United States Patent

[11] 3,632,023

[72] Inventor **Mack S. Johnston**
Rolling Hills, Calif.

[21] Appl. No. **19,626**
[22] Filed **Mar. 16, 1970**
[45] Patented **Jan. 4, 1972**

[73] Assignee **Republic Corporation**
Los Angeles, Calif.

Continuation-in-part of 814,883, Mar. 26, 1969, now Patent No. 3,563,424. This application Mar. 16, 1970, Ser. No. 19,626

[54] **TAPPING DEVICE FOR BEER KEGS AND THE LIKE**
18 Claims, 10 Drawing Figs.

[52] **U.S. Cl.** **222/400.7**
[51] **Int. Cl.** **F04f 1/06**
[50] **Field of Search** 222/400.7, 291; 251/149.1, 149, 149.6

[56] **References Cited**
UNITED STATES PATENTS

3,035,603	5/1962	Jamieson et al.	222/400.7 X
3,361,152	1/1968	Akers	222/400.7 X
2,187,389	1/1940	Winkler	222/400.7 X
3,065,885	11/1962	Chatten	222/400.7

Primary Examiner—Stanley H. Tollberg
Attorney—Le Blanc & Shur

ABSTRACT: Disclosed is a tapping device for beer kegs and the like including a keg adapter inserted into the keg opening from without the keg for semipermanent securement within the keg opening and a coupler releasably secured to the adapter. The adapter includes segregated liquid and gas passages and liquid and gas valves in the respective passages. Valve-actuating members extend within a central chamber opening outwardly of the keg adapter. The coupler includes segregated liquid and gas passages and a depending probe for displacing the valve-actuating members and thereby opening the liquid and gas valves whereby gas under pressure is communicated into the keg and liquid is withdrawn therefrom. The coupler further includes an automatic gas shutoff valve.

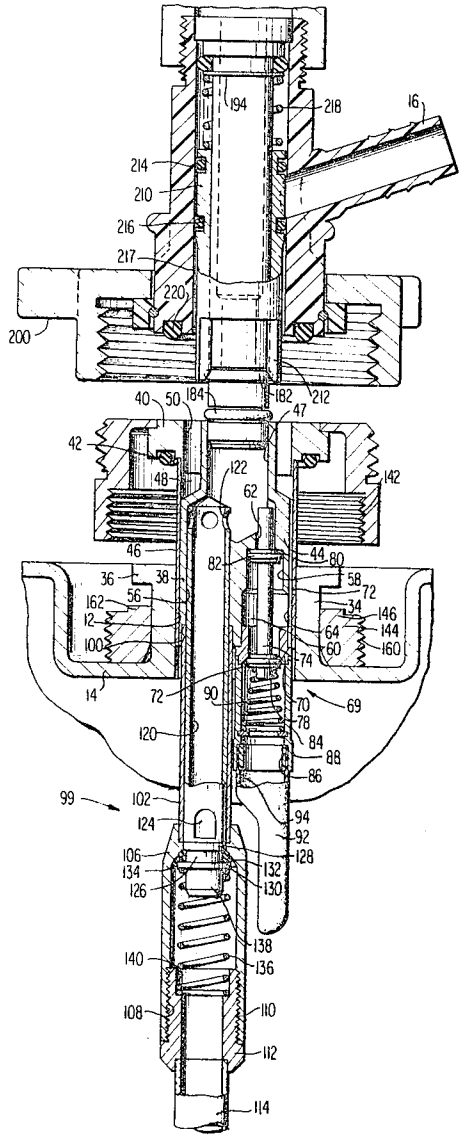


FIG. 3

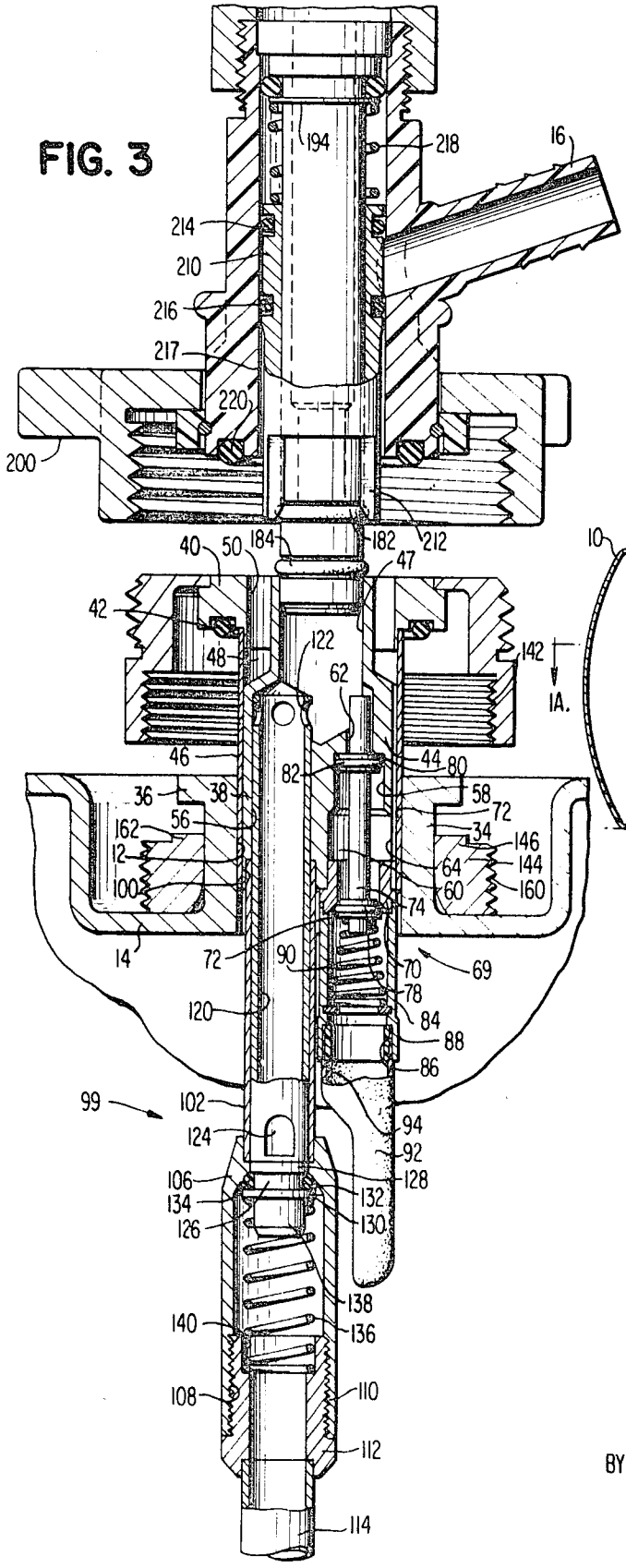
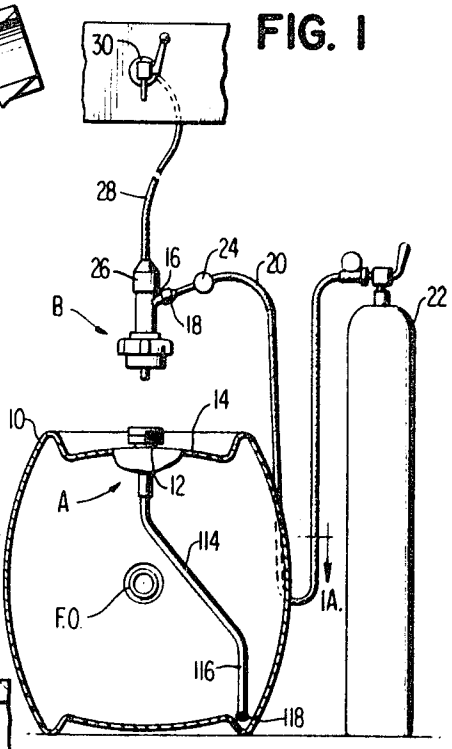


