

[54] KEG TAPPING DEVICE

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Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 155,231, June 21, 1971, which is a continuation of Ser. Nos. 851,008, Aug. 18, 1969, and Ser. No. 864,448, Oct. 7, 1969, which is a continuation-in-part of Ser. No. 851,008, Aug. 18, 1969, which is a continuation-in-part of Ser. No. 783,484, Dec. 13, 1968, Pat. No. 3,550,818, which is a continuation-in-part of Ser. No. 773,406, Nov. 5, 1968, abandoned, which is a continuation-in-part of Ser. No. 676,291, Oct. 18, 1967, abandoned, which is a continuation-in-part of Ser. No. 611,610, Jan. 25, 1967, Pat. No. 3,410,458, which is a continuation-in-part of Ser. No. 587,627, Oct. 18, 1966, Pat. No. 3,422,448, which is a continuation of Ser. No. 406,682, Oct. 27, 1964, abandoned, which is a continuation-in-part of Ser. No. 395,084, Sept. 8, 1964, Pat. No. 3,231,154, and Ser. No. 150,982, Nov. 8, 1961, abandoned, said Ser. No. 395,084, is a continuation of Ser. No. 150,982.

[52] U.S. Cl. 222/400.7; 137/212

[51] Int. Cl. B65d 83/00

[58] Field of Search 222/400.7; 137/212, 322

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[57] ABSTRACT

In one form hereof, there is disclosed a keg adapter having a siphon body formed of bar stock receivable through the opening of a keg from without the keg. The siphon body has liquid and gas passages extending longitudinally of the keg adapter terminating at their upper ends in a pair of bores disposed eccentrically of the central axis of the keg adapter. In another form, there is disclosed a keg adapter having a siphon body formed primarily of tubular stock with tubular members receivable through the opening of a keg from without the keg. The tubular members per se comprise liquid and gas passages terminating at their upper ends in a pair of openings disposed eccentrically of the central axis of the keg adapter and opening through a flange member formed of bar stock. A coupler unit, having a pair of depending probes, is engageable with either form of the keg adapter with the probes being receivable in the bore holes or tubes as applicable to form a continuation of the liquid and gas passages. A sleeve is provided in the liquid passage of both adapters for opening a normally closed liquid valve therein. A gas valve is axially spaced from the liquid valve and in both forms includes a gas check valve comprising a flexible envelope having a slit and which envelope lies in communication with the gas passage. In the one form, the gas valve also includes a spring-biased valve plate mounting an O-ring sealing about the walls of the gas passage. The tips of the probes on the coupler unit in the one form depress the associated valve members to open the valves and permit ingress of gas through the coupler unit and keg adapter into the keg and egress of liquid from the keg through the keg adapter and coupler unit. In the other form, the tip of the liquid probe on the coupler depresses the sleeve to open the liquid valve whereby air flows through the coupler into the keg past the check valve of the adapter and beer flows outwardly from the keg through the adapter and coupler.

49 Claims, 21 Drawing Figures

FIG 1

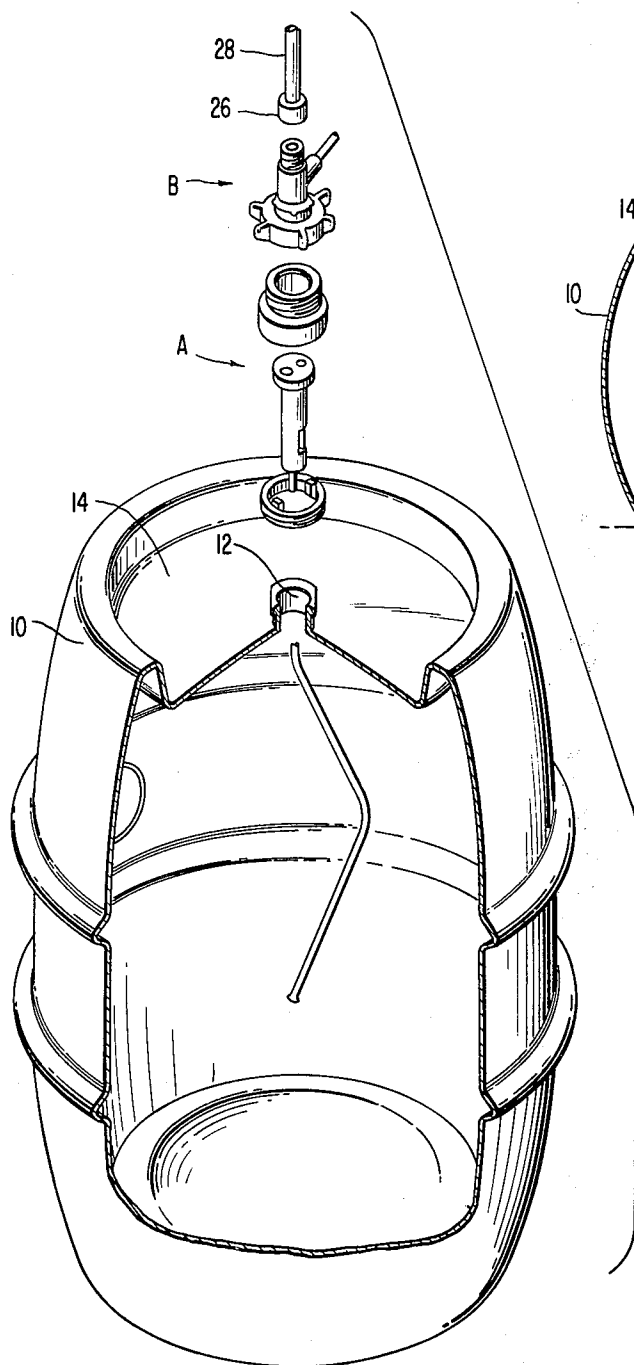
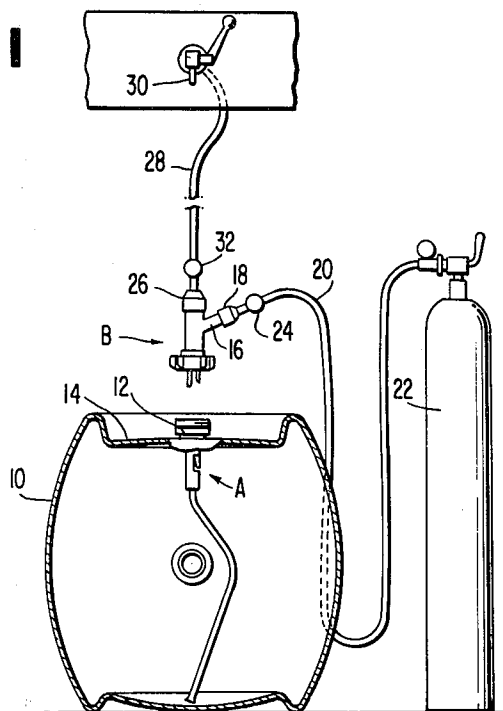


