Aug. 26, 1941. G. D. PEET 2,253,940

BREW COOLING EQUIPMENT

Filed Aug. 27, 1940 2 Sheets-Sheet 1

Fig. 1.

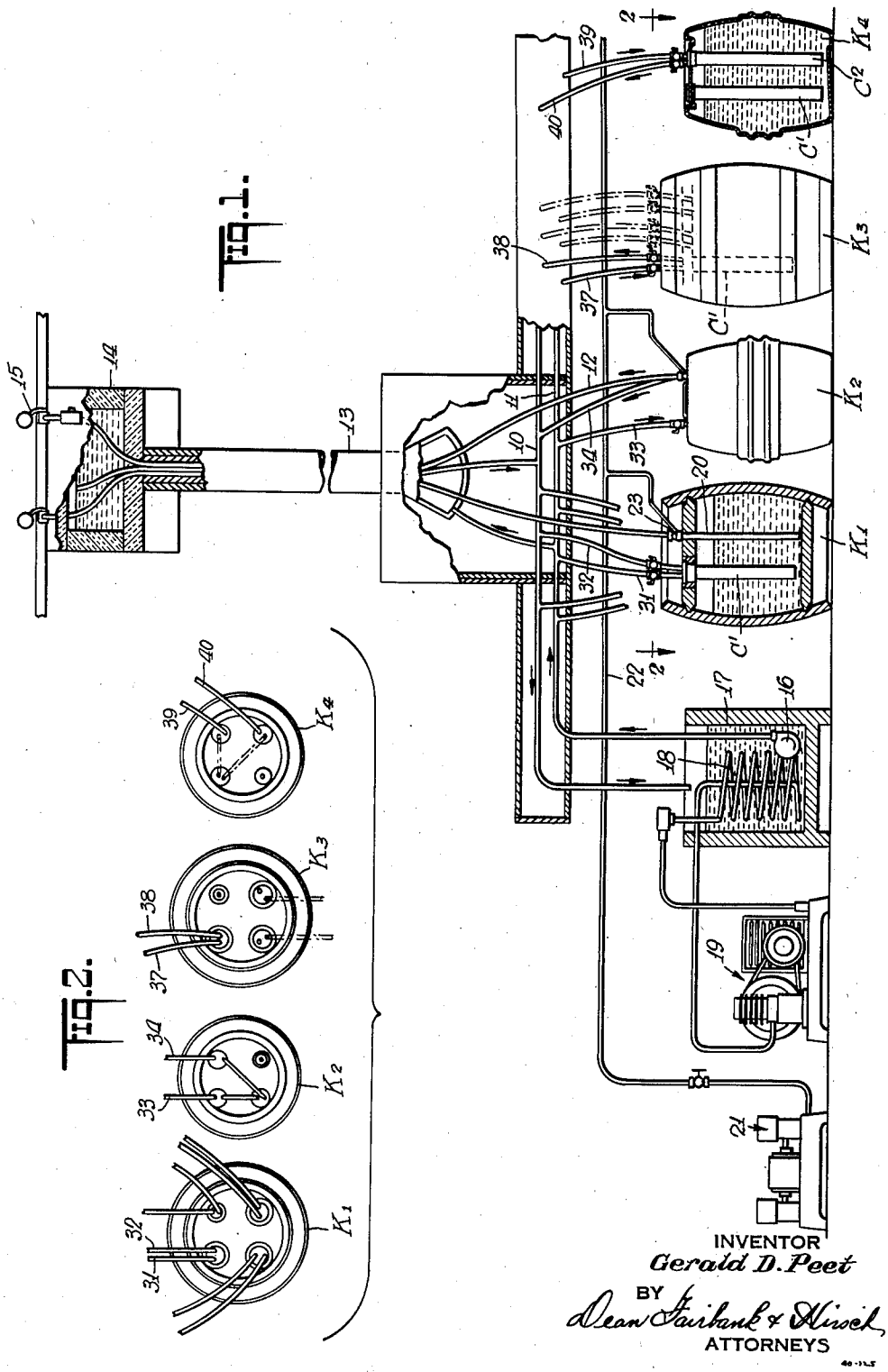


Fig. 2.

