heat conductive instrumentality within the barrel or keg in direct contact with the contained brew by which heat may be abstracted when the unit is set up in the installation of the above identified patent, to bring the contents to and maintain it within the predetermined dispensing temperature range desired, so that the brew may be dispensed directly from the barrel without traverse through auxiliary cooling appliances. Desirably this instrumentality is a conduit built into the barrel through which cooling fluid preferably cold water, is circulated, said conduit exposing a relatively large heat abstracting area to the brew, effective to bring down to desired dispensing temperature within a reasonable period of time practical in the average tavern, the contents of a barrel, even though it has been warmed to a temperature of 55 degrees F. or more at the time the barrel is connected in the installation.

Another feature is the disposition of the major portion of the cooling instrumentality below the level of the filling bunghole and preferably near the bottom of the barrel to avoid interference with the filling or racking tube when inserted through the filling bunghole or of the usual draft tube when inserted through the draft outlet, and also to apply the most intense cooling effect near the bottom of the barrel from which region the brew is drawn.

In a practical embodiment specifically shown, the cooling conduit comprises a unitary metal tubular conduit or pipe of length greatly in excess of the depth of the barrel, the major length of the pipe extending in a series or sequence of similar preferably identically spaced and generally parallel runs which illustratively are in the form of convolutions preferably helical convolutions, the ends of which are, preferably connected to the upper head of the barrel. In the embodiment shown, the major area of the cooling instrumentality is in the lower half of the barrel below the filling bung and risers connect respectively to the inlet and outlet at the upper head.

While the invention may be incorporated in wooden or metal barrels specially built for the purpose, it lends itself readily to the adaptation of conventional wooden beer barrels for the purpose. For that purpose, the conventional stave construction and lower head may be utilized, but the upper head merely, to which the ends of the cooling structure are affixed, is modified so that

its major thickness extends above the croze and a sufficient additional effective depth is afforded to compensate for the volume of the cooling coil. In wooden barrels specially built for the purpose, the staves and heads may be quite conventional, except that the crozes are disposed each $\frac{3}{16}$'' nearer the respective rims of the barrel.

In the accompanying drawing in which are shown one or more of various approved embodiments of the several features of the invention,

Fig. 1 is a view in longitudinal cross section of a wooden barrel modified in accordance with the invention,

Fig. 2 is a fragmentary sectional detail view on a larger scale showing one of the terminal connections from the cooling coil in the barrel head prior to connection into the cooling circuit,

Fig. 3 is a view similar to Fig. 2 with a closure in place therein,

Fig. 4 is a view similar to Fig. 2 showing the terminal as connected, and

Fig. 5 is a view similar to Fig. 1 of an alternative embodiment of the invention.

In Fig. 1 is shown the conventional wooden beer barrel, with the usual lower head 10 fitting in croze 11. The upper head 12 may have the usual tap bushing 13 plugged by the usual cork 14 after the barrel is filled. The upper head, however, is modified to carry the heat abstracting element, preferably a coil 15 of metal tubing. The cooling coil may include a number of convolutions 16 rising in helical form from slightly above the bottom of the barrel and of outer diameter somewhat smaller than that of the head, as shown. The unitary piece of tubing 15 includes at one end a riser 17 rising from the lowermost convolution and at the other end, a shorter riser 18 rising from the uppermost convolution, said risers connected at their upper ends in liquid-tight relation to corresponding connections 19 with respect to the barrel head.

The connections mounting the risers of the cooling coil are preferably in a diametral plane at right angles to the axis of the filling bung hole 20 and the cooling coil is wholly below said hole. Accordingly, there is no interference with the insertion of the conventional brewers' filling or racking tube commonly extended across the entire diameter of the barrel in charging or filling.

Desirably the tubing 15 is of a metal of sufficient strength to withstand the mechanical shock to which transporation brew barrels are commonly subjected in the course of handling, as for example of stainless steel. Among other materials suitable for the purpose are certain special alloys mainly of copper. Where the tubes are made of copper alloy or the like, the outer wall thereof is preferably coated with silver or with tin, which are neutral to the brew.