FIG 2

FIG. 5

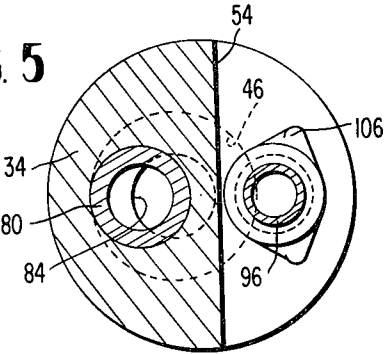


FIG. 3

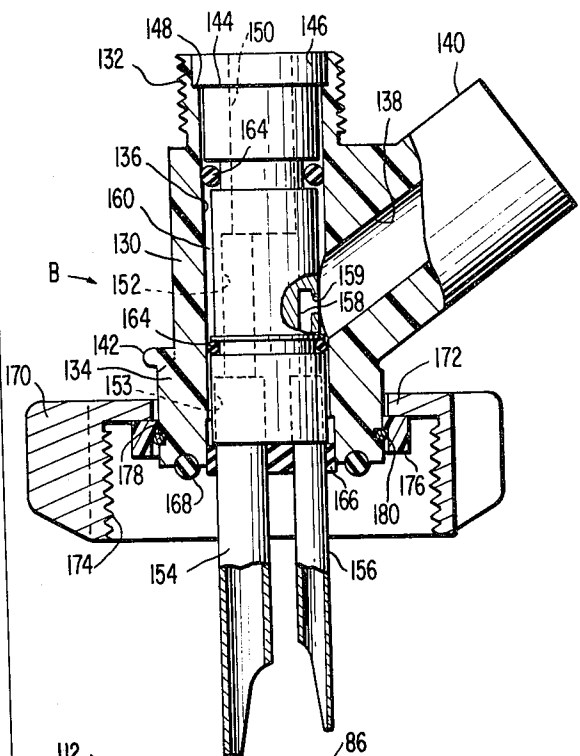
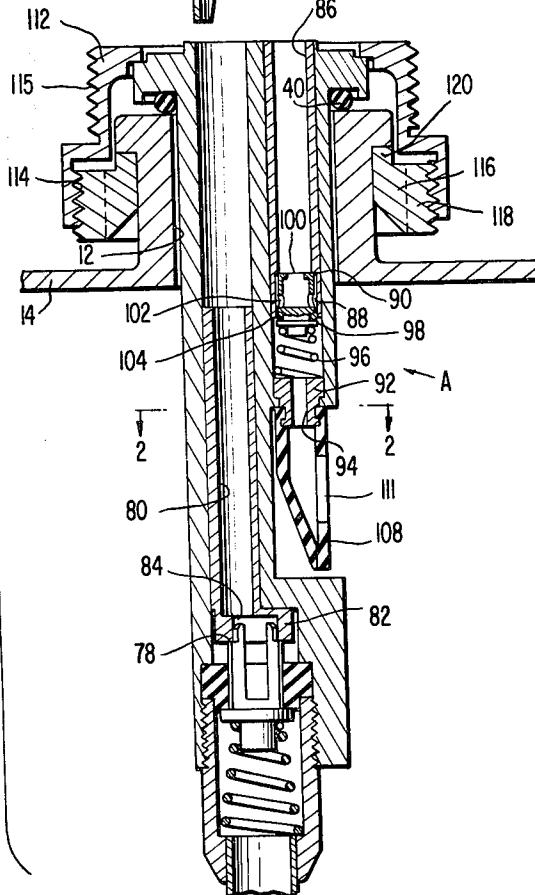
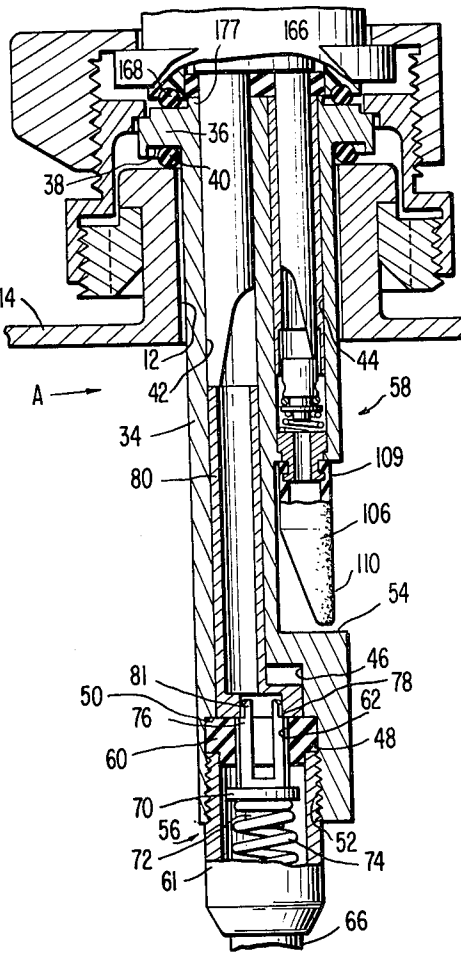