INVENTOR
Gerald D. Peet
BY
Dean Fairbank & Hirsch
ATTORNEYS

Aug. 26, 1941. G. D. PEET 2,253,940

BREW COOLING EQUIPMENT

Filed Aug. 27, 1940 2 Sheets-Sheet 2

FIG. 3.

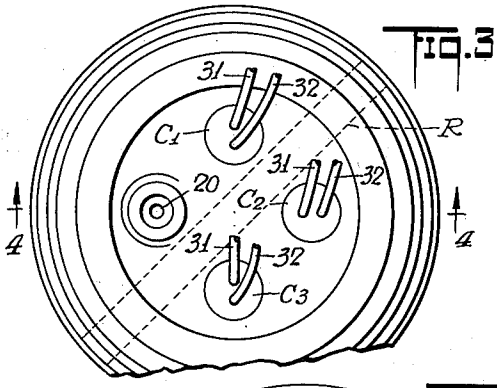


FIG. 5.

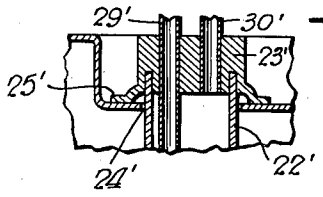


FIG. 4.

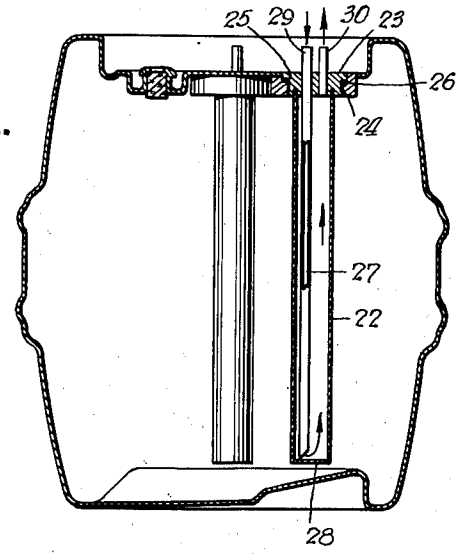


FIG. 6.

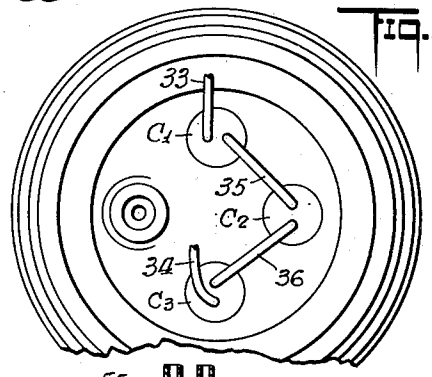


FIG. 8.

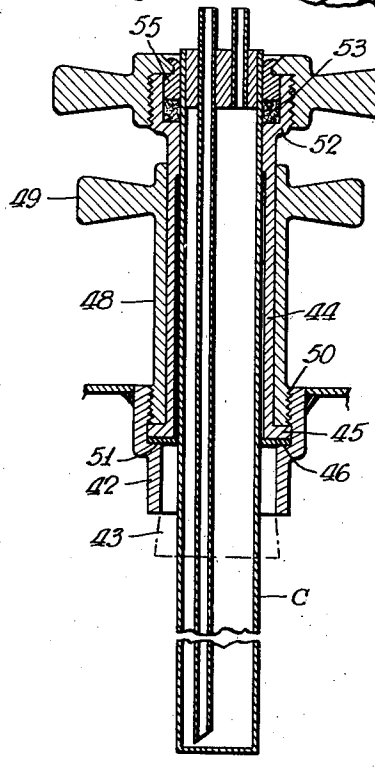
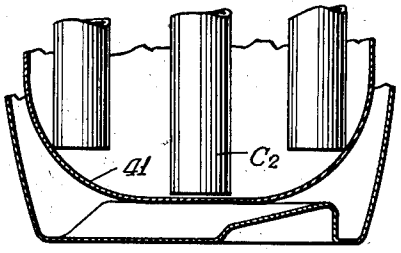


FIG. 7.