FIG. 1



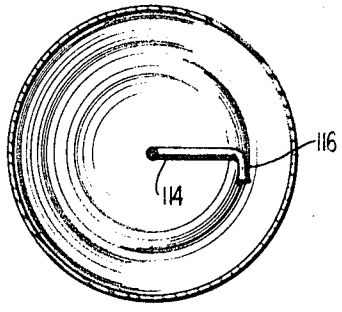


FIG. 1A

INVENTOR
MACK S JOHNSTON

BY LeBlanc & Shur

ATTORNEYS

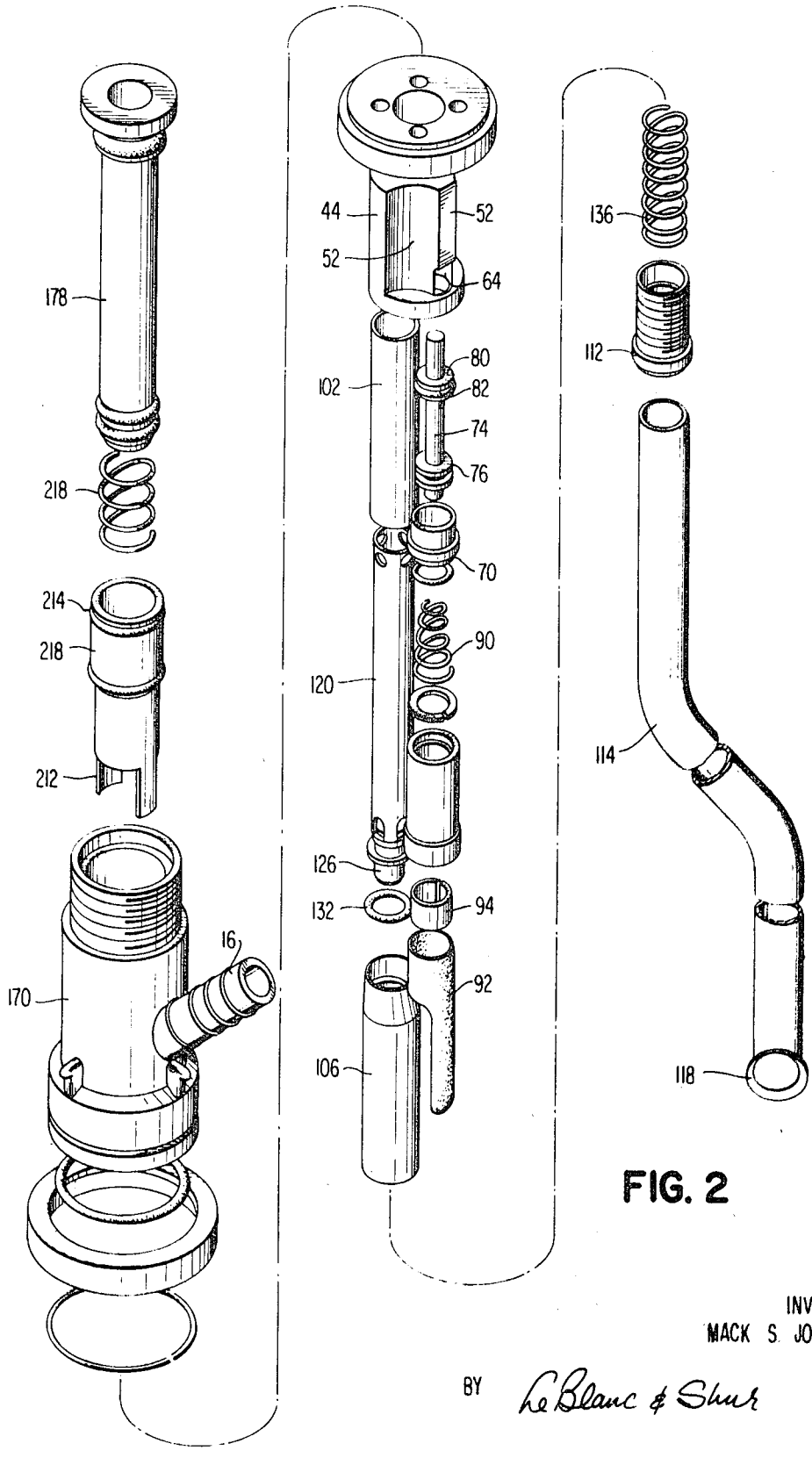


FIG. 2

INVENTOR
MACK S. JOHNSTON

BY LeBlanc & Shur

ATTORNEYS

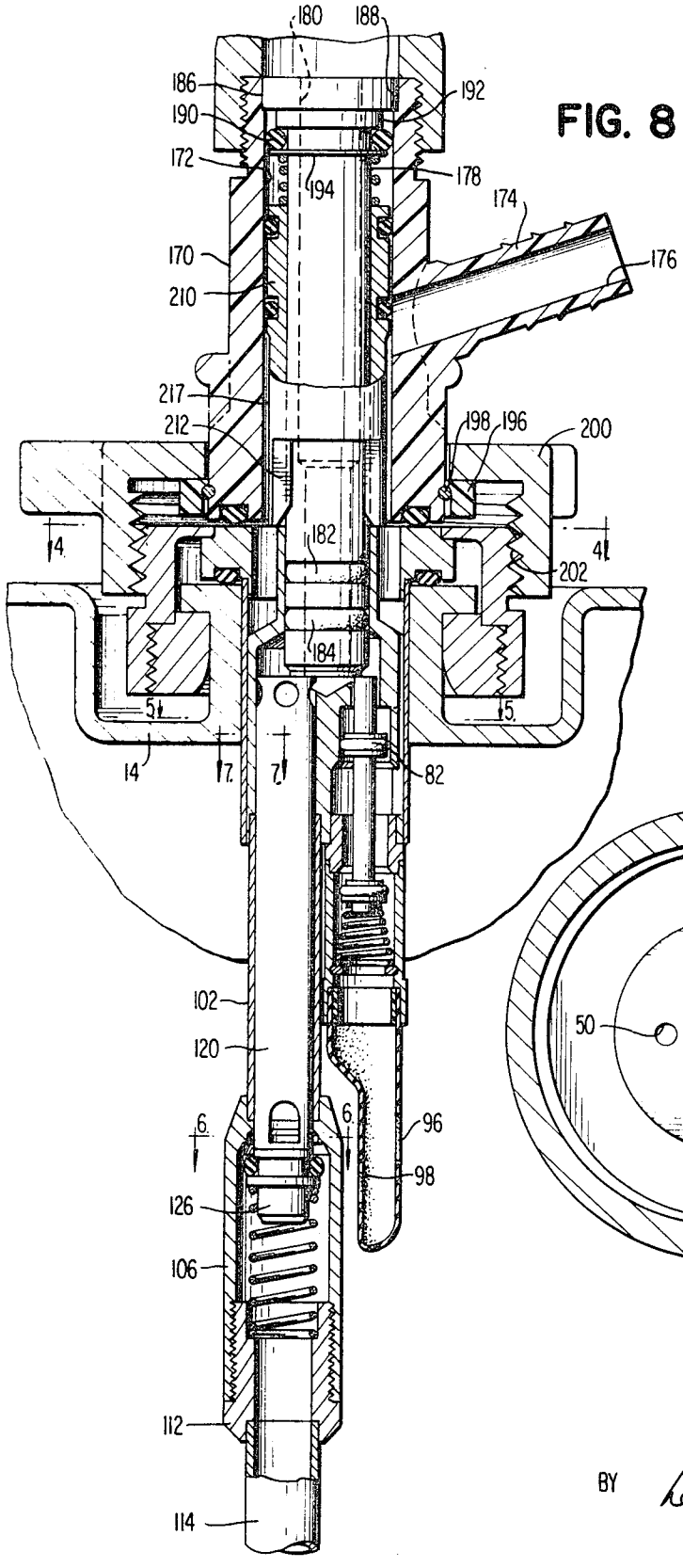


FIG. 8

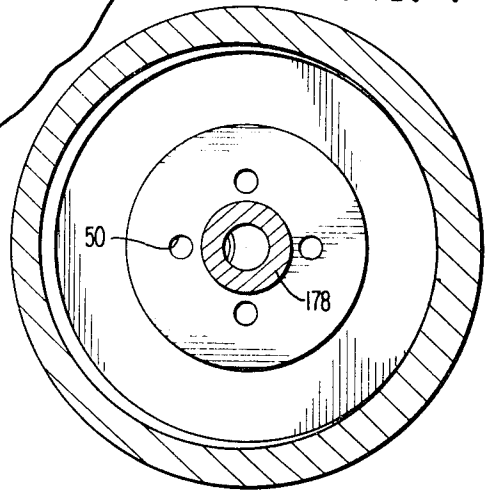


FIG. 4

INVENTOR
MACK S. JOHNSTON

BY LeBlanc & Shur

ATTORNEYS

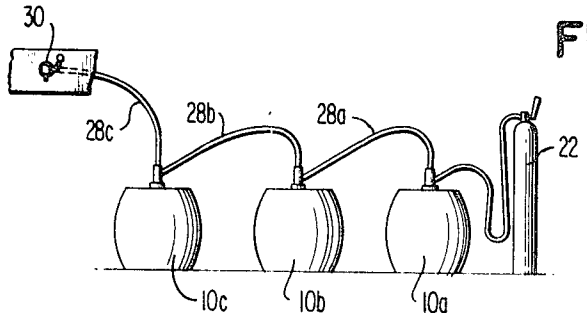
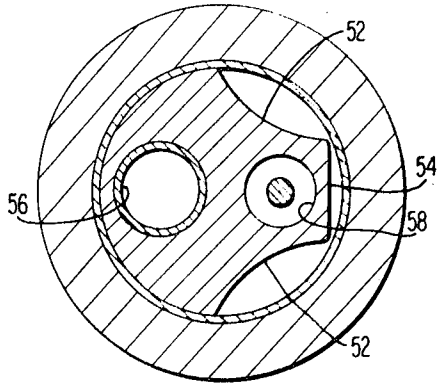


FIG. 9

FIG. 5



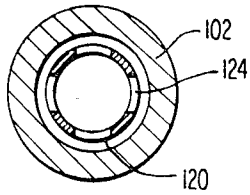


FIG. 6

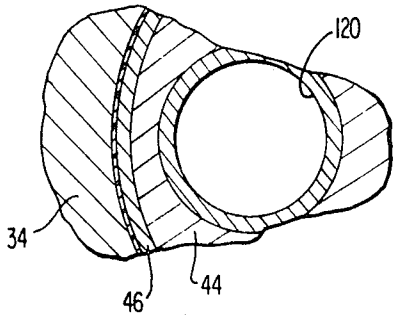


FIG. 7

INVENTOR
MACK S. JOHNSTON

BY LeBlanc & Shur

ATTORNEYS

TAPPING DEVICE FOR BEER KEGS AND THE LIKE

This application is a continuation-in-part of copending applications Ser. No. 815,542 filed Apr. 14, 1969 and Ser. No. 814,883 filed Mar. 26, 1969 (now U.S. Pat. No. 3,563,424); application Ser. No. 815,540 (now U.S. Pat. No. 3,552,077) being a continuation-in-part of application Ser. No. 676,291 filed Oct. 18, 1967 (now abandoned) and application Ser. No. 814,883 being a continuation of application Ser. No. 676,291; said application Ser. No. 676,291, filed Oct. 18, 1967, being a continuation-in-part of copending application, Ser. No. 611,610, filed Jan. 25, 1967 (issued Nov. 12, 1968 as U.S. Letters Pat. No. 3,410,458); which is, in turn, a continuation-in-part of copending application, Ser. No. 587,627 filed Oct. 18, 1966 (issued Jan. 14, 1969 as U.S. Letters Pat. No. 3,422,448); said application Ser. No. 587,627 being, in turn, a continuation of application Ser. No. 406,682 (now abandoned) filed Oct. 27, 1964; application Ser. No. 815,542 being also a continuation-in-part of copending application Ser. No. 502,092 filed Oct. 22, 1965 (issued Apr. 22, 1969 as U.S. Letters Pat. No. 3,439,884); which in turn, is a continuation-in-part of application Ser. No. 406,682 (now abandoned) filed Oct. 27, 1964; said application, Ser. No. 406,682 being a continuation-in-part of application, Ser. No. 395,084 (issued Jan. 25, 1966 as U.S. Letters Pat. No. 3,231,154) filed Sept. 8, 1964 and application Ser. No. 150,982 (now abandoned) filed Nov. 8, 1961; said application Ser. No. 395,084 being, in turn, a continuation of said application Ser. No. 150,982.