FIG. 4



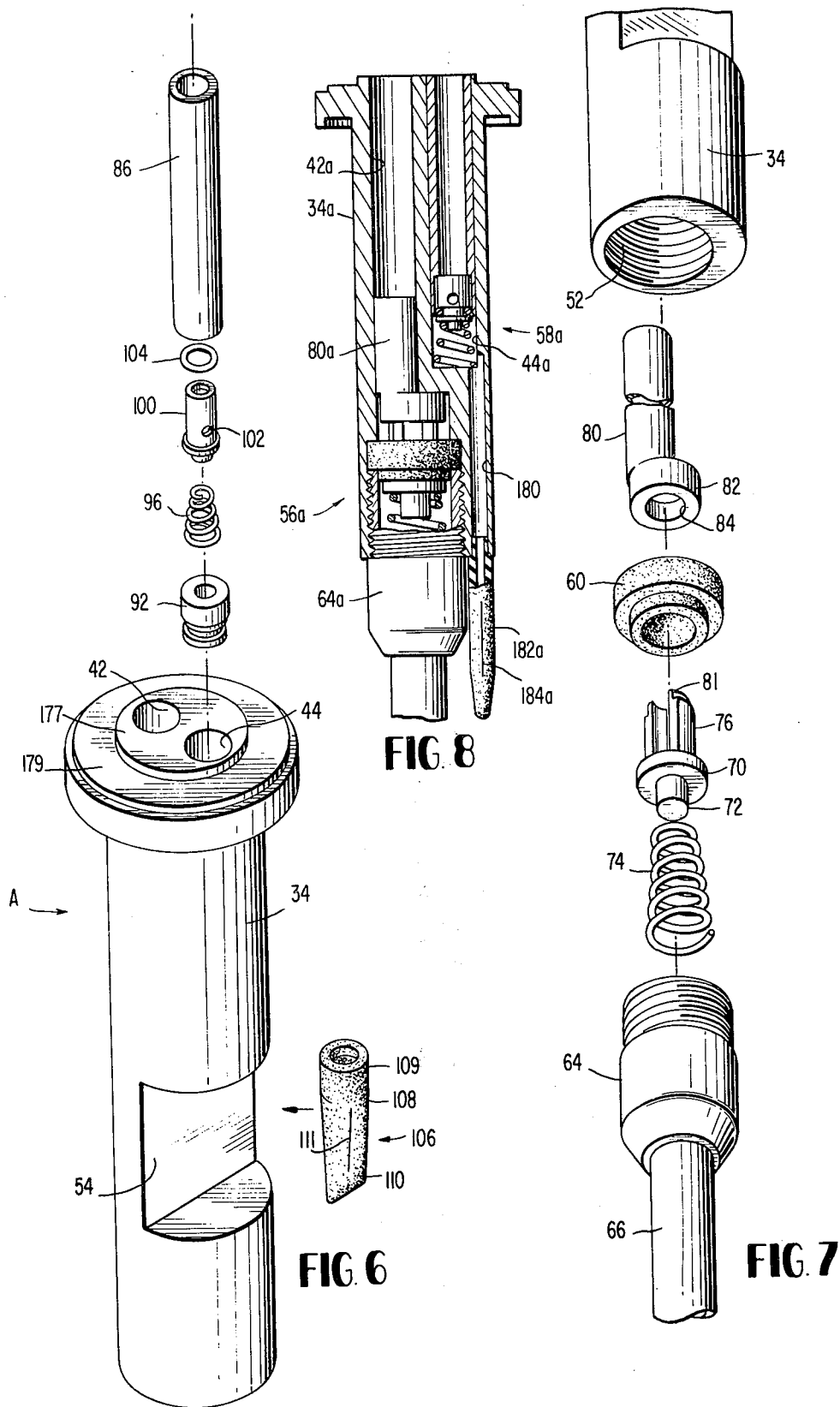


FIG. 9

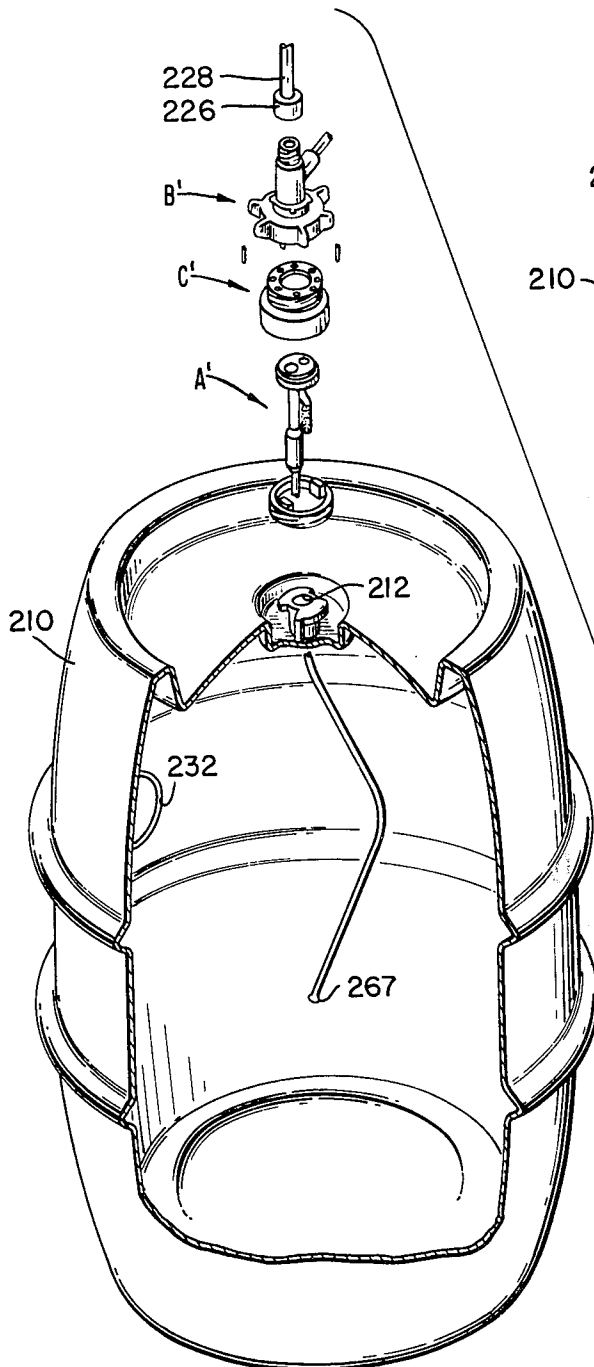
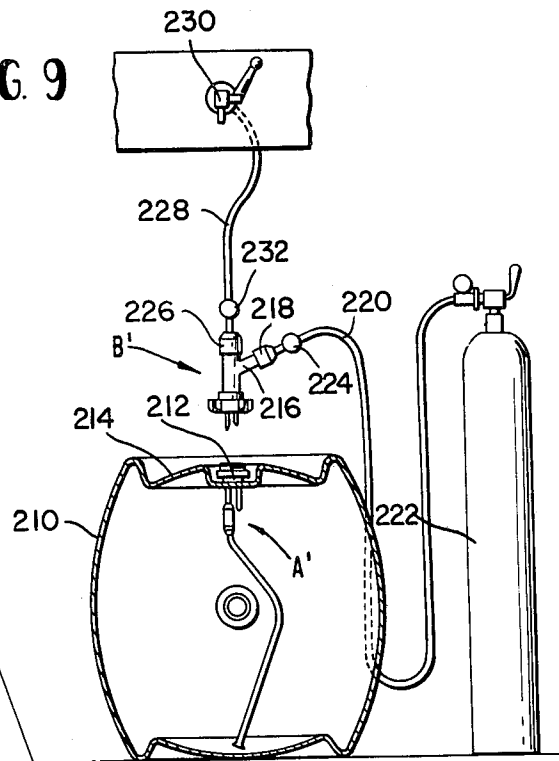
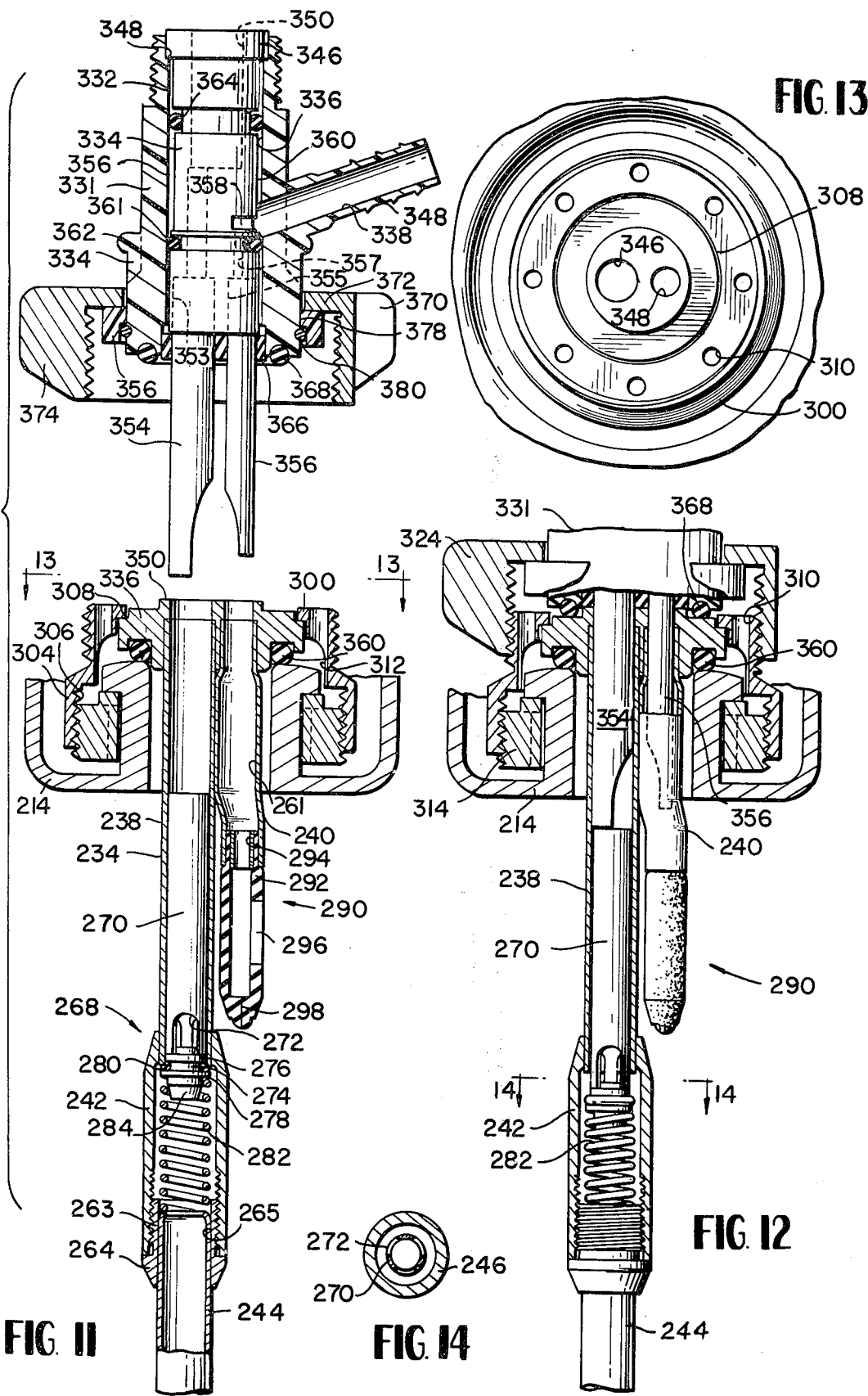


