This invention relates to apparatus for dispensing a gas-charged liquid from a container and is particularly directed to apparatus for dispensing a carbonated beverage, for example, beer, from a conventional keg.

It is the principal object of this invention to provide an insert member which can be introduced into the interior of the container through an opening therein which member includes a cavity containing liquified gas under pressure and which member also contains a regulator device for introducing gas from the cavity into the container, the action of the regulator being controlled from a member accessible exteriorly of the container. Another object is to provide dispensing apparatus of this type in which the insert member includes a passage for delivery of fluid from the interior of the container. A more detailed object is to provide dispensing apparatus of this type in which means accessible exteriorly of the container are provided to control flow of gas from the cavity to the interior of the container and also to control flow of liquid from the interior of the container.

Other and more general objects and advantages are to provide dispensing apparatus for carbonated beverages which is readily adaptable to standard kegs now in use and which requires a single connection on the upper end of the container or keg. Another advantage is to eliminate the requirement for tilting the keg in order to withdraw the entire contents thereof.

Another object is to provide a dispensing device for carbonated beverages, the device including an insert member having a cavity filled with liquid under pressure, the member being insertable into one of two openings provided in the container and the contents of the container being dispensed through a valve controlled discharge conduit connected to the other opening in the container. Other and more detailed objects and advantages will appear hereinafter.

In the drawings:
Figure 1 shows a preferred embodiment of my invention as applied to a standard metallic beer keg of the type now in common use.
Figure 2 shows the insert member on an enlarged scale.
Figure 3 is a perspective view, partly broken away, showing the mounting of the insert member on an end wall of the container.
Figure 4 is a view similar to Figure 3 showing a liquid dispensing conduit and speed coupling attached to the upper portion of the insert member.
Figure 5 is a longitudinal sectional elevation showing the upper portion of the insert member and showing details of the speed coupling.
Figure 6 is a sectional elevation taken substantially on the lines 6—6 as shown in Figure 5.
Figure 7 is a detail partly in section, showing details of operation of the speed coupling.
Figure 8 is a sectional detail showing construction of the lower end of the insert member.
Figure 9 is a transverse sectional view taken substantially on the lines 9—9 as shown in Figure 6.

Figure 10 is a sectional elevation similar to Figure 5 showing the position of the parts in the upper end of the insert member during shipment and prior to connection with the speed coupling.

Figure 11 is a fragmentary view similar to the lower end of Figure 1 and showing a modification.

Referring to the drawings, the metallic barrel or keg 10 is conventional in form and is provided with an opening 11 in the upper end wall 12. In this form of my invention the second opening 13 in the lower side wall is closed by plug 14.

In accordance with my invention, I provide an insert member generally designated 15 which is insertable into the interior of the keg or container 10 through the opening 11. The insert member 15 comprises a body 16 and a cartridge 17 connected in end to end relationship. A cavity 18, within the cartridge 17 contains liquified carbon dioxide under pressure. Since the maximum outer diameter of the cartridge 17 is limited by the size of the opening 11 in the container, the volume of the cavity 18 may be increased by curving the cartridge to increase its length. In this way sufficient liquid carbon dioxide is contained within the cartridge to empty the entire contents of the container 10. Discharge of liquid from the interior of the container takes place through the inlet fitting 19 which contacts the bottom of the container 10. This fitting 19 is attached to the lower end of the cartridge 17 and communicates with the central discharge pipe 21 which extends longitudinally through the center of the cartridge 17. The body 16 contains passage means as described below adapted to carry liquid through the body 16 and to the discharge chamber 22 formed centrally at the upper end thereof.

Means are provided for securing the upper end of the body 16 to the container 10 and as shown in the drawings, this means includes a stationary internally threaded ring 23 formed integrally on the upper end wall 12 of the container and an annular nut 24 engages the threaded ring 23 and serves to clamp the annular abutment 25 against the sealing ring 26 and wall 12. The abutment 25 is carried on a terminal fitting 27 which is connected by threads 28 to the upper portion of the body 16 and functions as an integral portion thereof. As shown in Figure 1 the upper extremity of the clamping nut 24 lies below the level of the lip or chime 29 which defines the upper end of the container or keg 10. Accordingly, the presence of the clamp nut 24 and the insert member 15 does not interfere with normal stacking of the kegs 10.