INVENTOR
Gerald D. Peet
BY
Dean Fairbank & Hirsch
ATTORNEYS

Patented Aug. 26, 1941 2,253,940

UNITED STATES PATENT OFFICE

2,253,940

BREW COOLING EQUIPMENT

Gerald D. Peet, Montclair, N. J., assignor to Nova-del-Agene Corporation, Newark, N. J., a corporation of Delaware

Application August 27, 1940, Serial No. 354,335

10 Claims. (Cl. 62—141)

The present invention is concerned with the art of cooling brew within the original shipping and storage package, by the circulation of cooling fluid through hollow structures in heat conductive relation with the brew contents.

As conducive to a clear understanding of the invention, it is noted that in the practical operation of brew cooling and dispensing systems of the type disclosed and claimed in Patent No. 2,051,013, granted August 11, 1936, to H. E. Schulse, it is frequently desirable for the tavern to have available an extra or reserve supply of untapped kegs, available for immediate use when required. Such kegs when connected according to the particular disclosure of the said Schulse patent are maintained at dispensing temperature and may be so maintained for many hours or days prior to tapping. For practical purposes, it would be sufficient, however, to keep the contents of the kegs on reserve at a temperature well above dispensing temperature and yet sufficiently cool to prevent deterioration. An arrangement which would impart such lesser degree of refrigeration to the contents of the kegs on reserve would bring about economy in power consumption and in the capacity of the refrigerating installation.

When it is attempted to direct the cooling fluid through cooling passages of constant area, the desired economy is not readily attainable because it is the magnitude of the cooling conduit area submerged in the brew which primarily determines the temperature to which the brew is cooled, assuming that an adequate supply of refrigeration is available, as it is in practice.

Viewed from the aspect of the keg structure per se, rather than as a system and method of operation, it is noted that the cooling instrumentalities which engage the contents of brew kegs of the internally cooled type require periodic inspection to assure their operative and sanitary condition.

For convenience and economy, it is therefore an important object so to construct and arrange such coolers as to facilitate removal thereof from the keg structures for such inspection and for repair and re-installation or replacement as the case may be, and that without disassembling or breaking down the kegs.

With the use of shipping and storing brew packages of the conventional dimensions, it is important that the bulk of the cooling instrumentality that extends into the brew be minimized, as any excess brew displacing bulk would require radical alteration of the shape and size of the kegs and of the tools and dies for their manufacture in order for the effective volumetric capacity of the keg to meet the requirements of the law.

For minimum bulk of the submerged cooler, the use of primary refrigerant to be circulated therethrough would appear to commend itself. In practice, however, such refrigerant has proved to be objectionable in that it tends to freeze and destroy the brew in contact therewith, without adequate cooling of the brew at the region of the keg interior from which it is drawn.

Where on the other hand secondary refrigerant, such for instance as chilled water with or without freezing point depressant is to be circulated through the cooler in the keg, the intensity of refrigeration is so much less than with primary refrigerant that a considerably larger surface area of cooler in contact with the brew is required to effect adequate brew cooling. Such larger surface area has heretofore been attained by other workers in the art only by resort to such cooling structures as those disclosed in Schulse patents, Nos. 2,098,210 and 2,098,211, granted November 2, 1937, which are built into the kegs as a unitary part thereof, and are so conformed as to necessitate breaking up the keg in order to repair or replace the cooling instrumentality or even to permit thorough inspection thereof, to ascertain the need for repair or replacement. That procedure, while not prohibitive in the case of wooden kegs, has proved to be a serious obstacle in the case of metal kegs of types that are coming into increasing use. Metal kegs of construction now used, do not admit of disassembly without cutting the same apart by resort to a cutting torch for instance, and the accurate and secure re-assembly of the parts is so costly an operation as to render preferable the scrapping of an entire otherwise perfect keg, if any defect is found or suspected in the cooling instrumentality therein.