FIG. 10



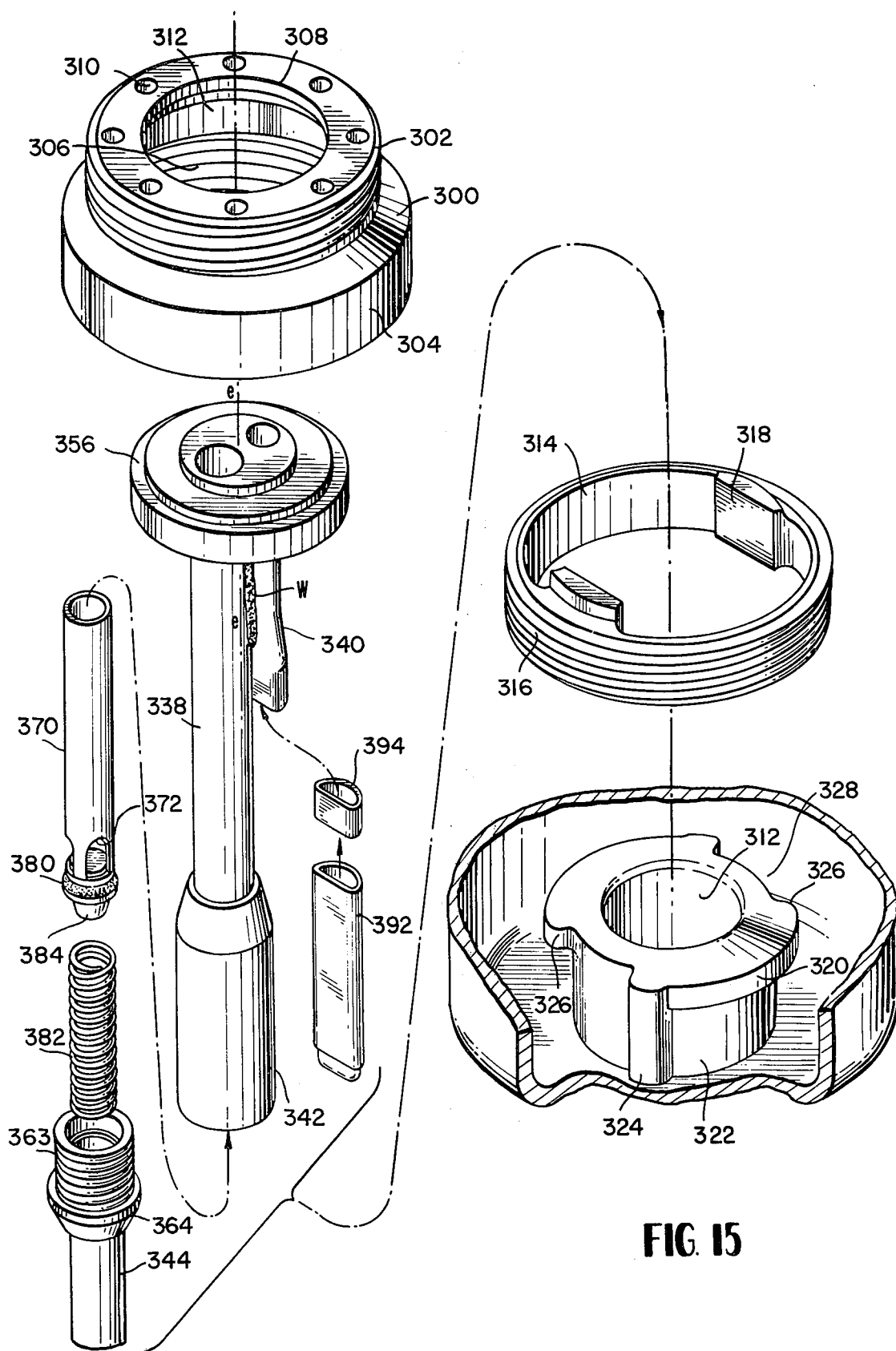
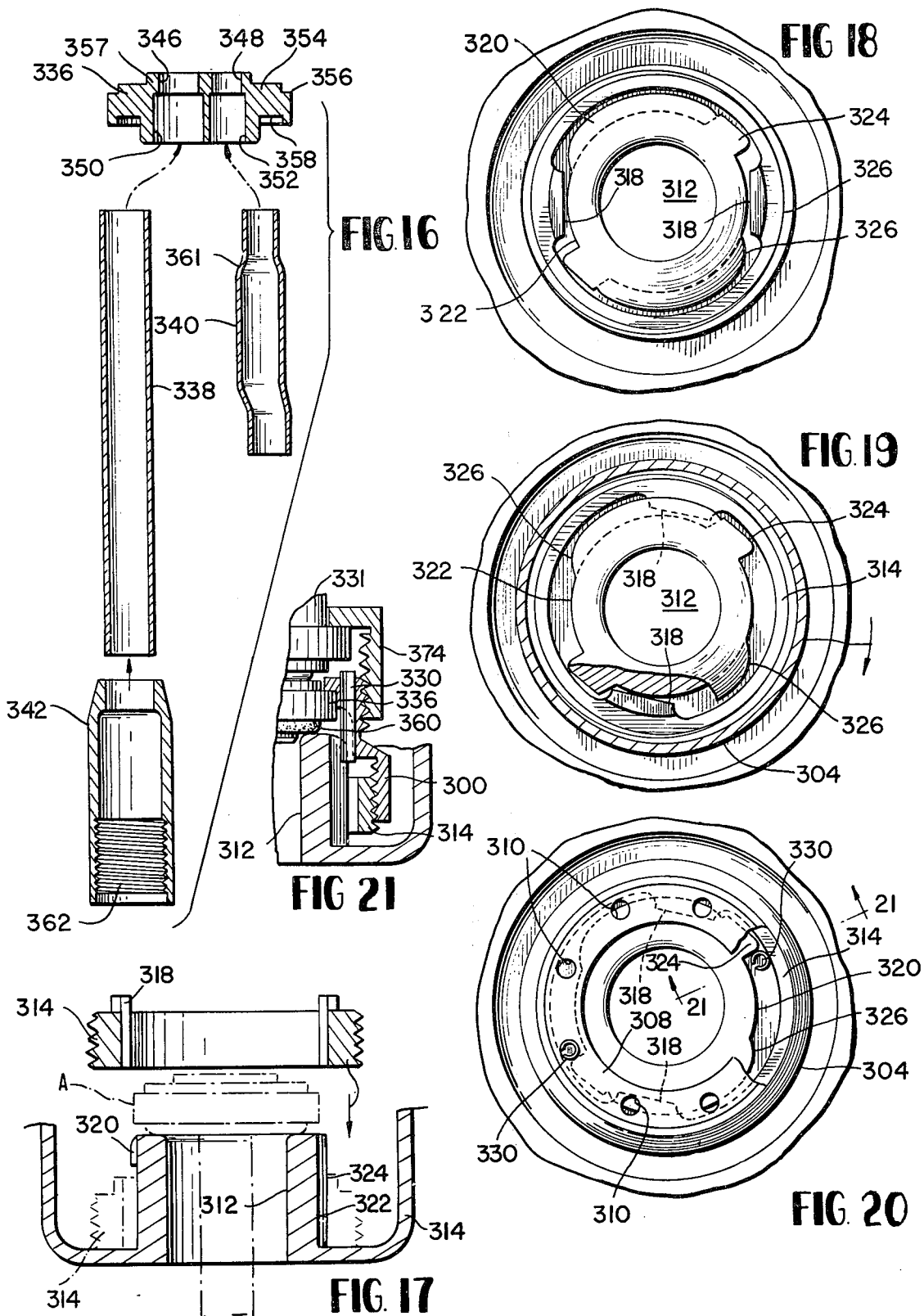