In one desirable embodiment in extensive commercial use, the half barrels or kegs of conventional size of 15½ gallons capacity are equipped with coils of the silver plated copper alloy which coils are $\frac{5}{8}$'' outer diameter and have a wall thickness of .042''. The coil conformed as previously set forth and as shown in the drawing is somewhat over 14 feet long and exposes to contact with the brew a relatively large surface area, in this instance, 335 square inches. By the arrangement set forth, the cooling conduit exposes to the brew within the barrel a relatively large area per unit of volumetric capacity of the barrel, in the neighborhood of 25 square inches per gallon. The cooling conduit submerged in the brew remaining in the lower half of the barrel when the same has been half emptied presents a surface area exceeding 35 square inches per gallon. By virtue of this construction when cold water at temperature but little above the freezing point is pumped through the coil it will abstract heat and the brew will be brought down to the desired dispensing temperature in a period of time so short as to be entirely practical for use in the average tavern. In actual practice, especially in hot weather, the brew in the fresh barrel when delivered to the tap room may have been warmed to a temperature of around 60° F. When the keg with its contents thus warmed is connected up in the cooling line it will be seen that a sharp temperature gradient exists between the brew around the coil and the cold water flowing within the coil, so that heat is rapidly abstracted from the brew through the thin conductive metal wall of the coil and is carried away by the circulating water so that in the continued circulation the temperature gradient between the brew and the water drops as the beer is cooled. Since the major cooling area is near the bottom of the keg, the region from which the brew is drawn, dispensing temperature at that locality is reached in but a few minutes after the keg has been set up and connected. Once the brew in the keg has reached proper dispensing temperature, usually around 40° F., the continued flow of the cooling water is effective to maintain the brew substantially at that temperature by compensating for the rise in temperature of the brew that would otherwise occur by slow conduction of heat from the warm tap room through the wall of the keg.

The connection 19 by which the ends of the cooling tube are connected to the keg head 12 may be of any of a wide variety of constructions, one of which is illustratively shown in Fig. 2. The aperture 12' in the barrel head has a tapered bore at its lower face for accommodating a tapered bushing 50 which mounts the upper end of the riser which fits snugly within the length of said bushing and is swaged outward near its upper end 51 into a corresponding groove 51' in the bushing. The bushing is securely wedged in place by screwing over the upper nipple end 52 thereof a tapped collar 53 inserted into the upper end of the hole 12'. By this arrangement a mechanically secure and liquid tight connection is afforded which however is releasable should occasion arise to replace the head or the coil.

The bushing 50 has a skirt 50' of length adequate sufficiently to steady the risers of the coil to prevent excessive or destructive vibration in handling or transit of the empty barrel. It is understood that the cooling coil is further steadied against vibration by the incompressible liquid contents in transport of the full barrel.

For many purposes the brew filled barrel may be handled and delivered with the threaded sleeve 53 open because any dust or particles that might enter into the cooling coil would promptly be washed out after the keg has been set up on the cooling line. However the threaded sleeve 53 may readily be closed to exclude foreign particles prior to delivery of the filled barrel to the tap room. For this purpose the sleeve 53 is formed with a ledge 54 for accommodating a disk of cardboard, celluloid or the like such as a milk bottle cap which is adequate for the purpose.

Any suitable releasable coupling is used to connect the branch outlets from the cooling fluid header to the collars 53. In a desirable construction shown in Fig. 4 an elbow 56, bearing a flexible

gasket 57 at its lower lip 58 is clamped against the end of bushing 60, by means of a bushing 59 screwed into collar 53. The flexible branch outlet (not shown) is drawn over the upper end of elbow 56. If desired a friction plug (not shown) may be used in place of bushing 59.

The invention is applicable to brew barrels of standard capacity at present in use, the effective capacity of which according to the invention is not altered despite the space occupied by the cooling coil. For this purpose the head 12 is conformed unlike that of the conventional barrel head, the main thickness of which extends below the conventional croze 21, but as shown the major thickness projects above the croze. Approximately 51 cubic inches effective volume of the key occupied by the particular cooling coil above described would be compensated for by thus adding approximately ⅜" to the effective height of the interior of the barrel.

It is seen that the head as thus modified is still as thick and substantially as strong as the conventional head despite the fact that by this modification there is added sufficient effective capacity to compensate for the presence of the coil. For installing the cooling unit in a conventional barrel it is merely necessary to remove the upper two hoops 22 and 23, to loosen the third hoop 24 without disturbing the fourth hoop 25 which holds the staves together, then to apply the new head 12 with its attached cooling coil and to reapply and retighten the hoops.