By the present invention, effective cooling of the contents of a combined shipping and storing keg of conventional volumetric capacity may be attained by the use of chilled water as the cooling agent, without the need for taking part, breaking down or dissecting the keg to permit withdrawal or replacement of a cooling instrumentality, the latter presenting the required large cooling surface area exposed to the brew, though it has a bulk sufficiently small not to displace so much brew as to require radical alteration of the keg to conform to legal content requirements.

Among other objects are to provide a keg of the above type which though equipped with internal cooling means, is nevertheless capable of being manufactured by resort to existing tools and dies, and may be filled or racked by standard keg filling equipment, without any interference from the cooling appurtenances therein, and which dispenses with the need for additional reinforcement of the keg structure, despite the presence of openings therein to accommodate the cooling equipment carried thereby, and despite the stress imposed by such equipment.

Another object is to provide a keg of the internally cooled type, which admits, without the need for external control, of selective temperature adjustment of the keg contents, depending upon requirements.

Another object is to provide a keg structure of the above type, which admits of the convenient introduction of the cooling instrumentality into the filled keg at the dispensing place.

It is accordingly an object of the present invention to provide a brew cooling and dispensing system and method, whereby differential cooling areas are made available within the kegs to permit of a lesser cooling area to be placed in service in those kegs that are to be kept untapped on reserve and to permit the ready substantial increase of the operating cooling conduit area submerged in the brew with respect to those kegs that are about to be tapped or to be put in service, thereby to afford the additional refrigeration to bring their contents down to dispensing temperature and to maintain the same at such temperature.

According to the invention, the individual kegs incorporated in the system comprise each a plurality of separate and distinct, desirably interchangeable cooling units, each of relatively small cross-section, said units collectively affording the surface area required for cooling the brew and bringing it to desired dispensing temperature when a given secondary refrigerant is circulated therethrough, those kegs that are on reserve having a lesser number of said units connected in the cooling circuit. Each of the separate and distinct cooling units is removably mounted at a correspondingly small opening in the keg in position to afford adequate clearance for the racking tube used to fill the keg, and displacing an amount of brew far less than would a single cooling unit of the same length and surface area.

Each individual cooling unit embodies a heat conducting conduit for the cooling fluid, said conduit being desirably dependent from the upper head, with its inlet and its outlet at said head, the conduit extending substantially the depth of the keg.

The several cooling units of each keg may be connected in parallel across cooling mains, or in series, or in the case of kegs kept in reserve and not tapped until later, only some of the cooling units need be connected in the cooling circuit for a lesser degree of cooling, that may be adequate at that stage.

The cooling units may be incorporated in the keg at the brewery prior to filling or racking the keg or alternatively the keg may be shipped to the dispensing place devoid of any cooling units, the apertures for such cooling units being closed with corks or plugs, the cooling units being inserted into the keg at the dispensing place in manner similar to the insertion of the draft tube. The bulk of each cooling unit is so small that it admits readily of such introduction into the filled keg.

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

Fig. 1 is a diagrammatic front view of an installation illustratively showing various constructions of keg and various modes of connection of the cooling fluid thereto,

Fig. 2 is a sectional view taken on line 2—2 of Fig. 1 and showing plan views of the several kegs on the line,

Fig. 3 is a plan view of one typical keg,

Fig. 4 is a view in longitudinal cross-section taken on line 4—4 of Fig. 3,

Fig. 5 is a fragmentary view of a modification of the keg of Fig. 4,

Fig. 6 is a fragmentary plan view of the series connected arrangement of cooler units,

Fig. 7 is a fragmentary view in longitudinal cross-section showing a particular embodiment of keg unit, and

Fig. 8 is a view in longitudinal cross-section on a larger scale showing the mode of introduction of the cooling unit into the keg at the dispensing place.