FIG. 15



KEG TAPPING DEVICE

This application is a continuation in part of copending application Ser. No. 155,231 filed June 21, 1971 as a continuation of application Ser. No. 851,008 filed Aug. 18, 1969 for KEG TAPPING DEVICE, and also of copending application Ser. No. 864,448 filed Oct. 7, 1969 for KEG TAPPING DEVICE as a continuation-in-part of copending application Ser. No. 851,008 filed Aug. 18, 1969 for KEG TAPPING DEVICE, application Ser. No. 851,008 being, in turn, a continuation-in-part of copending application Ser. No. 783,484 filed Dec. 13, 1968 for KEG TAPPING DEVICE, now U.S. Pat. No. 3,550,818 dated Dec. 29, 1970; said application Ser. No. 783,484 being, in turn, a continuation-in-part of copending application Ser. No. 773,406 filed Nov. 5, 1968 for KEG TAPPING DEVICE (now abandoned in favor of continuing application Ser. No. 7393 filed Mar. 26, 1969 which is now also abandoned); said application Ser. No. 773,406 being, in turn, a continuation-in-part of copending application Ser. No. 676,291 filed Oct. 18, 1967, and abandoned in favor of application Ser. No. 814,883 filed Mar. 26, 1969 as a continuation of said application Ser. No. 676,291, and now U.S. Pat. No. 3,563,424 issued Feb. 16, 1971; said application Ser. No. 676,291 being, in turn, a continuation-in-part of copending application Ser. No. 611,610 (issued Nov. 12, 1968 as U.S. Pat. No. 3,410,458) filed Jan. 25, 1967 for BEER TAPPING DEVICE; said application Ser. No. 611,610 being, in turn, a continuation-in-part of application Ser. No. 587,627, (issued Jan. 14, 1969 as U.S. Pat. No. 3,422,448) filed Oct. 18, 1966, for TAPPING DEVICE FOR BEER KEGS AND THE LIKE, which application Ser. No. 587,627 is a continuation of application Ser. No. 406,682 (now abandoned), filed Oct. 27, 1964, for SIPHON DEVICE FOR BEER KEGS AND THE LIKE; said application Ser. No. 406,682 being, in turn, a continuation-in-part of application Ser. No. 395,084 (issued Jan. 25, 1966 as U.S. Pat. No. 3,231,154), filed Sept. 8, 1964, for SIPHON DEVICE FOR BEER KEGS AND THE LIKE, and application Ser. No. 150,982 (now abandoned), filed Nov. 8, 1961 for SIPHON DEVICE FOR BEER KEGS AND THE LIKE; 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 and improved tapping apparatus for drawing liquids, such as beer, from containers, such as beer kegs or barrels, using a gas to drive the liquid from the container. In particular, the present invention relates to an improved tapping device usable with conventional beer kegs and comprising two forms of an improved keg adapter for sealing the liquid and gas passages therethrough, a novel and improved coupler unit for use with the keg adapter to dispense the beer from the keg at the beer dispensing establishment, and a novel and improved assemblage for locking the keg adapter in final securement within the keg opening.

Prevailing practice in the beer industry is for a brewery to provide draft beer to retail outlets in conventional kegs having $\frac{3}{4}$ inch tapping openings in their top walls, the openings being closed with a bung in the form of a cork or plug. To dispense the beer from the keg, the bartender taps the keg by knocking in the bung and inserting an elongated tap rod with an associated siphon device for drawing the beer from the keg, these being fastened to the keg by means of a bayonet or like

connection. The siphon device includes means for injecting compressed air or CO₂ through the tap rod into the keg to drive the beer up through the siphon. When the beer has been fully withdrawn from the keg, the bartender removes the tap and siphon device from the keg and installs the latter in a fresh keg, repeating the process for additional kegs.

This common practice in the tapping of beer kegs has been revolutionized by the use of what are now termed "keg adapters" and "coupler units." Generally, these devices comprise a keg adapter having discrete liquid and gas passages for respectively permitting egress of liquid from the keg and ingress of gas into the keg to drive the liquid from the keg. Liquid and gas valves are normally disposed in the respective liquid and gas passages, precluding outflow of beer through either passage prior to tapping. Coupler units are provided at the beer dispensing establishments and are connected to the keg adapters when the keg is to be tapped. Various devices, including devices carried by the coupler unit, are provided for opening the liquid and gas valves for the purposes stated.