While according to the foregoing disclosure the barrels in use may be rebuilt to incorporate the cooling coils or new barrels may be thus built, it may be desirable for the latter application to use as the upper head the conventional construction used for the lower head but to attain the added volumetric capacity to compensate for the presence of the coil by disposing the crozes ⅛" nearer the respective rims of the keg.

Wooden beer barrels have to some extent been superseded by metal barrels and in Fig. 5 is shown the application of the present invention to one construction of such metal barrel for cooling and maintaining the beer cooled therein. The barrel illustratively shown, comprises complementary inner half barrels 30 and 31, welded together at their contacting rims and complementary outer half barrels 32 and 33, similarly welded together, to determine therebetween a space which may serve to provide a heat insulating jacket of dead air or partial vacuum, but which is ordinarily filled with a suitable insulating stuffing 34. The lower head of the barrel includes stiffening structure 35 interposed between and engaging the inner and outer head elements thereof. The upper head is similarly provided with stiffening structure 36 between the head elements 37 and 38 there-of. The tapping or tap bushing 39 fixedly connects the middles of the upper head elements and is plugged by the usual cork 40 before the barrel is filled. Preferably the structure is strengthened by metal ribs 41 intervening between the inner and outer wall elements of the barrel.

The metal barrel construction, which as thus far described is known and not my invention, is modified to accommodate the cooling coil 15 of the same conformation shown in the wooden barrel of Fig. 1. For this purpose, the outer upper head 38 has depressions 42 at which the head elements 36, 37 and 38 are brought into contact, as shown, and at apertures in which the coil risers are attached by connections 19' preferably similar to those shown in Fig. 2.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:—

1. A combination shipping, cooling and dispensing barrel for brew, comprising a heat insulating structure including a side wall and end walls, a draft outlet and a filling bunghole, said barrel having built thereinto a heat conductor presenting a heat conductive wall for contact of the brew within the barrel, said conductor being positioned so as not to interfere with the usual filling or racking tube when inserted through the filling bunghole and not to interfere with the draft tube when inserted through the draft outlet, said barrel having an inlet and an outlet through which cooling fluid may be circulated into heat abstracting contact with said conductor.

2. A combined shipping, cooling and dispensing container for brew, comprising a heat insulating barrel structure including a side wall having a filling bunghole, and end walls, one of which has a draft outlet, said barrel having built thereinto a cooling-fluid conduit having an inlet and an outlet exposed at a wall of the barrel structure, said cooling conduit presenting a heat conducting wall in position for contact with the brew within the barrel, said conduit being positioned so as not to interfere with the usual filling or racking tube when inserted through the filling bunghole diametrically across the width of the barrel and not to interfere with the draft tube when inserted through the draft outlet substantially to the bottom of the barrel.

3. A combined shipping, cooling and dispensing container for brew, comprising a heat insulating barrel structure including a side wall having a filling bunghole and end walls, and having a draft outlet in one of said end walls, said barrel having built thereinto a cooling-fluid conduit having an inlet and an outlet exposed at a wall of the barrel structure, said cooling conduit presenting a heat conducting wall in position for contact with the brew within the barrel, said conduit having the major portion of its heat conducting surface near the lower end wall for maximum cooling effectiveness near the lower or inlet end of the draft tube to be inserted through the draft outlet, said conduit being positioned so as not to interfere with the usual filling or racking tube when inserted through the filling bunghole diametrically across the width of the barrel and not to interfere with the draft tube when inserted through the draft outlet substantially the depth of the barrel.

4. A combined shipping, cooling and dispensing container for brew, comprising a barrel structure of conventional type including a side wall having a filling bunghole, an upper head and a lower head, the upper head having a draft outlet, said barrel having built thereinto a cooling-fluid conduit having an inlet and an outlet exposed at and substantially flush with the upper head of the barrel, said cooling conduit presenting a metal wall in heat abstracting relation with the brew within the barrel, said conduit being positioned so as not to interfere with the usual filling or racking tube when inserted through the filling bunghole diametrically across the barrel and not to interfere with the draft tube when inserted through the draft outlet substantially the depth of the barrel.

5. A combined shipping, cooling and dispensing beer barrel comprising a bulging wooden side wall

having a central filling bunghole, upper and lower wooden heads fitting in corresponding crozes in the side wall, the upper of said heads having a draft outlet through which a draft tube may be inserted to extend through substantially the depth of the barrel, a metal walled cooling fluid conduit built into the barrel and including an inlet tube length and an outlet tube length, both said inlet and outlet tube lengths fixed at their respective extremities to and accessible through the upper head of said barrel, said cooling conduit having the major portion of its effective cooling surface in the lower portion of said barrel, said cooling conduit affording a clear passage throughout the depth of the barrel so as not to interfere with the draft tube when inserted through the draft outlet, and also affording a clear passage from the filling bunghole, so as not to interfere with insertion of the filling or racking tube.