Referring now to Fig. 1 of the drawings, there is illustratively shown in general outline a brew cooling and distributing installation, in which a plurality of kegs K_1, K_2, K_3, K_4, located in the basement for instance, are internally cooled by circulation therethrough of cooling fluid by connection across cooling mains 10 and 11. The brew from the kegs on tap is dispensed through brew lines 12, extending upward through a common heat insulated jacket 13 to a dispensing box 14 with faucets 15 located at a bar, illustratively on the floor of the building above the kegs. The cooling mains are supplied with circulating cooling liquid, desirably chilled water, propelled by a pump 16 from a cooling liquid box 17, in which is submerged the refrigerating coil 18, the compressor unit being shown at 19.

Of the kegs shown on the line, only kegs K_1 and K_2 are shown tapped, the draft tube 20 being shown inserted theerin. The other two kegs K_3 and K_4 are illustratively shown connected to the cooling circuit to cool their contents to a lesser degree, sufficient during storage of the brew on reserve prior to tapping. A source of compressed gas 21 is connected through a line 22 in conventional manner as at 23 to the draft tubes for propulsion of the brew to the remote faucets.

According to the present invention, each keg is provided with a plurality, illustratively and desirably three separate and distinct generally cylindrical cooling units C_1, C_2, C_3, ordinarily distributed at equal angular intervals and at uniform radial distance from the axis of the keg. The draft tube 20 and the three coolers illustratively are at the vertices of a square inscribed with small clearance within the head of the keg to which they are removably affixed as best shown in Figs. 4 and 5. The racking or belly bung hole (not shown) is desirably in a plane midway between two of the cooling units, so that the racking tube may be introduced as shown at R in dotted lines, without obstruction by the cooling units.

The individual cooling units may be of any of a variety of constructions. In general, each of said units comprises a conduit of heat conducting material, having its inlet and its outlet at the upper head of the keg, and extending

substantially the depth of such keg. In a simple practical embodiment of such cooling unit, each comprises a heat conducting shell, desirably a metal cylindrical cartridge 22, affixed in the upper head of the keg, and extending downward therefrom substantially through the depth of the keg. As best shown in Fig. 4, the rim of each cartridge is affixed in a plug 23, desirably of metal or molded plastic, removably threaded as at 24 into the head and with an outstanding flange 25 seated upon a compressible washer 26. Through the plug 23 and extending downward through the length of the cartridge 22 is a smaller pipe 27, the lower end of which may be cut on the bias, so as to contact the bottom 28 of the cartridge without impeding flow, and the upper end of which protrudes above the plug as at 29. A short outlet pipe 30 through the plug 23 communicates with the interior of the cartridge.

As shown in Figs. 1 and 3, pairs of branch pipes 31 and 32 from the respective mains are secured over the protruding ends 29 and 30 consisting the terminal, that is the inlet and outlet respectively of each cooling unit. Accordingly, cooling liquid will be pumped in operation in parallel through the plurality of cooling units in the keg K.

When three coolers are used as shown, in a conventional half-barrel or 15½ gallon keg, each cooler may be of outer diameter of 1½ inches, so that the combined areas of the three holes for the coolers is but 5.3 square inches, which does not detract appreciably from the mechanical strength of the keg head that accordingly requires no further reinforcement. In the arrangement set forth, the area of each cooler exposed to the brew is about 85 square inches, and the combined submerged surface area of the three coolers thus exceeds 250 square inches, which is adequate for most practical purposes to cool the brew contents to dispensing temperature and to maintain it thereat with chilled water as the cooling agent. Thus the cooling surface area in the brew exceeds 16 square inches and is less than 18 square inches per gallon of brew. The total bulk of cooling unit that displaces brew in the brew filled half barrel or 15½ gallon keg is, however, only about 1.5 quarts or well under three per cent of the keg contents. Substantially the same relationship both as to cooling area per gallon and ratio of cooler bulk to keg contents would be utilized for full barrels, quarter barrels or any other size of transportation keg to which the invention might be applied.

While the embodiment of Fig. 4 shows cooler units that are releasable with respect to the keg and accordingly readily removed or severed therefrom, the embodiment of Fig. 5 shows a modification in which the cooling unit is removed or severed from the keg by a cutting operation, but without the need for breaking down or dissecting the latter.