First passage means are provided in the body 16 for delivering gas under pressure from the cavity 18 to the interior of the container 10. As shown in the drawings, this passage means generally designated 30 includes the passage 31, bore 32, passage 33, annular space 34 within bore 35, passage 36, axial bore 37 and lateral passage 38. A regulator valve assembly generally designated 40 includes a movable valve part 41 which is adapted to close against seat 42 to shut off flow through the passage means 30. A check valve may be provided to prevent return flow from the container into the lateral passage 38, and as shown in the drawings, this check valve may comprise a ball 43 maintained against a seat 44 by means of a leaf spring 45. The leaf spring is mounted in a recess 46 and held in position by means of a fastening 47. From this description, it will be understood that upward movement of the valve part 41 away from the stationary seat 42 allows gas from the cavity 18 to flow through the first passage means 30 into the interior of the container 10. The movable valve element 41 of the regulator assembly 40 is mounted on the piston 50 which slides within the axial bore 51 within the body 16. The projection 52 forms a smaller piston sliding within the axial bore 53. A central opening 54 in the piston 50 establishes
communication between the axial bores 51 and 53. The annular space within the bore 51 and below the seal ring 55 is connected to the vent passage 56 by means of the port 57. A spring 58 within this space acts to move the piston upward while a spring 59 tends to move it downward. The regulator part 53 is therefore balanced between the springs 58 and 59. The part 53 is subjected to a pressure force tending to move it downward and this force results from pressure within the bore 51 below the piston 60 acting on the relatively large upwardly facing effective area on the regulator part 53. The pressure in the bore 51 between piston 60 and 69 is the same as the pressure in the small bore 37. Since these spaces are in communication through the central opening 54, the high pressure in the passage 36 acts on the relatively small downwardly effective area of the movable valve part 41 within the seat 42. From this description it will be understood that the regulator part 53 and the movable valve part 41 which constitutes a portion thereof will move upward as a unit whenever the upward force developed by the pressure in the passage 36, plus the force of the spring 58, overcomes the downward force of the pressure in the bore 51 between the pistons 69 and 59, together with the force of the spring 59.

When the movable valve part 41 moves upward away from the seat 42, high pressure gas from the cavity 18 passes through the first passage 30 and into the interior of the container 10 by way of the check valve 43, 44. The regulator part 53 moves downward and closes the valve part 41 against the seat 42 as soon as fluid pressure builds up to a predetermined level in the space between the pistons 50 and 60.

A stationary bushing 61 is threaded into the central bore 62 in the upper end of the body 16 and is provided with a central aperture 63 which slidably receives the upper post 64 fixed on the piston 60. A fluid charge valve generally designated 65 includes a movable valve part 66 slidable mounted on the upper portion of the post 64. A spring 67 within the bore 62 extends between the bushing 61 and the valve part 66 and acts to move the valve part upward with respect to the body 16. The valve part 66 may be provided with a nose piece portion 68 which is connected thereto by means of a threaded stem 69. A seal ring 70 is clamped between the nose piece portion 68 and the valve part 66. Clearance space 71 is provided in the extreme upper end of the post 64 around the lower end of the stem 69.

The seal ring 70 is adapted to seal against the conical seat 72 provided in the seat member 73 which functions as an integral part of the body 16. This seat member 73 is clamped in position by means of the conical sleeve 27. An apertured gasket ring 74 prevents leakage between the body 16 and the extension or seat member 73.

A second passage is provided in the body 16 through which liquid from the interior of the container 10 passes to the discharge chamber 22. As best shown in Figure 6 of the drawings, this second passage includes the delivery pipe 21, the port 76, the lateral branch 77, the drilled holes 78 and 79, the lateral ports 80 and 81, the bore 62 and the space within the seat 72. The movable valve part 66 of the valve assembly is thus positioned in the second passage generally designated 75 to control the discharge of liquid from the interior of the container 20.