6. A combined shipping, cooling and dispensing beer barrel comprising a bulging wooden side wall having a central filling bunghole and wooden heads fitting in crozes in the side wall, the upper of said heads having a draft outlet through which a draft tube may be inserted to extend through substantially the depth of the barrel, a metal walled cooling fluid-conduit built into the barrel and including an inlet tube length and an outlet tube length, said inlet and outlet tube lengths extending downward through the major portion of the depth of the barrel, the major portion of the conduit connecting the lower ends of said inlet and outlet tube lengths, both said inlet and outlet tube lengths being fixed at their respective extremities to and accessible through the upper head of said barrel, said conduit having the major portion of its effective cooling surface substantially concentric with said barrel and near the lower head thereof, and affording a clear passage transversely of the barrel so as not to interfere with the filling or racking tube when inserted through the filling bung hole.

7. A combined shipping, cooling and dispensing beer barrel comprising an outer sheet metal wall including an upper and a lower head, an inner sheet metal wall spaced therefrom and including an upper and a lower head, and heat insulating means filling the space between the outer and inner walls, the side walls having a central filling bung hole therethrough, said upper heads having a draft outlet through which a draft tube may be inserted to extend through substantially the depth of the barrel, a metal walled conduit built into the barrel and including an inlet tube length and an outlet tube length, both said inlet and outlet tube lengths fixed at their respective extremities to and accessible through the upper heads of said barrel, said cooling conduit having the major portion of its effective cooling surface near the lower head of the inner barrel wall, said cooling conduit affording a clear longitudinal passage throughout the depth of the barrel, so as not to interfere with the draft tube when inserted through the draft outlet, and also affording a clear transverse passage, so as not to interfere with insertion of the filling or racking tube when inserted through the filling bung hole.

8. A barrel for shipping, cooling and dispensing beer or the like, having a heat insulating side wall and heat insulating end walls with a draft outlet in the upper end wall, said barrel structure including within the interior thereof a metal wall built thereinto presenting a cooling surface for contact with the liquid contents and defining a space for the circulation therethrough of cooling fluid, the major portion of said cooling surface being nearer to the lower end wall than to the upper end wall.

9. A barrel for shipping, cooling and dispensing brew, having a substantially conventional external wall structure, said barrel having built thereinto cooling means providing a flow passage having a heat-conducting wall of substantial surface area for contact with the contents of the barrel, and having the major portion of its cooling surface near the lower head of the barrel, said flow passage having exposed inlet and outlet terminals affixed to the barrel wall and substantially flush with said wall structure, for connection to a cooling fluid circulating system.

10. A barrel for shipping, cooling and dispensing brew, having heat insulating side walls and heads, said barrel having built thereinto cooling means comprising an inlet tube and an outlet tube affixed to the upper head and means affording communication between the lower ends of said tubes and having a heat conducting wall of substantial surface area for contact with the brew, said tubes having exposed terminals substantially flush with the upper head for releasable connection thereto of feed and return conduits of a cooling fluid supply system.

11. A combined transportation, cooling and dispensing container comprising a barrel having a head with a draft outlet therein, a metallic cooling coil having risers spaced from said draft outlet and secured to and depending from said head, said coil comprising a plurality of convolutions rising in helical conformation from near the bottom of said barrel, substantially coaxially thereof and of a diameter extending near the periphery of the head, said risers extending respectively from the lower and upper end of said helical conformation, and serving as mounts for the cooling coil and for admission and discharge of circulating cooling fluid.

12. A combined transportation, cooling and dispensing container comprising a conventional wooden beer barrel wall having conventional heads, a cooling element disposed in the interior of said barrel and accessible to circulating fluid from the exterior thereof, one of said heads on said barrel of substantially conventional thickness having a major portion thereof extending toward the exterior of the barrel from the conventional croze thereof, thereby to increase the volumetric capacity of the barrel to compensate for the space taken up by the cooling element.