In the particular embodiment shown, the upper rim of the cooling cartridge or shell 22' is shown illustratively extending into and rigid with a plug 23', having a flange 25' superposed over and welded about the rim of aperture 24' in the metal head through which the cartridge is shown extending into the keg.

For inspection or replacement of any cooling unit, the same may be severed from the keg wall by applying a cutting torch for instance to the inner part of flange 25'. The cooling unit may then be readily lifted out of the keg, without the need for disassembling or dissecting or breaking down the keg structure. A new cooling unit may then be readily introduced through the aperture in the keg and welded in place, the outer part of severed flange 25', which remains welded to the keg, being first ground off to provide a smooth seating surface on the keg wall for the replacement of the cooling unit.

While the cartridge embodiment of cooling unit has been illustratively shown in the drawings as circular in cross-section, it will be understood that any of numerous other cross-sections may be used if desired.

While the particular installations and structures described afford a cooling area within the brew which for most uses is adequate when chilled water is used as the cooling agent, it is understood that, within the scope of the invention, other secondary refrigerating agents may be used that are effective to bring the brew down to a temperature below the freezing point of water, but above 28 degrees F. which is the approximate freezing point of brew. Such enhanced refrigeration may be required in very hot weather, where in addition to the added heat intake through the keg walls, the brew might suffer considerable warming in the course of its flow to the glass, and its temperature would be further raised by the warm glass into which it is poured and pending delivery to the consumer it might be further heated, so that it might become too warm to suit the taste by the time it reached the consumer. Among secondary refrigerating agents useful for the enhanced refrigeration required under the extremely adverse conditions noted, would be water with a freezing point depressant such as salt, glycerin or ethylene glycol, but alcohol is ordinarily preferred as the depressant.

It will be understood that even under ordinary ambient temperature conditions, the use of chilled water with a freezing point depressant such as alcohol would be advantageous, in that it permits the use of cooling units of even less bulk than those above described. If, for instance, a mixture of water, and alcohol having a freezing point of 28 to 30 degrees F. is used as the cooling agent, then the collective surface area of the cooling units may be reduced from 250 square inches or more to 160 square inches, and brew will be served at the acceptable drinking temperature. Accordingly, where three cooling units are used in the keg, each need be of diameter of but one inch. The surface area of coolers in the brew would thus be between ten and twelve square inches per gallon of keg content, and the bulk of such coolers would be well under one and one-half per cent of the keg contents.

In the keg K_2 shown as a single-walled metal keg, a series rather than a parallel connection to the several cooling units is illustratively shown. In that case, as best shown in Fig. 6, only one pair of branches 33 and 34 is required, connected as shown to two of the pipes 29 and 30, series connection between the successive cooling cartridges being effected by way of jumper pipes 35 and 36 connecting the outlet of each cooling unit to the inlet of the succeeding cooling unit.

Keg K_3, illustratively a wooden keg is shown in reserve on the line, untapped. Illustratively, only one pair of branch conduits 37 and 38 is shown connected to one of the cooling units C_1,

the other two being left unconnected. Thus, the simple connection of this keg on the same cooling line that supplies the kegs on tap, affords a lesser degree of refrigeration, that is, a degree sufficient to keep the brew from deterioration prior to use, it being understood that when the keg is about to be tapped, the additional cooling units would be connected into operation either in parallel as shown at keg K_1 and Fig. 3 or in series as shown at keg K_2 and Fig. 6. Illustratively the fourth keg K_4 is shown with series connection from two conduits **39** and **40**. Where particularly adverse conditions may demand, the full amount of refrigeration may be applied before tapping, and ordinarily this is desirable immediately prior to tapping, so that the brew will be sufficiently cool for serving immediately after the keg has been tapped.