The apertured gasket 74 is provided with an opening 82 which is in alignment with the vent passage 56 in the body 16 and with the drilled hole 83 in the seat member 73. The hole 83 communicates with the annular space 84 between the seat member 73 and the terminal sleeve 27. This annular space 84 communicates to atmosphere through ports 85 in the terminal sleeve 27. All plugs 86 are positioned in the drilled holes 78 and 79 in the body 16 and these plugs extend through apertures provided in the gasket 74 and into drilled holes provided in the terminal sleeve 27. Fig.

ure 10 shows the position of the parts at the upper end of the insert member 15 during shipment and when a hose connection is made to the knob to withdraw the contents thereof. A standard bottle cap 87 is mounted on the upper end of the terminal sleeve 27 in sealing relationship. A central plug 88 is held in position by this bottle cap and extends downward through the sealing chamber 22 in the seat member 73. This plug engages the nose piece portion of the movable valve part 66, thereby holding the valve part 66 in a retracted position against the force of the compression spring 67. The seal ring 70 is thus maintained out of contact with the conical seat 72. A cover disk 89 may be provided within the clamping nut 24 above the bottle cap 87 to exclude foreign matter from the annular cavity 90 within the nut 24.

When the contents of the keg or container 10 are to be withdrawn, the cover disk 89 is removed and the bottle cap 87 is removed by a conventional tool from the upper end of the terminal sleeve 27. The plug 88 is then withdrawn from the discharge opening 22, allowing the spring 67 to close the valve part 66 by bringing the seal ring 70 into contact with the conical seat 72. Upward movement of the valve part 66 permits the post 64 and piston 69 to move upward within the bore 62 and the piston 69 contacts the lower side of the bushing 61 as shown in Figure 5. So long as the piston 69 remains in the retracted position shown in Figure 10 by reason of contact of the upper end of the post 64 with the shoulder 91 on the valve part 66, the regulator part 53 is held down by the force of the spring 58. In this way the movable valve element 41 is maintained in contact with the stationary seat 42 so long as the bottle cap 87 and plug 88 are in place, and hence, discharge of gas from the cavity 18 into the container 10 is prevented. When the piston 69 moves to its upper position as shown in Figure 5, the compression spring 59 is permitted to lengthen and hence reduce the force which it applies to the regulator part 53. Thereafter, the regulator valve assembly 40 functions to maintain a substantially constant pressure within the interior of the container 10 by admitting gas under pressure from the cavity 18 as the liquid contents of the container are drawn off through the discharge chamber 22.

Discharge of the contents of the container 10 through the chamber 22 is accomplished by means of a quick connection assembly generally designated 93 and a discharge hose 94. The hose 94 is provided with a terminal fitting 95 clamped by means of a nut 96 to the upper end of the connection sleeve 27. A spring 97 is mounted in the central passage of the sleeve 97. A hollow collar 99 is fixed to the sleeve 97 and is adapted to project downward through the discharge opening 22. Apertures 100 in the lower portion of the spear 99 communicate with the space inside the conical seat 72. The lower end of the spear is rounded and engages the upper end of the nose piece portion of the movable valve part 66, thereby moving the seal ring 70 out of contact with the conical seat 72. Liquid from the said second passageway 75 therefore flows through the discharge valve assembly 65 through the interior of the spear 99 past the check valve 98 and into the discharge hose 94. A valve or spigot, not shown, at the end of the hose 94 controls discharge of liquid from the interior of the container 10.

The quick connection parts 93 may be of conventional design as shown in Figure 5 of the drawings and may include a shell 101 clamped to the sleeve 97 by means of the nut 101Z. A series of spring fingers 102 within the lower end of the shell engage under a shoulder 103 formed on the upper end of the terminal sleeve 27. The quick coupling at the upper end is accomplished by moving the sleeve 101 axially into the annular space 90 within the nut 24. The hollow spear 99 enters the discharge opening 22 at the same time. When the parts reach the position
shown in Figure 5, the spring fingers 102 engage under
the shoulder 103 to prevent separation of the parts.
When it is desired to disconnect the hose 94 and asso-
ciated parts from the bottle 87, the spring fingers 102
cause the loose ring 104 to move upwardly at the same
time, thereby prevent-
the spring fingers from reengaging under the
shoulder 103. 
Upward movement of the shelf 101 and
and shell 101 are moved manually downward as a unit
to the position shown in Figure 7. Spring fingers 102
then engage the loose spring 104 mounted on the ter-