The present invention relates to a new improved tapping device for drawing fluid such as beer from containers such a beer kegs or barrels, using a gas to drive the fluid from the container, the tapping device including a keg adapter semipermanently installed in the keg opening at the brewery to seal the keg and a coupler which is releasably secured to the keg adapter at a beer-dispensing establishment wherein the coupler and keg adapter have communicating gas and liquid passages for admitting gas under pressure into the keg and driving the beer from the keg. More specifically, the present invention relates to a new improved keg adapter for use with conventional beer kegs having standard three-quarter inch diameter openings and wherein the keg adapter is inserted into the keg opening from without the keg, the keg adapter having novel enlarged liquid and gas passages for improved series keg installations and the coupler therefor having a novel automatic gas shutoff valve.

The majority of the beer kegs in use in the United States at the present time have a three-quarter inch diameter beer dispensing opening in the top wall of the keg and are designed to receive a tapping unit connected to the keg by means of a bayonet-type coupler. Commonly, the keg is tapped by knocking in a bung sealingly engaged within the keg opening and inserting an elongated tap rod with an associated siphon device for drawing the beer from the keg, the latter being fastened to the keg by means of the bayonet-type connection. These siphon devices include means for injecting gas or air under pressure through the tap rod into keg and to drive the beer up through the siphon. External valves for controlling the flow of gas into the keg and the beer from the keg are also conventionally employed.