Thus, the arrangement of multiple coolers in the respective kegs, lends considerable flexibility and economy to the installation. Without interfering with the operation of the compressor or the circulating pump for the cooling fluid, it is thus possible to apply maximum refrigeration to any keg, as for instance, one on tap, which requires it and a selectively lesser degree of refrigeration for kegs not on tap but on reserve, and which require less refrigeration, all with corresponding economy in size and cost of cooling equipment. Each keg thus has alternative terminal connections for its cooling instrumentality to permit of the degree of cooling desired or required. As desired or required, any keg may be given more or less refrigeration, depending on the number of the cooling units that are connected into the cooling circuit.

In a typical installation, the untapped, standby kegs or those on reserve are connected with but one of the cooling units in circuit and are thereby kept sufficiently cool to prevent deterioration, but yet above dispensing temperature. Such single cooling unit is adequate to keep the temperature below 55° F., even though the ambient temperature is as high as 90° F. and under the usual temperatures prevailing in the dispensing premises, such single cooling unit would be effective to keep the temperature of the brew in the neighborhood of 50° F. When the additional cooling unit or units are connected in circuit for service from the kegs, the brew becomes cooled thereby to bring it down to the desired dispensing temperature.

In Fig. 7 is shown an embodiment of double-walled metal keg, the general structure of which is substantially conventional, including an inner keg wall **41** with a curved bottom. By disposing one of the plurality of coolers, for instance cooling unit C_2, at the axis of the keg as shown, the cooling effect thereof may be applied effectively even to the last remnant of brew in the bottom of the keg as the latter is about to be exhausted.

The embodiment of Fig. 8 shows an arrangement whereby cooling units like those heretofore described may be installed in the keg after the same has been delivered to the dispensing place. Illustratively, the keg head has circular apertures, one for each cooler, with collar **42** welded thereto, into which is fitted a cork stopper **43** substantially as in the arrangement provided in the conventional bushing of the draft outlet. The cooling unit C is encircled by a sleeve **44** with an outturned flange **45** to seat upon a shoulder **46** in the keg. That sleeve is encircled by a swivel collar **48** with finger grips **49**, and has an inclined, or if desired, a screw connection **50** to the collar **42**. The upper end of sleeve **44** is desirably provided with a unitary socket **52**, lodging a rubber washer **53** to encircle the cooling unit C, a wing nut **54** being screwed upon said socket, and carrying a land piece **55**.

Thus, it will be clear that the cooling unit is inserted in collar **42** to rest on cork **43**, and the swivel sleeve **44** is thereupon tightened in place. In this operation, a liquid-tight seal is effected at the gasket **46** seated upon shoulder **51**, and the brew in the keg will not be exposed to atmosphere in the subsequent steps. The cooler C is now forced downward in which operation it first dislodges the cork which drops into the keg. After the cooling unit C has been forced through the depth of the keg, a secure liquid-tight seal is effected with respect to the upper end of the cooling unit by tightening the wing nut **54** and exerting pressure upon the gasket **53** through the land piece **55**.

It will be understood that if desired say one of the cooling units might be installed at the brewery for convenience in connection upon delivery at the dispensing room, the additional cooling unit or units alone being introduced into the keg at the dispensing place as occasion arises.

Thus, it will be seen that the keg construction as set forth, presents a number of new and advantageous features, among which are the following: (1) Access is had to the cooling units without disassembling or severing the keg; (2) The keg may be made in conventional sizes, of conventional wall construction and with the use of the tools heretofore in use for the purpose; (3) The cooling units in the keg do not detract from the volumetric capacity of the keg to objectionable extent; (4) The keg admits of the use of conventional racking or filling equipment in that the cooling units do not obstruct the diameter across the belly bung hole through which the racking tube is inserted; (5) The keg admits of selectivity in the degree of cooling, depending on the number of cooling units thereof placed in the cooling circuit; (6) The keg admits of ready installation of the cooling units therein, either at the brewery or at the dispensing place, as desired.

As many changes could be made in the above apparatus and many apparently widely different embodiments of this invention could be made without departing from the scope of the claims, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

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

1. An installation for brew cooling and dispensing, comprising a plurality of kegs, some of which are on tap and others on reserve, each of the kegs on tap having a plurality of cooling units extending through the respective walls thereof into the brew contents, means for circulating cooling fluid from a common source through the several cooling units, those of the kegs on reserve having less than the total number of cooling units connected into the cooling circuit and being thereby maintained at a temperature below that at which deterioration sets in and above dispensing temperature.