One form of a prior tapping device provides a keg adapter having a pair of liquid and gas passages extending therethrough with the respective outer portions of said passages defining longitudinally extending bore openings extending eccentrically relative to the axis of the keg adapter. Spring loaded liquid and gas valves are disposed in an inner portion of the keg adapter normally sealing the respective passages. To install this keg adapter, the adapter is inserted through the filling opening in the side of the keg and inserted upwardly from within the keg into the opening in the top wall of the keg. The lower portion of the keg adapter body is transversely enlarged and seats against the margin of the keg about the keg opening. The upper portion of the keg adapter body is threaded and receives a nut whereby the body is clamped in the keg opening. A coupler unit is provided for use with this keg adapter and includes a pair of liquid and gas passages terminating at the lower end of the coupler unit in a pair of depending probes receivable within the respective bore openings formed in the outer portion of the keg adapter body. The liquid and gas passages of the coupler unit are adapted for respective connection to a beer tapping faucet and a source of compressed gas. Upon securing the coupler unit to the keg adapter, the probe is received within the bore openings to displace the valve seats against the bias of their associated springs to open the normally closed liquid and gas valves, permitting ingress of gas into the keg and egress of beer through the communicating liquid passages of the keg adapter and coupler unit to the dispensing faucet.

An important consideration of this type of tapping device as well as other types is that beer 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 liquid flow path from the keg to the faucet 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 go flat and become wild. It must also be recalled that most kegs or barrels in use in the United States at the present time have a $\frac{3}{4}$ inch beer dispensing opening through their top walls and are designed to have a tapping unit connected to the keg by means of a bayonet type joint. Thus, any successful tap-

ping device must be adapted for use with this small, $\frac{3}{4}$ inch opening and with the foregoing means of attachment to the kegs. For proper operation of the liquid and gas valves in the adapter body of the previously described device, such valves require a substantial spring force and a cross-sectional area of the valve seats and associated valve housing larger than the cross-sectional areas of the liquid and gas passages per se. The valves have thus been laterally offset from the respective bore openings in the keg adapter with the consequence that the semi-cylindrical offset lower end of the liquid probe engages the central portion of the valve to open the latter. Accordingly, when the liquid valve is open, the passage through the valve seat and into the bore is restricted to an area less than the cross-sectional area of the liquid passage through the probe. Dispensing flat and wild beer from a keg employing the foregoing tapping device is thus not an uncommon experience.

Moreover, the foregoing described tapping device is somewhat difficult to install. The usual manner of installation is to insert the keg adapter through the side wall of the keg holding it by the siphon probe which extends to the bottom of the keg when finally installed. By manipulating this probe from the side opening, the upper portion of the keg adapter can be inserted through the top wall keg opening with its enlarged inner body portion seating against the interior wall of the keg about the keg opening.

Furthermore, and with respect to the foregoing described tapping device, a threaded nut screws down about the upper portion of the keg adapter to clamp it within the keg opening. The coupler also threads about the nut in the same direction to secure the coupler to the adapter. As sometimes occurs, unthreading the coupler from the adapter nut causes the nut to unthread from the adapter body thereby loosening the adapter permitting it to be removed from the keg opening. If the adapter is loose and not sealed about the keg opening, the keg cannot be effectively filled at the brewery without remedial measures being taken.

The present invention provides novel, improved beer tapping devices which minimize the above discussed and other shortcomings of prior beer tapping devices and provide various advantages in manufacture, construction, mode of operation and result over such prior devices. Generally, and in one form of the present invention, this is accomplished by providing a beer tapping device comprised of a keg adapter having a cylindrical body receivable within the keg opening from without the keg and a radially outwardly directed flange adjacent its outer end for seating on the flange about the keg opening. A ring having an internally threaded lower skirt portion engages over the flange on the keg adapter body and a second externally threaded ring lies in threaded engagement with the first mentioned ring and below the keg flange, whereby the adapter body is clamped within the keg opening.

The adapter body is provided with generally axially extending liquid and gas passages which open through the upper end of the adapter body in a pair of side-by-side eccentrically extending bore holes. A coupler unit having liquid and gas passages terminating in respective downwardly extending probes is releasably secured to the keg adapter with the bore openings of the latter receiving the respective probes of the coupler unit whereby gas is permitted to flow into the keg through the communicating coupler unit-keg adapter gas pas-

sages to drive beer from the keg through the communicating coupler unit-keg adapter liquid passages to the faucet. In order to provide substantially non-contorted flow passages through the keg adapter body and to provide valves in the keg adapter body having sufficient strength to maintain the valves in a normally closed position while simultaneously occupying a minimum of space in the open position thereby not restricting the flow passages, and further to provide such valves in a cylindrical body receivable in the keg opening from without the keg, the liquid and gas valves in the keg adapter body are axially offset one from the other with the liquid valve being radially inset from the liquid passage through the adapter body adjacent its inner end. Particularly, the laterally offset liquid bore extends inwardly beyond the inner end of the gas bore and terminates in a cylindrical recess in the inner end of the adapter body which recess is radially inset from the axis of the liquid bore. An annular valve seat is provided in the upper portion of this recess and a valve plate, having a bifurcated stem extending through the opening in the valve seat, is spring-biased against the seat to maintain a normally closed position. A metal siphon tube threads into the recess and, when the keg adapter is finally installed in the keg, extends to adjacent the bottom of the keg to drain the latter. An axially movable sleeve is located in the liquid passage and terminates at its inner end in a radially inwardly offset foot portion which seats on the upper end of the bifurcated valve stem. Thus, when the coupler unit is releasably secured to the keg adapter, the liquid probe extends within the liquid passage and engages the upper end of the sleeve to depress the latter longitudinally in the liquid passage thereby to displace the valve plate inwardly from the valve seat. Thus, a substantially non-contorted large liquid passage is provided through the keg adapter permitting delivery of beer from the keg through the siphon tube and recess, past the valve plate, bifurcated stem and into the sleeve and liquid bore and into the probe of the coupler unit for ultimate delivery to a dispensing faucet.

To provide a gas valve and a gas check valve wholly within the cylindrical confines of the adapter body, such that the latter is receivable through the keg opening from without the keg, the gas valve is located within the keg along the adapter body intermediate the liquid valve and the adapter flange. The gas valve comprises a poppet-type valve having a spring-biased plate carrying an O-ring for sealing about the walls of the gas passage. Thus, when the coupler unit is applied to the keg adapter, the gas probe engages the poppet valve and displaces the latter against the bias of its spring to locate the O-ring seal in an enlarged diameter chamber, whereby the gas flows from the probe past the O-ring seal and the walls of the chamber into a gas check valve. The gas check valve comprises a flexible envelope in communication with the gas passage below the gas valve and has a slit through its wall for permitting passage of gas from the gas passage into the keg and preventing passage of gas and liquid from the keg into the gas passage. The flexible envelope lies in a cutout portion of the cylindrical adapter body and is particularly formed to lie wholly within the cylindrical confines of the latter. By the foregoing construction, the keg adapter can be inserted within the keg opening from without the keg with the adapter flange resting on the flange about the keg opening. The flange is then se-

cured in the keg by a double ring assembly cooperable with the keg flange, and it will thus be appreciated that this entire installation is accomplished from outside the keg and without manipulation of the keg adapter.