Modern-tapping units have replaced the bung in the top of the keg with a keg unit or adapter which serves to seal the keg opening until tapped and carries liquid and gas passages for respectively transferring gas from the outside to the inside of the keg and liquid from the inside to the outside of the keg. Normally closed liquid and gas valves are disposed in the respective liquid and gas passages. It is generally desirable to install the keg adapter in the keg opening from outside the keg. It will thus be appreciated that the keg adapter body housing the valving apparatus and passages must be constructed as to be receivable within the three-quarter inch diameter opening. A number of variously constructed keg units have been proposed. Most however, do not take into account the facts of life concerning the dispensing of a quality beverage particularly where beer is dispensed and this constitutes a further constraint, in addition to the limitation imposed by the use of the keg opening, limiting the design of keg adapters, particularly the arrangement of the beer and gas valves and the size of the passages in the keg adapter. For example, beer unlike any other liquids, must be handled with extreme care lest it lose those qualities such as taste, proper head and foam, and freedom from cloudiness, which the public demands. Thus, if the flow path from the keg to the dispensing apparatus is too tortuous or contorted or if there is too large a pressure drop across the tapping device caused by a restricted flow path, the beer will become flat or wild, i.e., too much foam. Thus, the valves and passages in the keg adapter must be specially constructed to avoid the foregoing problems and yet must be disposed in a keg adapter receivable in the small keg opening from without the keg while simultaneously ensuring the drawing of quality beer at a proper flow rate.

Furthermore, a keg adapter should not only be designed for successful tapping of a single keg to provide the desired flow rate and quality of the beer, but is has also been found desirable, particularly in many large beer-dispensing establishments to provide kegs connected in series wherein a plurality of kegs are behind and dispense beer to a single faucet. In such installations, the tapping device in the first keg is connected to the gas source in the usual fashion. The beer outlet through the first tapping device is connected through suitable hosing to what would normally be the gas inlet on the tapping device in the next serially connected keg. Similarly, the beer outlet from the second tapping device or keg would likewise be connected by suitable hosing to what would normally be the gas inlet passage in the tapping device associated with the third serially connected keg. This type of hookup would be provided for all the serially connected kegs with the beer outlet of the tapping device associated with the last keg being connected to the dispensing faucet. It will thus be seen that the gas under pressure drives the beer from the first keg into the second keg with the beer in the second keg being driven into the third keg and so on with the beer in each keg being delivered to succeeding kegs until the beer is wholly dispensed through the faucet and all the kegs are empty. The passages as well as the associated valves therein in each of the tapping units must accordingly be designed as to accommodate the flow of both gas and beer. The flow through these passages must not be such as to diminish either the equality or the flow rate of the beer dispensed. It has been found where conventional tapping devices have been employed in kegs connected in series that the cumulative effect of restrictions in the flow passages diminishes the flow rate of the beer to undesirable levels also diminishing the quality of the beer. This has been found to be particularly true where more than three kegs are connected in series.

A further problem associated with keg adapters of the type discussed is the possibility of the beer spitting when the coupler is initially applied to the keg adapter but prior to its final securement. For example, the coupler usually has a depending probe which opens the beer valve prior to final securement and hence sealing of the coupler to the adapter. Since the pressure in the keg normally exceeds the external pressure, beer will tend to flow through the partially opened beer valve and spit out of the keg between the coupler and adapter before final securement and a seal therebetween is accomplished. Surging of the beer in the gas passages when the keg pressure exceeds the gas supply pressure is another undesirable characteristic of keg adapters of this type. In either case, beer enters undesirably into the gas passages, resulting in dried beer and yeast accumulations resulting in bacterial formations.

Another important problem in the use of keg adapters and couplers of the foregoing described type resides in the accessibility of the gasline to the ingress of dirt and other contaminants when the coupler lies in disassembled relation from the keg adapter. Concomitantly, it has been found desirable to provide a gas shutoff valve at the keg, particularly an automatically actuated gas shutoff valve, rather than at the source of gas pressure. In most beer-dispensing establishments the

source of gas under pressure is located at a position remote from the kegs and it is necessary before uncoupling one keg from the beer line and connecting another fresh keg to the beer line to shut off the gas under pressure at the source which may be in another room or indeed another floor. Thus, by applying an automatic gas shutoff valve in conjunction with the coupler, the gasline is sealed from contaminants when the coupler is uncoupled from the keg adapter. Moreover, by the coupling action, the gas supply is automatically cutoff from the coupler without the necessity of first shutting the gas supply off at its gas source.

Accordingly, it is a primary object of the present invention to provide a novel, improved tapping device for liquids and the like having improved liquid and gas passages and valves therefor.

It is another object of the present invention to provide a novel improved beer tapping device having enlarged liquid and gas passageways.

It is still another object of the present invention to provide a novel, improved tapping device usable with a large number of kegs connected in series to s dispensing faucet wherein the rate of flow of beer through the faucet is not substantially diminished and is substantially the same as the rate of flow of beer through a faucet connected to a single-pressurized keg utilizing the tapping device hereof. A related object of the present invention is the provision of enlarged liquid and gas passages wherein the cumulative effect of restrictions in the passages does not deleteriously affect the quality or the rate of flow of beer through the dispensing faucet in series installation.

It is a further object of the present invention to provide a novel, improved keg adapter for use with kegs of the type having a three-quarter inch tapping opening and wherein the keg adapter includes liquid and gas valve actuators movable to open the respective liquid and gas valves in response to insertion of the probe on the coupler into the keg.

It is a still further object of the present invention to provide a novel, improved coupler having an integrally contained automatic gas shutoff valve.

It is a related object of the present invention to provide a novel, improved keg tapping device comprised of a substantially all metal construction, and which is inexpensively constructed, easy to install, rugged in use, and reliable in operation.

These and further objects and advantage of the present invention will become more apparent upon reference to the following specification, appended claims and drawings wherein:

FIG. 1 is a diagrammatic view of a beer keg and a tapping device therefor constructed in accordance with the present invention;

FIG. 1A is a cross-sectional view thereof taken generally about on line 1A—1A in FIG. 1;

FIG. 2 is an exploded perspective view of parts forming the keg adapter of the tapping device hereof;

FIG. 3 is a vertical cross-sectional view of the keg adapter and coupler hereof;

FIG. 4 is a cross-sectional view of the keg adapter and coupler taken about on line 4—4 in FIG. 8;

FIG. 5 is a cross-sectional view thereof taken about on line 5—5 in FIG. 8;

FIG. 6 is a cross-sectional view thereof taken about on line 6—6 in FIG. 8;

FIG. 7 is a fragmentary enlarged cross-sectional view thereof taken about on line 7—7 of FIG. 8;

FIG. 8 is a cross-sectional view of the keg adapter and coupler therefor when fully installed in the keg; and

FIG. 9 is a schematic illustration representing a plurality of kegs connected in series one to the other.

Referring now to FIG. 1, there is illustrated a conventional beer keg **10** having an opening **12** in its top wall **14** which receives the keg tapping device hereof including a keg adapter A, the adapter being semipermanently installed in the keg **10** at the brewery. A dispenser coupler unit B forming a part of the keg tapping device thereof may be readily connected with keg adapter A at the beer-dispensing establishment to form a complete tapping assembly as hereinafter amplified. Briefly, coupler unit B has a gas inlet port **16** adapted to receive a coupler **18** attached to the end of a gas supply hose **20** which, in turn, communicates with a source of gas or air under pressure indicated at **22**. If desired, a valve **24** may be placed in the hose **20** so that the gas or air pressure may be controlled at the location of the keg **10**. The coupler B has a beer exit fitting **26** attachable to the end of a flexible hose **28** by means of which beer is supplied from keg **10** to a dispensing faucet **30**. The arrangement shown in FIG. **1** is merely for the purpose of illustrating the usage of the present invention and the components thereof other than the tapping device comprising keg adapter A and coupler unit B are conventional and do not comprise any part of the present invention.