dinal sleeve 27. The spring fingers 102 frictionally


grip the loose ring 104 so that subsequent upward
movement of the shelf 101 and spring fingers 102 causes the loose
ring 104 to move upwardly at the same time, thereby prepre-
venting the spring fingers from reengaging under the
shoulder 103. 
Upward movement of the shelf 101 and
elevet 97 under the annular space 90 within the nut 24 also
withdraw the hollow stem 99 from the discharge
chamber 22 with the result that the movable valve part
66 moves upwardly under force of the spring 67 to engage
the seal ring 70 with the conical seat 72. Removal of the
discharge hose 94 by means of the quick connection
therefore automatically results in closing of the said
second passage through the body 16.
Safety valve means are provided to vent both the
cavity 18 and the interior of the keg or container 10 in
the event that internal pressure should build up to objectionable magnitudes. As best shown in Figures 5 and 6
of the drawings, a safety valve 106 for venting the in-
terior of the keg or container 10 is provided by the mov-
able valve part 107 cooperating with said


ease 109. The spring 110 holds the valve closed against
the seat for normal pressures within the container but
allows the valve part 107 to move away from the seat
under abnormal pressures to vent the container through
the ports 111 and 112 to the vent passage 56.
The cavity containing sufficient liquid gas to expel the entire
contents of said keg, control means for said device
which said pressure regulator is located, such passage
means extending from said cavity in the lower part of
body to a point of discharge intermediate the ends
thereof so as to discharge gas under pressure into said
beach chamber, second passage means in said body open-
ing at the lower end thereof into said beach chamber
and opening for discharge at the upper extremity of said body exteriorly of said keg, and third passage means
in the device extending from a point in the body
communicating with said beach chamber to the outside
of said keg, and safety valve means in said


cavity 18. 
Means are provided on the body for filling the cavity
18 with liquified gas under pressure, for example, liquid


carbon dioxide. This means includes the cage 115
mounted on the body 16 and provided with the filling
valve assembly generally designated 116. This
valve as-
sembly includes the stationary seat 117 provided on the
cage 115 and movable valve part 118 adapted to close
against the seat under action of the spring 119. It
will be observed that the high pressure of gas within the

cavity 18 and within the bore 32 acts to maintain the valve
part 118 in closed position against the seat 117. When
it is desired to charge the cavity 18 with the liquified
gas under pressure, the insert member 15 including
the body 16 and cartridge 17 is withdrawn through the opening
11 in the container wall 12. A connection fitting, not
shown, is then engaged within the taper bore 120 of the
cage 115 and liquified gas under pressure is admitted
through the port 121 and inlet valve assembly 116. The
regulator valve part 41 remains closed during the filling
operation.
In the modified form of my invention as shown in
Figure 11, the plug 14 is removed from the opening
13 in the lower portion of the keg or container 10a and a
discharge valve assembly 123 of conventional design is
substituted for the plug 14. A conventional connection
assembly 124 connects the valve 123 with the discharge
hose 125. A control valve or spigot, not shown, on the
hose regulates discharge from the interior of the
containter 10a. In this form of my invention the
"second passage" in the cartridge and body which prevents
the discharge of the contents of the keg or container 10a occurs through the second opening 13a, not through the insert member. In
this form of my invention, the regulator valve assembly 40
is brought into action by removal of the bottle cap
87 and plug 88 in the same manner as described above.
In both forms of my invention as described above, the
action of the regulator valve assembly is such as to insure
proper carbonation of the beverage and to avoid any over-
carbonation thereof. For example, beer may be car-
bonated to the proper extent by constructing the regu-
larator valve assembly so that a pressure of 12 pounds per
square inch is maintained on the beer within the con-
tainer at 38° F. This pressure is maintained regardless
of the quantity of the beer remaining within the con-
tainer, and therefore, the beer which is dispensed is
neither "wild" nor "flat" but contains just the desired
amount of carbonation.
Having fully described my invention, it is to be under-
stood that I do not wish to be limited to the details
herein set forth, but my invention is of the full scope of the
appended claims.
I claim:
1. An apparatus for dispensing beer, said apparatus


comprising a conventional beer keg having a recessed
upper end wall with a standard size opening therein
and in upper chime above the level of said upper end wall,
said keg having a beer chamber therein, and a device
adapted to be inserted through said opening into said
beer chamber, said device comprising an elongated body
of dimension substantially the entirety of its length
smaller than said standard size opening and with sub-
stantially all of the body being disposed within the
beer chamber, means sealingly securing said device
adjacent the upper end thereof to that portion of said upper end wall
bounding said opening therein, the uppermost part of the
body which protrudes above the upper end wall being
below the upper chime of said keg, the major portion
of the lower part of said body being hollow to present a