It will be appreciated that the foregoing described tapping device of this invention, as well as the prior art tapping device previously described, are formed of bar stock, particularly stainless steel. These devices are accordingly somewhat costly to manufacture, not only from the standpoint of the high cost of the initial bar stock material, but also because the devices must be extensively machined to the required configuration. Thus, the manufacturing costs of this device are considerable.

Accordingly, the present invention, in another form hereof, also provides a novel and improved beer tapping device providing various adaptages in manufacture, construction, mode of operation and result and which device constitutes a significant advance in the economics of manufacturing keg tapping units of the type discussed previously. Generally, this is accomplished by providing a beer tapping device comprised of a novel keg adapter having a body, formed primarily of low cost tubular stock, receivable within the keg opening from without the keg and a radially outwardly directed flange adjacent its outer end for seating on the flange about the keg opening. Furthermore, the present invention also provides a novel unique locking assemblage for semipermanently securing a keg adapter within the keg opening and particularly the keg adapters of the present invention.

The keg adapter body in this form of the invention is particularly of simple and economical construction and includes a pair of elongated discrete tubular members or tubes which provide at least in part the liquid and gas passages through the adapter body portion. The upper or outer ends of the tubes are preferably brazed into and open through an outer flange. The outer portions of the tubes form a pair of side-by-side openings or passages through the upper or outer end of the adapter. These passages extend parallel to but offset from the central axis of the adapter and are adapted to receive the probes of the aforescribed coupler unit attachable to the keg adapter at the beer dispensing establishment. As in the previously described embodiment of the keg adapter of this invention, the coupler unit is releasably secured to this latter described keg adapter with the openings of the latter receiving the respective probes of the coupler unit whereby gas is permitted to flow into the keg through the communicating coupler unit-keg adapter gas passages to drive beer from the keg through the communicating coupler unit-keg adapter liquid passages to the faucet.

The keg adapter of this embodiment is readily, easily and inexpensively fabricated and this constitutes a major feature of the present invention. To this end, the keg adapter is fabricated primarily from readily available low cost metal tubular stock whereby the cost of the keg adapter is drastically reduced in comparison with the previously described keg adapters. It will be readily acknowledged by those familiar with this art that bar stock, particularly stainless steel bar stock, is expensive. A keg adapter, when manufactured primarily from such stainless steel bar stock, is a relatively expensive manufacture with a substantial portion of the cost being attributable to the cost of the bar stock and the machining operations necessary to form the bar

stock to the desired configuration. In accordance with the present invention, a very limited quantity of bar stock is employed in the manufacture of the keg adapter hereof, with the majority of the parts comprising the keg adapter being formed of considerably less expensive and more readily available tubular stock, whereby the overall cost of the present keg adapter is substantially reduced. Moreover, the present keg adapter, the main body of which is formed of substantially tubular stock, has more than adequate strength to carry anticipated loads and stresses during handling and particularly when semipermanently installed within the keg. Specifically, the tubular parts of the present keg adapter form the side-by-side liquid and gas passages which when assembled are secured one to the other along their side edges as to mutually reinforce one another for a portion of the length of the adapter body. The overall strength of the keg adapter is thus substantial. In order to provide substantially non-contorted flow passages through the keg adapter body and to provide valves in the keg adapter body having sufficient strength to maintain the valves in a normally closed position while simultaneously occupying a minimum of space in the open position thereby not restricting the flow passages, and further to provide such valves in an adapter body portion receivable in the keg opening from without the keg and also within a body portion formed primarily of members formed from tubular bar stock as previously described, the liquid and gas valves in the keg adapter body are axially offset one from the other. Particularly, the laterally offset liquid passage extends inwardly beyond the inner end of the tubular gas bore and terminates in an enlarged tubular housing for the liquid valve. An annular valve seat is provided in this housing and constitutes the lower end of the tube extending from the flange to the housing. An axially movable sleeve is located in the tubular liquid passage and carries a valve body at its inner end which is maintained in sealing relation about the valve seat by a spring located within the housing. The lower end of the housing is coupled to the upper end of a siphon tube which extends to the keg bottom. Thus, when the coupler unit is releasably secured to the keg adapter, the liquid probe extends within the liquid tube and engages the upper end of the sleeve to depress the latter and the valve carried thereby to displace the latter inwardly from the valve seat. Thus, a substantially non-contorted large liquid passage is provided through the keg adapter similarly as in the previously described embodiment permitting delivery of beer from the keg through the siphon tube, housing and sleeve into the probe of the coupler unit for ultimate delivery to a dispensing faucet.

To provide a gas check valve wholly within the cylindrical confines of the adapter body of this embodiment, such that the latter is receivable through the keg opening from without the keg, the gas valve is located within the keg along the adapter body at the inner end of the gas tube which is axially spaced above the enlarged housing of the liquid passage. Particularly, the gas check valve comprises a flexible envelope in communication with the gas tube at its inner end and has a slid through its wall for permitting passage of gas from the gas passage into the keg and preventing passage of gas and liquid from the keg into the gas passage. By the foregoing construction, the keg adapter can be inserted within the keg opening from without the keg with the

adapter flange resting on the flange about the keg opening.

The foregoing described keg adapters as well as other keg adapters of similar types may be secured in the keg by a double ring assembly cooperable with the keg flange, and it will thus be appreciated that this entire installation is accomplished from outside the keg and without manipulation of the keg adapter. It will be further appreciated that the keg adapter hereof as well as similar types of keg adapters are secured within conventional three-quarter inch keg openings. Particularly, the keg opening comprises an upstanding cylindrical neck having a pair of laterally projecting interrupted flanges. Directly opposed ends of the flanges have lugs which project outwardly along the full axial extent of the keg neck. To secure either of the keg adapters within the keg opening from without the keg, an externally threaded inner locking ring is provided and has a pair of inwardly and upwardly projecting diametrically opposed lugs receivable, when the ring is inserted about the keg neck, within the slots between the interrupted flanges about the keg neck. An externally threaded collar, having an inwardly directed flange about its upper end for engagement over the keg adapter flange, has an internally threaded depending skirt portion for threaded engagement about the inner ring. Thus, when the keg adapter has been inserted through the keg opening from without the keg, the locking ring is slipped past the adapter flange and about the keg neck with the lugs on the locking ring slipping through the slots formed by the interrupted keg flanges. The collar is then disposed over the adapter flange and threaded about the locking ring. Initial threading action of the collar about the locking ring, rotates the latter such that its lugs are disposed below the keg flanges. Further threading action of the collar about the locking ring draws the latter upwardly such that the lugs engage the keg flanges. Tightening the collar about the ring thus clamps the keg adapter flange about the marginal portions of the keg neck about the keg opening to secure the adapter in place.