Referring now to FIG. **3**, there is illustrated a keg adapter A secured within the opening **12** of keg **10**. Keg opening **12** comprises a standard three-quarter inch diameter opening which is common to the standard so-called Peerless-type beer keg and includes an annular keg neck **34** having an outwardly projecting flange **36** adjacent its upper end. Keg adapter A includes a cylindrical housing or body **38** adapted to be received within keg opening **12** from without the keg and having an outwardly directed flange **40** about its upper end. Housing **38** includes an inner body member **44**, preferably formed of stainless steel bar stock, and enclosed in final assembly, within a outer sleeve **46**. The upper portion of body **44** includes a central chamber **47** opening outwardly through the outer and of keg adapter A, chamber **47** being coaxial with body **38**. As best seen in FIGS. **2, 3** and **5**, body **44** is provided with a pair of circumferentially spaced axially extending arcuate grooves or cutouts extending inwardly from the annular slot **48** toward the inner end of body **44**. As seen in FIG. **5**, the circumferential segment **54** between grooves **52** is also cutaway.

A pair of bores **56** and **58** are provided in the inner end of body **44** and extend generally parallel to the axis of body **44** at radially offset positions. As seen in FIG. **3**, bore **56** opens at its upper or outer end into the lower end of central chamber **47**. Bore **58** is counterbored at **60** and has a reduced diameter portion **62** adjacent its upper end and which opens into chamber **47**. Sleeve **46** encompasses body **44** and a portion of the gas passage through adapter A is provided via openings **50**, annular slot **48**, the openings between grooves **52** and sleeve **46** and a side opening **64** into bore **58** formed through body **44** adjacent its inner end between grooves **52**.

A gas valve, generally indicated **69**, is provided within bore **58** and comprises an annular member **70** received within the lower end of bore **58**. Member **70** has a chamfered surface **72** forming an annular valve seat. A valve stem **74** is received within bore **58** and includes a lower valve member **76** mounting an O-ring **78** for sealing engagement about valve seat **72**. Stem **74** also includes an upper valve member **80** mounting a O-ring seal **82** for engagement within the reduced diameter portion **62** of bore **58**. The upper end of stem **74** extends within chamber **74** and a least a portion of it lies inset form the walls of chamber **47** for reasons as will be described hereinafter. Annular member **70** is preferably brazed within the lower end of body **44** and a sleeve **84** is preferably similarly secured to and extends from the lower end of member **70**. The lower end of sleeve **84** includes an enlarged diameter portion **86** and an annular groove for receiving a circlip **88** which forms a seat for the lower end of spring **90**. The upper end of spring **90** engages about the lower end of stem **74** to bias the stem outwardly to seat O-ring seal **78** against valve seat **72**. The enlarged diameter lower end of sleeve **84** receives the upper end of a flexible, preferably plastic check valve **92**. Valve **92** includes an elongated flexible tubular envelope closed at its lower end and having an upper annular portion receivable within the enlarged diameter portion of sleeve **84**. A split ring clip **94** retains the upper portion of valve **92** within sleeve **84**. Suitable epoxy may also be applied in order to ensure an effective seal. The lower portion of valve **29** is substan-

tially D shaped in cross section with the outer arcuate wall containing a longitudinally extending slit **96**. A slit **98** may also be provided in the flat rear wall of valve **92** as well as in its lower end as desired. With the foregoing check valve construction, gas or air from the pressure source passes through the passage portion previously described, past the O-ring **78** of the valve stem **74** (the stem **74** being depressed to open valve **69** in a manner to be described), through sleeve **84** and into the envelope **92** for ingress into the keg through the slits **96** and **98**, the pressure of the gas or air moving the edges of the slits apart to provide an opening. Should the keg pressure exceed the pressure of the incoming gas or air the excessive keg pressure will cause the edges of the one or more slits to bear against one another precluding reverse flow of gas or air or beer from the keg into the gas passages of the keg adapter.

The keg adapter is also provided with a through liquid passage for transmitting liquid from the inside to the outside of the keg. Particularly, the lower portion of body **44** is counterbored at **100** to receive the upper end of a tube **102**, furnace brazing of tube **102** to body **44** being preferable. The upper end of a tubular housing **106** is received about and preferably furnace brazed to the lower end of tube **102**. The lower end of tubular housing **106** is internally threaded as at **108** to receive the externally threaded portion **110** of a locking nut **112**. The upper end of a siphon tube **114** is received within an enlarged diameter portion of nut **112** adjacent its lower end and is preferably furnace brazed thereto. A suitable epoxy is preferably provided about this juncture as well as the joint between the upper end of housing **106** and tube **102** as to insure an effective fluidtight seal.

As best illustrated in FIGS. **1** and **1A**, siphon tube **114** extends from keg adapter A at a diverging angle with respect to the central axis of the keg toward the side and bottom of the keg to avoid interference with keg-filling equipment (not shown) which is inserted at the brewery through the opening to fill the keg. Siphon tube **114** also angles laterally, as indicated at **116**, to locate its lower flared end **118** within the circumferential groove or chime about the juncture of the bottom and sidewalls of the keg. The flared end **118** is located within the lower chime to afford draining of substantially the entire fluid contents of the keg notwithstanding the high pressures within the keg which slightly elongate the keg in an axial direction. For example, if the lower end of the siphon tube was located in the central portion of the dished bottom keg wall and the keg elongated in response to high pressures, it would be raised slightly from the bottom wall thereby precluding draining the keg in its entire reel. Inasmuch as the grooved portions about the bottom keg wall are not subject to slight elongation due to excessive pressures, the flared lower end **118** of the siphon tube **114** remains in the lowermost portion of the keg whereby substantially all of the contents of the keg can be siphoned.

A liquid valve generally indicated at **99**, is provided in the liquid passage formed by siphon tub **114**, housing **106**, tube **102** and chamber **47**. Valve **99** includes an elongated tubular sleeve **120** disposed within tube **102** with its upper end terminating at least in part within the cylindrical confines and outwardly of the inner end of chamber **47** for purposes as will become clear. A plurality of openings **122** are provided through the upper end of sleeve **120** to form an enlarged liquid passage between sleeve **120** and chamber **47**. A plurality of recesses **124** are formed through the lower end walls of sleeve **120** and a valve body **126** is suitably secured to the inner end of sleeve **120** as by a plurality of spot welds. Valve body **126** includes a generally cylindrical member having a pair of axially spaced flanges **128** and **130**, flange **128** having a reduced diameter for reception in the smaller diameter opening through the outer end of housing **106**. An O-ring seal **132** is disposed about valve body **126** between flanges **128** and **130**, and, when the valve is closed, seats against the upper bevelled wall surface **134** of housing **106**, to form an effective fluid seal thereabout. It will be appreciated that the diameter of the flange **130** is larger than the diameter of tube **102**. The valve is maintained in a normally sealed position as illustrated in FIG. **3** by a coiled spring **136**, the upper end of which encircles a lower stem portion **138** of valve body **126** in engagement against the underside of flange **130**. The lower end of coil spring **136** seats about a shoulder formed within a enlarged diameter portion **140** of nut **112**. It will be appreciated that axial inward movement of sleeve **120** and valve body **126** displaces O-ring seal **132** away from seat **134** against the bias of coil spring **136** thereby providing a through fluid passage from the interior to the exterior of the keg through siphon tube **114**, nut **112**, housing **106**, past the open valve through openings **124** into sleeve **120**, outwardly through the end opening and side opening **122** of sleeve **120** and into chamber **47**.