13. A combined transportation, cooling and dispensing container comprising a wooden beer barrel having conventional side walls with conventional crozes therein, a conventional lower head mounted therein, the upper head having a conventional thickness but having the major portion thereof extending upward above the croze, thereby to increase the volumetric capacity of the barrel, as compared to conventional barrels, in which the major portion of the head thickness extends into the barrel from the croze, and a cooling coil mounted in said upper head and suspended therebelow into the brew and having a volumetric displacement substantially equal to that added to the barrel by the head construction set forth.

14. A metal brew barrel construction comprising an inner two-part barrel structure and an outer two-part barrel structure spaced therefrom

for heat insulation, means sustaining the inner with respect to the outer barrel, a tap bushing extending through the spaced heads of the inner and outer barrel, the head with the tap bushing having its inner and outer walls locally contacting, and a cooling element within said barrel having a bushing support mounted in the respective local contacting portions of the barrel head.

15. In a combined transportation, cooling and dispensing container, the combination of a head having a cooling tube mounted thereon to extend into the container, the mount for each end of said tube comprising a tapered bushing carrying the tube and inserted through the lower face of the head and a collar threaded upon the end of said bushing and inserted through the upper face of said head to effect a liquid and gas tight attachment of the bushing, said collar having means for releasable connection thereto of a cooling fluid feed.

16. A brew barrel of conventional external dimensions and form having a metallic cooling conduit built thereinto for submersion in the brew content, said conduit having inlet and outlet connections exposed at the exterior of the barrel, the distance between the inner faces of the barrel heads being somewhat greater than the distance conventionally used to compensate for the loss in capacity due to the presence of the cooling coil.

17. A combined shipping, cooling and dispensing container for brew, comprising a heat insulating structure including a side wall and end walls, a draft outlet and a filling bung hole, said barrel having built thereinto a cooling-fluid conduit having an inlet and an outlet exposed at an outer surface of the barrel structure, said cooling conduit presenting a heat conducting wall for contact with the beer within the barrel, all portions of said conduit being clear of the normal paths respectively traversed by a filling or racking tube during insertion through the filling bung hole, and of a draft tube during insertion through the draft outlet.

18. A combined transportation, cooling and dispensing container for brew, comprising a barrel body having a head at one end, a tubular cooling conduit enclosed by the outer wall of said barrel and having the major portion of its length nearer the opposite end of said barrel, said conduit including risers each supported at its end by said head, and a plurality of convolutions connecting said risers.

19. A combined transportation cooling and dispensing container for brew, comprising a barrel body having a head at one end, a metal tubular member within and exposed for contact with the brew in the interior of the barrel, said tubular member having the major portion of its length nearer the opposite end of said barrel, and including risers each supported at its end by said head and a plurality of convolutions connecting said risers.

20. A combined transportation cooling and dispensing container for brew, comprising a barrel body having a filling bung hole, a head at one end with a draft outlet therein, a tubular metal cooling conduit of length several times the height of said barrel and exposed for contact with the brew in the interior of the barrel, conduit carrying terminals accessible at the outer face of said head and secured directly thereto, the main length of said conduit being connected in a sequence of spaced runs and said conduit being connected at its ends to said terminals, all portions of said conduit being clear of the normal paths respectively traversed by a filling or racking tube during insertion through the filling bung hole and of the draft tube during insertion thereof through the draft outlet.

21. A combined transportation, cooling and dispensing container for brew, comprising a barrel body having a head at one end, a tubular cooling conduit contained within said barrel, said conduit being constructed and arranged to prevent undue vibration thereof, said conduit having its major portion near the opposite end of said barrel and having risers each supported from its end by said head, and a plurality of convolutions connecting said risers.

22. A combination shipping, cooling and dispensing container for brew, comprising a heat insulating barrel structure including a side wall having a filling bung hole, and end walls, one of which has a draft outlet, said barrel having built thereinto a cooling-fluid conduit having an inlet and an outlet exposed at a wall of the barrel structure, said cooling conduit presenting a heat conducting wall in position for contact with the brew within the barrel, said conduit being positioned so as not to interfere with the usual filling or racking tube when inserted through the filling bung hole diametrically across the width of the barrel and not to interfere with the draft tube when inserted through the draft outlet substantially to the bottom of the barrel.

23. A combined transportation, cooling and dispensing container for brew, comprising a barrel body having a head at one end, a draft outlet therein, a tubular metal conduit of length several times the height of said barrel and exposed for contact with the brew in the interior of the barrel, conduit carrying terminals mounted on and exposed at the exterior of said head, said conduit having risers connected at their ends to said terminals, the main length of said conduit being unitary with and connected to the lower ends of said respective risers and being disposed as a sequence of spaced runs, with the major portion of the surface area thereof located near the opposite end of said barrel.