2. An installation for brew cooling and dispensing comprising a source of secondary refrigerant, a plurality of kegs, each of said kegs having one or more hollow cooling units connected for

circulation therethrough of refrigerant from said source, and of submerged surface area sufficient to maintain the contents of an untapped keg below a temperature at which said contents might deteriorate, and higher than normal dispensing temperature, each of said kegs having one or more additional hollow cooling units therein, all of the cooling units in each keg on tap being connected for circulation therethrough of refrigerant from said source and being jointly effective as thus connected to bring the brew contents of a keg down to and to maintain the same at dispensing temperature, said several cooling units of each keg extending in fluid tight relation through corresponding apertures in the wall thereof and into the brew contents thereof.

3. The combination recited in claim 2 in which each of the cooling units is of cross-section no larger than that of the corresponding aperture, for facility of removal therefrom and insertion therein.

4. The combination recited in claim 2 in which the various cooling units are substantially interchangeable and the combined surface area of the cooling units engaging the brew in each keg on tap is in excess of 16 square inches per gallon of the brew content thereof, whereby chilled water will serve as the secondary refrigerant.

5. The combination recited in claim 2 in which each cooling unit of each keg is individually connected with respect to the source of secondary refrigerant, the combined surface area of the cooling units engaging the brew in each keg on tap being in excess of 10 square inches per gallon of brew content.

6. The combination recited in claim 2 in which the cooling units of each keg on tap are connected in series, the connections between cooling units on each keg comprising jumper conduits connecting the outlet of each unit other than the last to the inlet of another of said units, the total surface area of the cooling units engaging the brew within each keg on tap being in excess of 10 square inches per gallon of brew content.

7. The method of treating and dispensing brew, which consists in setting up in dispensing position a keg with brew therein, circulating secondary refrigerant in heat conductive relationship at an area of contact with the brew in the untapped keg sufficient to maintain the temperature of said brew below that at which deterioration sets in, and higher than normal dispensing temperature, thereupon circulating such refrigerant in heat conductive relationship with the brew in said keg at a larger area of contact, sufficient to bring the temperature of the keg contents down to dispensing temperature, and after the brew has reached such temperature, tapping the keg and supplying gas thereto, for propulsion of the brew therefrom as desired, and continuing the circulation of refrigerant to maintain the remaining keg contents at substantially dispensing temperature until the keg has been exhausted.

8. A combined shipping, storing and cooling container for brew, having a cooling instrumentality comprising a plurality of cooling units mounted at corresponding apertures in the wall thereof, each of sufficient length for a substantial portion thereof to extend into the brew contents, said cooling instrumentality having terminal connections arranged for circulating cooling fluid alternatively through less than the total number of said units for pre-cooling, or through the total number of said cooling units for cooling to dispensing temperature, the various cooling units in the container extending clear of the course through which racking is effected, the aggregate cooling surface of said cooling units engaging the brew being sufficient to bring the brew down to and maintain it at dispensing temperature with the use of secondary refrigerant as the cooling agent.

9. The combination recited in claim 8, in which each of the cooling units is of cross section no larger than that of the corresponding mounting aperture for facility of removal therefrom and insertion therein.

10. The combination recited in claim 8, in which the various cooling units are substantially interchangeable and the surface area of the cooling units engaging the brew is in excess of sixteen square inches per gallon and the bulk thereof is less than three per cent of the volume of the brew contents.

GERALD D. PEET.

CERTIFICATE OF CORRECTION.

Patent No. 2,253,940. August 26, 1941.

GERALD D. PEET.

It is hereby certified that error appears in the above numbered patent requiring correction as follows; In the grant, lines 2 and 13, name of assignee, for "Nova-del-Agene" read --Novadel-Agene--, as shown by the record of assignments in this office; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 30th day of September, A. D. 1941.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.