To install the keg adapter A within keg opening **12**, the siphon tube **114** and adapter body **38** are inserted into opening **12** until flange **40** rests on keg flange **36**. An externally threaded collar **142** is clamped over flange **40** of keg adapter A to retain the latter, in cooperation with a locking ring **144**, secured within the keg opening. The securing means including collar **142** and ring **144** is disclosed in my U.S. Pat. No. 3,422,448 issued Jan. 14, 1969; the disclosure of which is herein incorporated by reference thereto as though full set forth herein. As more fully described in that patent, ring **144** includes a thin wall section having inwardly and upwardly projecting diametrically opposite tabs **146** formed on its inner periphery. Ring **144** is snapped over flange **36** as to rest on top of the keg with the tabs extending upwardly. Collar **142** is then placed over the upper end of the adapter and threaded about ring **144** whereby ring **144** is drawn up within the lower inside portion of collar **142** until the upper ends of tabs **146** engage the underside of keg flange **36**. Thus, when collar **142** and ring **144** are assembled, they cooperate with the keg flange to securely lock the keg adapter A within opening **12** to prevent longitudinal or rotational movement of the unit A relative to the keg opening and seal the keg adapter A about the keg flange **36** by O-ring seal **42**.

Referring now to FIGS. **3** and **8**, coupler unit B comprises a generally cylindrical head **170** having a central vertically extending bore **172** and a tubular arm **174** projecting from one side of head **172** and having a central passage **176** constituting the air inlet port **16**. As will be recalled, arm **174** is adapted to receive the end of a piece of tubing for connecting coupler unit B to a tank of pressurized gas or air such as tank **22** illustrated in FIG. **1**. Coupler unit B also includes a generally tubular probe **178** which is located within bore **172** and which has a central bore **180** that forms the liquid passageway through the coupler unit. The exterior of probe **178** which is located within bore **172** and which has a central bore **180** that forms the liquid passageway through the coupler unit. The exterior of probe **178** adjacent its lower end is provided with grooves for receiving respective O-ring seals **182** and **184** which may be of neoprene rubber. The upper end of probe **178** has an outwardly extending flange **186** receivable within a counterbored portion **188** of head **170** whereby, when probe **178** is positioned within head **170**, its upper end is aligned with the top of head **170** as illustrated in FIG. **8**. Probe **178** is also provided with an O-ring seal **190** for sealing between the probe and head **170** adjacent the upper end of the probe, O-ring seal **190** being disposed between an enlarged diameter portion **192** of probe **178** and a washer **194**. An annular member **196** is secured about the slightly enlarged lower end of head **170** by an snapring **198** and retains a collar **200** rotatably mounted on coupler head B between arm **174** and snapring **196**. Collar **200** has a plurality of handle portions formed integrally therewith and is internally threaded as at **202** for cooperation with the externally threaded portion of collar **142** for securing coupler unit B to the keg adapter A.

A significant feature of the present invention is the provision of an automatic gas shutoff valve in the coupler whereby the gasline is automatically opened when the coupler is assembled with keg adapter A, and automatically sealed when the coupler is disassembled from keg adapter A. To this end, there is provided a sleeve **210** within bore **172**, encompassing probe

178, the lower end of sleeve 210 terminating in a pair of circumferentially spaced downwardly projecting lugs 212. As illustrated in FIG. 3, a pair of O-ring seals 214 and 216 are axially spaced along sleeves 210 for sealing engagement about the bore 172. Sleeve 210 is normally biased into the position illustrated in FIG. 3 by a coiled spring 218, the upper end of which bears against the underside of washer 194. The lower end of spring 218 bears against the upper end of sleeve 210. Sleeve 210 is retained within coupler unit A by the upper O-ring seal 182 which precludes passage of sleeve 210 downwardly beyond O-ring seal 182. It will be appreciated that, in the position of sleeve 210 as illustrated in FIG. 3, seals 214 and 216 seal about bore 172 on opposite sides of bore 176 in gas inlet are 174 precluding passage of gas or air in either direction within bore 172. Referring to FIG. 8, it will be appreciated that, when sleeve 210 is displaced upwardly relative to probe 178, the lower O-ring seal 216 about sleeve 210 is disposed above bore 176 to permit ingress of gas through passage 176 into the annular passage defined between bore 172 and a lower reduced diameter portion 217 of sleeve 210.

In use, keg adapter A is secure within the keg opening 12 at the brewery in the manner described previously. It will be noted that, prior to tapping, liquid valve 99 and gas valve 69 and 92 seal the respective liquid and gas passages through keg adapter A and the O-ring seal 42 seals between adapter A and flange 36. IT will also be appreciated that the gas check valve 92 precludes entry of gas or beer into the gas passage through the keg adapter. When the keg is located at the dispensing establishment and is to be tapped, coupler unit B is aligned over the keg such that the lower end of probe 178 engages within the upper end of central chamber 47 with the lower seal 184 initially sealing between probe 178 and chamber 47. The lower end of probe 178 also engages the upper ends of both the sleeve 120 and stem 74 upon further inward displacement of the coupler unit B toward keg adapter A. Further displacement of probe 178 toward keg adapter A displaces sleeve 120 and stem 74 inwardly causing the respective O-ring seals 132 and 78 to be displaced inwardly from their respective valve seats. Downward movement of coupler B relative to adapter A caused by the threading action of collar 200 about adapter collar 142 causes the lower end of probe 178 to fully open the liquid and positive gas valves 99 and 69 respectively. Thus, the inward displacement of sleeve 120 by probe 178 locates O-ring seal 132 inwardly of seat 134 to provide a through beer passage from the keg through siphon tube 114, housing 106, about O-ring seal 132; through openings 124 into sleeve 120; through sleeve 120 and through the open end of sleeve 120 and openings 122 into chamber 47; and then through the central bore 180 of probe 178 for dispensing at faucet via beer lien 28.