24. A combined transportation, cooling and dispensing container for brew, comprising a barrel body having a head at one end, a draft outlet therein, a tubular metal cooling conduit of length several times the height of said barrel exposed for contact with the brew in the interior of the barrel and having terminal connections spaced from said draft outlet and affixed in said head, the main length of said conduit extending in a series of spaced generally parallel runs between said terminals, said conduit having a surface area submerged in the brew which exceeds 18 square inches per gallon.

25. A combined transportation, cooling and dispensing container for brew, comprising a barrel body having a head at one end, a draft outlet therein, a tubular metal cooling conduit of length several times the height of said barrel exposed for contact with the brew in the interior of the barrel and having terminal connections spaced from said draft outlet and affixed in said head, the main length of said conduit extending in a series of spaced generally parallel runs between said terminals, the portion of said conduit still submerged in the brew within the lower half of the barrel when half the barrel contents have been emptied, exceeding 35 square inches per gallon of such remaining brew.

26. A combined transportation, cooling and dispensing container for brew, comprising a bar-

rel body having a head at one end, a draft outlet therein, a tubular metal conduit of length several times the height of said barrel and exposed for contact with the brew in the interior of the barrel, conduit carrying terminals mounted on and exposed at the exterior of said head, said conduit having risers connected at their ends to said terminals, the main length of said conduit being unitary with and connected to the lower ends of said respective risers and being disposed as a sequence of closely spaced similar runs, with the major portion of the surface area thereof located near the opposite end of said barrel, the surface area of said conduit exposed to the brew remaining in the lower half of the barrel when half emptied being in excess of 35 square inches per gallon of brew.

27. A combined transportation, cooling and dispensing container for brew, comprising a barrel body having a head at one end, a draft outlet therein and a filling bung hole between the ends of said barrel, a tubular metal conduit of length several times the height of said barrel within and exposed for contact with the brew in said barrel, the main length of said conduit extending in a series of generally parallel runs spaced from each other and spaced from the diametral course of a racking tube to be inserted through the filling bung hole, as well as from the longitudinal course of a draft tube to be inserted through the draft outlet, the ends of said tubular cooling conduit having risers affixed to said head and located in a plane substantially at right angles at said diametral course.

28. A combined transportation, cooling and dispensing container for brew, comprising a barrel body having a head at one end, a tubular cooling conduit contained within said barrel, said conduit having its major portion near the opposite end of said barrel and comprising a plurality of helical convolutions and risers, each of said risers supported from its end by said head, said risers extending upward from within the respective upper and lower ends of said helical convolutions.

HERMAN E. SCHULSE.

CERTIFICATE OF CORRECTION.

Patent No. 2,098,211. November 2, 1937.

HERMAN E. SCHULSE.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, first column, line 17, for the word "key" read keg; page 6, second column, line 10, claim 27, for "at" second occurrence, read to; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 15th day of February, A. D. 1938.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.

rel body having a head at one end, a draft outlet therein, a tubular metal conduit of length several times the height of said barrel and exposed for contact with the brew in the interior of the barrel, conduit carrying terminals mounted on and exposed at the exterior of said head, said conduit having risers connected at their ends to said terminals, the main length of said conduit being unitary with and connected to the lower ends of said respective risers and being disposed as a sequence of closely spaced similar runs, with the major portion of the surface area thereof located near the opposite end of said barrel, the surface area of said conduit exposed to the brew remaining in the lower half of the barrel when half emptied being in excess of 35 square inches per gallon of brew.

27. A combined transportation, cooling and dispensing container for brew, comprising a barrel body having a head at one end, a draft outlet therein and a filling bung hole between the ends of said barrel, a tubular metal conduit of length several times the height of said barrel within and exposed for contact with the brew in said barrel, the main length of said conduit extending in a series of generally parallel runs spaced from each other and spaced from the diametral course of a racking tube to be inserted through the filling bung hole, as well as from the longitudinal course of a draft tube to be inserted through the draft outlet, the ends of said tubular cooling conduit having risers affixed to said head and located in a plane substantially at right angles at said diametral course.

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It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, first column, line 17, for the word "key" read keg; page 6, second column, line 10, claim 27, for "at" second occurrence, read to; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 15th day of February, A. D. 1938.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.