cavity containing sufficient liquid gas to expel the entire
contents of said keg, control means for said device
which said pressure regulator is located, such passage
means extending from said cavity in the lower part of
said body to a point of discharge intermediate the ends
thereof so as to discharge gas under pressure into said
beach chamber, second passage means in said body open-
ing at the lower end thereof into said beach chamber
and opening for discharge at the upper extremity of said body exteriorly of said keg, and third passage means
in the device extending from a point in the body
communicating with said beach chamber to the environment of said keg, and safety valve means in said


cavity 18. 
Means are provided on the body for filling the cavity
18 with liquified gas under pressure, for example, liquid


carbon dioxide. This means includes the cage 115
mounted on the body 16 and provided with the filling
valve assembly generally designated 116. This
valve as-
sembly includes the stationary seat 117 provided on the
cage 115 and movable valve part 118 adapted to close
against the seat under action of the spring 119. It
will be observed that the high pressure of gas within the

cavity 18 and within the bore 32 acts to maintain the valve
part 118 in closed position against the seat 117. When
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gas under pressure, the insert member 15 including
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shown, is then engaged within the taper bore 120 of the
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through the port 121 and inlet valve assembly 116. The
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operation.
In the modified form of my invention as shown in
Figure 11, the plug 14 is removed from the opening
13 in the lower portion of the keg or container 10a and a
discharge valve assembly 123 of conventional design is
substituted for the plug 14. A conventional connection
assembly 124 connects the valve 123 with the discharge
hose 125. A control valve or spigot, not shown, on the
hose regulates discharge of fluid from the interior of the
containter 10a. In this form of my invention the
"second passage" in the cartridge and body which prevents
the discharge of the contents of the keg or container 10a occurs through the second opening 13a, not through the insert member. In
this form of my invention, the regulator valve assembly 40
is brought into action by removal of the bottle cap
87 and plug 88 in the same manner as described above.
7 fines of said keg, said control means including a pressure regulator, there being passage means in said body within which said pressure regulator is located, such passage means extending from said cavity in the lower part of said body to a point of discharge intermediate the ends thereof so as to discharge gas under pressure into said beer chamber, second passage means in said body opening at the lower end thereof into said beer chamber and opening for discharge at the upper extremity of said body exteriorly of the keg, third passage means in the device extending from a point in the body communicating with said beer chamber to the atmosphere outside the beer keg, and safety valve means in said third passage, said safety valve means being normally closed under proper operating conditions to prevent venting of the beer chamber but being openable upon attainment of a predetermined pressure within said beer chamber to vent the same to atmosphere, said body having an axial bore adjacent the upper end thereof, said pressure regulator comprising a pair of opposed pistons reciprocable within said axial bore, spring means normally urging said pistons apart and the lower of said pistons having a valve portion adapted to seat upon a portion of the body to close said first passage therein, spring means normally urging said pistons together, and the upper of said pistons having sealing means thereon in opposition to a portion of said body for sealing engagement therewith when such upper piston is in its uppermost position to close said second passage, and means for depressing said upper piston to open said second passage.

3. A device for dispensing liquid from a conventional container, the conventional container being of the type having an upper chine and a recessed upper end wall with a standard size opening therein below the level of the upper chine, said device being in the form of an elongated body of dimensions cross sectionally smaller than the opening in the conventional container so that the body may be inserted into the container through such opening,

said body having an annular abutment closely adjacent one end thereof for seating engagement upon the conventional container around the opening therein with the remaining portion of the body being disposed within such container and leaving only a minor portion thereof projecting from the container, control means in said body immediately below said annular abutment so that the control means substantially in its entirety is housed within a portion of the body totally confined within the associated container, the lower extremity of the body constituting the major extent of its length being in the form of a cavity containing liquefied gas of such volume as to expel the entire contents of the associated conventional container, a first axial passage in said body leading from said cavity to a discharge point intermediate the ends of the body, a second passage in said body leading from the lower extremity thereof to the upper extremity thereof, a pressure regulator disposed in said first passage, a fluid discharge valve in said second passage, said pressure regulator and fluid discharge valve including opposed axially movable portions disposed within said body and being normally spring biased in opposite directions, a vent passage extending axially of said body communicating the upper end of the body with a point intermediate the ends thereof, and a safety valve in said vent passage normally closing the same.

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