Turning now to the gas passages, when coupler unit B initially engages adapter A, the lower ends of lugs 212 also engage the upper face of flange 40. Continuous displacement of coupler B toward keg adapter A by the threading action of collar 200 about collar 142, provides for inward movement of head 170 relative to probe 178 to thereby locate the passage 176 inwardly of the innermost O-ring seal 216 about probe 178 permitting ingress of gas through passage 176 into the annular passage defined between sleeves 210 and bore portion 217 and into the openings 50 in the keg adapter flange. An O-ring seal 220 is provided about the lower end of head 170 to seal against the face of keg adapter A outwardly of openings 50 when coupler B is finally secured to adapter A. Note that O-ring seal 182 and 184 maintain the beer and gas passages segregated one from the other at this juncture and that, with gas valve 69 open, O-ring 82 seals between the chamber 47 which forms a part of the liquid passage and bore 58 which forms a part of the gas passage. When the coupler unit is thus finally secured to adapter A, it will be appreciated that there is provided a gas pressure into the keg including passage 176, the annular passage between sleeve 210 and bore 172, openings 50, the annular slot 48, the passages defined between grooves 52, 54 and the outer sleeve 46, the opening 64 into bore 58, through member 70 past the open valve, through sleeve 84, into flexible gas check valve 92, and through the slits 96 and 98 into the keg. When the coupler unit B is finally secured to the keg adapter A with the latter in sealing engagement against the keg flange 40, the valves 99 and 69 are maintained in their fully open positions as illustrated in FIG. 8. The gas flows through the previously described gas passages into the gas check valve 92 and outwardly into the keg through the slits 96 and 98 when the gas inlet pressure exceeds the keg pressure. The gas admitted into the keg under pressure drives the beer upwardly through the previously described liquid passages to the faucet 30.

It will be appreciated that spitting of beer when the keg is initially tapped is prevented by the unique assembly hereof since O-ring 184 seals the liquid passage between the coupler and adapter even as the former is secured to the latter. Particularly, prior to the engagement between the lower end of the probe and the upper end of sleeve 120 to open the beer valve, O-ring seal 184 engages within chamber 47 to prevent beer leakage about the probe when the coupler is being threaded down about the adapter and the sleeve 120 is being displaced inwardly to open the liquid valve. Note also that the gas check valve maintains the gas passage closed throughout the entire coupling operation. It will be further appreciated that upon uncoupling of the coupler B from keg adapter A, coil spring 218 displaces sleeve 210 in an axial direction relative to probe 178 to locate sealing rings 214 and 216 on opposite sides of passage 176 in bore 172. Thus, the gas is automatically shutoff at the coupler upon disassembly of the coupler from the keg adapter.

Moreover, by the present construction, there are provided improved and enlarged beer and gas passages through the keg adapter and coupler to permit utilization of series connected kegs. Referring to FIG. 9, there is illustrated a plurality of kegs 10 each employing a tapping unit constructed in accordance with the present invention. A gas pressure 22 source is coupled to the first keg 10*a* and a beer line 28*a* connects the beer outlet from leg 10*a* with what would normally be the gas inlet port on the tapping device of keg 10*b*. Keg 10*b* is similarly connected to keg 10*c*. Thus, beer flows under pressure from the first keg 10*a*, into the second keg 10*b* via what would normally be the gas inlet passage through its keg adapter, from keg 10*b* into keg 10*c* again via the gas inlet passage of its keg adapter and ultimately to faucet 30. The enlarged flow passages through the coupler and keg adapter, particularly the gas passages through openings 50, along the grooves 52 and through the opening 64, permit use of the present tapping unit for series installations.

A coating of plastic material, for example, as illustrated in FIG. 7 may be provided about sleeve 46. The keg adapter may thus be force fitted into the keg opening with the coating precluding ingress of beer between the walls of the opening and the keg adapter.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by United States Letters Patent is:

1. A liquid dispensing apparatus adapted for use with a keg or like container for liquids which has top, bottom and sidewalls with an opening in one wall characterized in that it comprises: a keg adapter including a main body adapted to be secured within the keg opening and having a liquid passage extending through said body in the general direction of the longitudinal axis thereof for the transfer of liquid from the inside to the outside of the keg, a normally closed valve in said liquid passage; said keg adapter including a gas passage bypassing said liquid passage and said liquid valve for transmitting gas

through the keg adapter from the outside to the inside of the keg, a normally closed gas valve in said gas passage, said body including a central opening adjacent the outer end of said keg adapter and forming a portion of one of said passages, a pair of valve actuating elements each having portions disposed in said central opening and movable in a generally axial direction from a normally disposed first position to a second position, and means coupling said valve elements to said valves for opening said valves in response to movement of said elements from said first position to said second position.

2. A liquid dispensing apparatus according to claim 1, wherein at least a portion of each of said liquid and gas passages is radially offset from the central axis of said keg adapter, said elements lying in part in said offset passage portions.

3. Apparatus according to claim 1 including a gas check valve disposed in said gas passage adjacent its inner end to preclude flow of liquid into said passage.

4. Apparatus according to claim 3 wherein said gas check valve includes a closed flexible envelope in communication with said gas passage, said envelope having an elongated slit formed through a wall thereof for permitting ingress of gas into the keg.

5. Apparatus according to claim 1 including an elongated siphon tube in communication with said liquid passage said body having a lateral extent at each axial position therealong less than the diameter of the keg opening whereby said adapter body is receivable within the keg opening from without the keg.

6. Apparatus according to claim 1 wherein said keg adapter includes a flange about the outer portion of said adapter body, said flange having a diameter greater than the diameter of the keg opening, means for releasably securing said keg adapter in said keg opening including a first externally threaded ring engageable below the keg flange and a second ring having an inwardly directed flange and an internally threaded depending skirt portion for threaded engagement with said second ring whereby said adapter flange is releasably clamped between said second ring flange and the keg flange upon threaded engagement of said first and second rings.

7. A liquid dispensing apparatus adapted for use with a keg or like container for liquids which has top, bottom and sidewalls with an opening in one wall characterized in that it comprises: a keg adapter including a main body adapted to be secured within the keg opening and having a liquid passage extending through said body in the general direction of the longitudinal axis thereof for the transfer of liquid from the inside to the outside of the keg, a normally closed valve in said liquid passage; a gas passage bypassing said position, said liquid passage and said liquid valve for transmitting gas through the keg adapter from the outside to the inside of the keg, a normally closed gas valve in said gas passage, one of said passages including a central opening adjacent the outer end of said keg adapter, a pair of valve actuating elements having portions disposed in said central opening and movable from a normally disposed first position to a second position, and means coupling said valve elements to said valves for opening said valves in response to movement of said elements from said first position to said second position, said liquid and gas valves being axially offset one from the other along said keg adapter.

8. A liquid dispensing apparatus adapted for use with a keg or like container for liquids which has top, bottom and sidewalls with an opening in one wall characterized in that it comprises: a keg adapter including a main body adapted to be secured within the keg opening and having a liquid passage extending through said body in the general direction of the longitudinal axis thereof for the transfer of liquid from the inside to the outside of the keg, a normally closed valve in said liquid passage; a gas passage bypassing said liquid passage and said liquid valve for transmitting gas through the keg adapter from the outside to the inside of the keg, a normally closed gas valve in said gas passage, one of said passages including a central opening adjacent the outer end of said keg adapter, a pair of valve-actuating elements having portions disposed in said central opening and movable from a normally disposed first position to a second position, and means coupling said valve elements to said valves for opening said valves in response to movement of said elements from said first position to said second position, said tubular element comprising a portion of said liquid passage, means for biasing said tubular element into said first position and retaining said tubular element in said liquid passage, said tubular element being movable axially inwardly against the bias of said biasing means into said second position to open said liquid valve, said liquid and gas valves being axially offset one from the other along said keg adapter.

9. A liquid dispensing apparatus adapted for use with a keg or like container for liquids which has top, bottom and sidewalls with an opening in one wall characterized in that it comprises: a keg adapter including a main body adapted to be secured within the keg opening and having a liquid passage extending through said body in the general direction of the longitudinal axis thereof for the transfer of liquid from the inside to the outside of the keg, a normally closed valve in said liquid passage; a gas passage bypassing said liquid passage and said liquid valve for transmitting gas through the keg adapter from the outside to the inside of the keg, a normally closed gas valve in said gas passage, one of said passages including a central opening adjacent the outer end of said keg adapter, a pair of valve-actuating elements having portions disposed in said central opening and movable from a normally disposed first position to a second position, and means coupling said valve elements to said valves for opening said valves in response to movement of said elements from said first position to said second position, means carried by said coupler and movable into a first position for normally sealing one of said passages through said coupler and into a second position providing for open communication through said one passage, and means for moving said sealing means from said first position to said second position in response to securing movement of said coupler toward said keg adapter.

10. A liquid dispensing apparatus adapted for use with a keg or like container for liquids which has top, bottom and sidewalls with an opening in one wall characterized in that it comprises: a keg adapter including a main body adapted to be secured within the keg opening and having a liquid passage extending through said body in the general direction of the longitudinal axis thereof for the transfer of liquid from the inside to the outside of the keg, a normally closed valve in said liquid passage; a gas passage bypassing said liquid passage and said liquid valve for transmitting gas through the keg adapter from the outside to the inside of the keg, a normally closed gas valve in said gas passage, one of said passages including a central opening adjacent the outer end of said keg adapter, a pair of valve-actuating elements having portions disposed in said central opening and movable from a normally disposed first position to a second position, and means coupling said valve elements to said valves for opening said valves in response to movement of said elements from said first position to said second position, one of said passages including a plurality of openings circumferentially spaced one from the other radially outwardly of said central opening.

11. A liquid dispensing apparatus adapted for use with a keg or like container for liquids which has top, bottom and sidewalls with an opening in one wall characterized in that it comprises: a keg adapter including a main body adapted to be secured within the keg opening and having a liquid passage extending through said body in the general direction of the longitudinal axis thereof for the transfer of liquid from the inside to the outside of the keg, a normally closed valve in said liquid passage; a gas passage bypassing said liquid passage and said liquid valve for transmitting gas through the keg adapter from the outside to the inside of the keg, a normally closed gas valve in said gas passage, one of said passages including a central opening adjacent the outer end of said keg adapter, a pair of valve-actuating elements having portions disposed in said cen-

tral opening and movable from a normally disposed first position to a second position, and means coupling said valve elements to said valves for opening said valves in response to movement of said elements from said first position to said second position, at least a portion of each of said liquid and gas passages being radially offset from the central axis of said keg adapter, said gas passage including a plurality of openings circumferentially spaced one from the other radially outwardly of said central opening, means providing for communication between said openings and said offset gas passage portion, said gas valve and its associated gas passage portion being disposed radially inwardly of said offset gas passage portion, and means providing for communication between said offset gas passage portion and the gas passage portion containing said gas valve.

12. A liquid dispensing apparatus adapted for use with a keg or like container for liquids which has top, bottom and sidewalls with an opening in one wall characterized in that it comprises: a keg adapter including a main body adapted to be secured within the keg opening and having a liquid passage extending through said body in the general direction of the longitudinal axis thereof for the transfer of liquid from the inside to the outside of the keg, a normally closed valve in said liquid passage; a gas passage bypassing said liquid passage and said liquid valve for transmitting gas through the keg adapter from the outside of the keg, a normally closed gas valve in sad gas passage, one of said passages including a central opening adjacent the outer end of said keg adapter, a pair of valve-actuating elements having portions disposed in said central opening and movable from a normally disposed first position to a second position, and means coupling said valve elements to said valves for opening said valves in response to movement of said elements from said first position to said second position, one of said actuating elements including an axially movable stem, sealing means between said stem and said body in said gas passage outwardly of said gas valve to maintain said liquid and said gas passages through said keg adapter segregated one from the other.

13. Apparatus according to claim 11 including means in said gas passage and outwardly of said gas valve for sealing about said gas valve-actuating element to maintain said liquid and gas passages segregated one from the other.

14. Apparatus according to claim 1, wherein at least a portion of each of said liquid and gas passages is radially offset from the central axis of said keg adapter, said gas passage including a portion spaced radially outwardly of said central opening and opening through the outer end portion of said adapter, means providing for communication between said radially outward and offset gas passage portions, said gas valve and its associated gas passage portion being disposed radially inwardly of said radially offset passage portion, means providing for communication between said radially offset passage portion and the gas passage portion containing said gas valve, and means in said gas passage portion outwardly of said gas valve for sealing about said gas valve actuating element to maintain said liquid and gas passages segregated one from the other.

15. Apparatus according to claim 1 wherein one of said actuating elements includes a tubular member, the valve associated with said one actuating element including a valve seat and a valve sealing element, said tubular element being movable from said first position locating said valve seat and said valve-sealing element in sealing engagement one with the other into said second position locating said valve seat and said valve-sealing element in spaced relation one from the other to permit fluid communication through the associated passage.

16. Apparatus according to claim 12 wherein said gas valve is carried by said stem, means for biasing said stem to maintain the valve carried thereby in a normally closed position, said sealing means being operative to maintain the seal between said stem and said body in both the open and closed positions of said gas valve.

17. Apparatus according to claim 1 together with a coupler unit having liquid and gas passages therethrough, one of said passages terminating adjacent the inner end of said coupler in a tubular probe receivable within said central opening, means for releasably securing said coupler unit to said keg adapter with said tubular probe being receivable in said central opening in said adapter body for moving said actuating elements from said first to said second position.

18. Apparatus according to claim 17 wherein one of said actuating elements includes a tubular member, the valve associated with said one actuating element including a valve seat and a valve-sealing element, said tubular element being movable from said first position locating said valve seat and said valve-sealing element in sealing engagement one with the other into said second locating second position locating said valve seat and said valve-sealing element in spaced relation one from the other in response to insertion of said probe within said central opening to permit fluid communication between said tubular probe and the keg through said tubular element.

* * * * *

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,632,023 Dated January 4, 1972

Inventor(s) Mack S. Johnston

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In Column 1, line 20, "Pat. No. 3,439,884" should read --Pat. No. 3,439,844--; in line 29, "a" should read --as--.

In Column 2, line 43, "equality" should read --quality--.

In Column 3, line 9, "coupling" should read --uncoupling--.

In Column 4, line 27, "a" should read --an--; in line 29, "and" should read --end--; line 54, "a" should read --an--; line 57, "74 and a least" should read --47 and at least--; line 57, "form" should read --from--.

In Column 5, line 48, "entire reel" should read --entirety--; line 55, "tub" should read --tube--.

In Column 6, line 5, "a enlarged" should read --an enlarged--; line 63, "an" should read --a--.

In Column 7, line 14, "are" should read --arm--; line 21, "secure" should read --secured--; line 26, "IT" should read --It--; line 51, "lien" should read --line--; line 72, "pressure" should read --passage--.

In Column 8, line 39, "leg" should read --keg--.

In Col. 9, line 50, Claim 7, "said position, said" should read --said--.

In Col. 11, line 26, Claim 12, "outside" should read --outside to the inside--; same line, "sad" should read --said--.

In Col.12, line 7, Claim 14, "passage portion" should read --passage--; line 41, Claim 18, "second locating second" should read --second--.

Signed and sealed this 5th day of December 1972.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents

FORM PO-1050 (10-69)

USCOMM-DC 60376-P69
* U.S. GOVERNMENT PRINTING OFFICE : 1969 O—366-334