To preclude rotation of the collar and hence loosening of the adapter in the keg opening, as for example, when the coupler unit is removed from the keg adapter, the collar has a plurality of openings spaced about its outer flange. When the collar is secured to the keg, a pair of split cylindrical pins are inserted through the collar openings which are aligned with the slots between the keg neck flanges. The pins are driven to lie flush with the collar flange. In this fashion, the lower ends of the pins engage between the interrupted keg flanges such that attempted rotation of the collar in either direction causes the pins to butt opposite ends of the interrupted keg neck flanges. Should it be necessary to remove the keg adapter from the keg opening, the pins can be driven downwardly through the collar openings toward the keg wall about the keg opening for reception in the space between the locking ring and the keg neck. In this manner, the collar is free to rotate and the keg adapter can then be unclamped from the keg opening.

The present invention further provides an improved coupler for use with the keg adapter hereof and includes an annular head and a stem releasably mounted within the annular head. The two probes receivable in either of the foregoing described keg adapters are carried by the stem. The stem carries a pair of axially

spaced sealing rings engaging the interior walls of the head whereby an annular space is provided therebetween. The head includes a laterally extending nipple for receiving a coupling whereby gas may flow into the annular passage. A lateral bore is provided in the stem and communicates between the annular passage and upper end portion of the gas probe.

Accordingly, it is a primary object of the present invention to provide a novel, improved tapping device for beer kegs and the like.

It is another object of the present invention to provide an improved tapping device for beer kegs and the like having a keg adapter of the type having discrete side-by-side liquid and gas passages and valves in each of the passages lying wholly within the cylindrical confines of the adapter body.

It is a related object of the present invention to provide a novel and improved tapping device for beer kegs and the like including a keg adapter having a cylindrical body receivable within the keg opening from without the keg and side-by-side liquid and gas passages having axially spaced valves.

It is a further related object of the present invention to provide a novel and improved tapping device for beer kegs and the like including a keg adapter formed primarily from tubular stock.

It is a further object of the present invention to provide an improved beer tapping device for beer kegs and the like which is of substantially all metal construction.

It is a still further object of the present invention to provide an improved beer tapping device for beer kegs and the like including a keg adapter which can be readily and easily manufactured at low cost.

It is an even further related object of the present invention to provide an improved beer tapping device for beer kegs and the like having a novel, unique locking assemblage for securing the keg adapter within the keg opening.

It is a further object of the present invention to provide an improved beer tapping device for beer kegs and the like having a novel, improved coupler unit of the type mounting two probes for reception in the respective liquid and gas passages of the keg adapter and which is readily and easily releasably secured to the keg adapter.

These and further objects and advantages of the present invention will become more apparent upon reference to the following specification, claims, and appended 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. 2 is an enlarged perspective view of a beer keg with parts broken out for ease of illustration and with the keg adapter and coupler unit herein in exploded juxtaposition;

FIG. 3 is a vertical cross-sectional view of the keg adapter and coupler therefor prior to assembly with the keg adapter being illustrated in final securement within the keg opening;

FIG. 4 is a fragmentary vertical cross-sectional view of the keg adapter and coupler therefor in final securement one with the other and with the liquid and gas valves in the keg adapter in an open position;

FIG. 5 is a cross-sectional view thereof taken about on lines 5—5 in FIG. 3;

FIG. 6 is a perspective view of the keg adapter body with parts forming the gas passage and gas valve therefor illustrated in exploded juxtaposition;

FIG. 7 is a fragmentary perspective view of the lower end of the keg adapter body and the upper end of the siphon tube with the parts forming the liquid valve illustrated in exploded juxtaposition;

FIG. 8 is a side elevational view of another form of keg adapter hereof with parts broken out and in cross section for clarity;

FIG. 9 is a diagrammatic view of a beer keg and a tapping device therefor constructed in accordance with still another form of the present invention;

FIG. 10 is an enlarged perspective view of the beer keg of FIG. 9 with parts broken out for ease of illustration and with another form of keg adapter and coupler unit hereof in exploded juxtaposition;

FIG. 11 is a vertical cross-sectional view of the keg adapter and coupler therefor illustrated in FIG. 9 prior to assembly with the keg adapter being illustrated in final securement within the keg opening;

FIG. 12 is a fragmentary vertical cross-sectional view of the keg adapter and coupler therefor illustrated in FIG. 9 in final securement one with the other and with the liquid valve in the keg adapter in an open position;

FIG. 13 is a horizontal cross-sectional view taken about on line 13—13 in FIG. 11;

FIG. 14 is a horizontal cross-sectional view taken generally about on line 14—14 in FIG. 12;

FIG. 15 is a fragmentary perspective view of the keg adapter body of FIG. 9 and an assemblage for locking such keg adapter in the keg opening with the parts thereof illustrated in exploded juxtaposition;

FIG. 16 is a vertical cross-sectional view of the keg adapter body of FIG. 9 with the parts thereof in exploded juxtaposition;

FIG. 17 is a vertical cross-sectional view of the keg opening and a locking ring forming a part of the locking assemblage for securing a keg adapter in the opening;

FIG. 18 is a fragmentary view of the keg opening with the locking ring in an initial position about the keg neck;

FIG. 19 is a horizontal cross-sectional view of the keg neck illustrating the position of the locking ring after it has been turned clockwise into its final locking position;

FIG. 20 is a plan view of the keg opening with the collar of the locking assemblage in a final locked position securing the keg adapter in the keg opening; and

FIG. 21 is a fragmentary cross-sectional view thereof taken generally about on line 21—21 in FIG. 20.

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 adapter A of the present invention, 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 hereof may be readily connected with keg adapter A at the beer-dispensing establishment to form a complete tapping assembly as hereinafter amplified. Briefly, the 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 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. A suitable valve 32 may be provided in beer-dispensing hose 28 as desired for controlling the flow of beer from keg 10.

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 unit comprising the keg adapter A and the coupler B are conventional and do not comprise any part of the present invention.

Referring now to FIG. 2, the keg 10 is illustrated with a keg adapter A constructed in accordance with one form of the present invention, insertable through the keg opening 12 from without the keg. That is to say, the keg adapter A is fully receivable within the keg opening 12 from outside the keg and the keg adapter or any part thereof need not be manipulated from within the keg as by through a filling opening indicated at 32, in the side wall of the keg, as required by prior devices of this type. It will be appreciated that keg adapter A is adapted for semipermanent assembly within the keg opening at the brewery prior to filling the keg and functions to seal the keg during the time interval between filling and tapping with the coupler unit B being connected to the keg adapter A at the beer-dispensing establishment for withdrawing beer from the keg through the keg adapter under pressure provided by the gas source.

Keg adapter A comprises a cylindrical siphon body 34 having a diameter substantially conforming to the internal diameter of opening 12 through the upper keg wall 14 as to be receivable therethrough in a close-fitting relation. The upper end of siphon body 34 is provided with an outwardly extending stepped flange 36 having an annular recess 38 formed in its underface for receiving an O-ring seal 40. Seal 40 seals keg adapter A about keg opening 12 when the latter is finally secured therein as hereinafter amplified. Siphon body 34 is provided with a pair of liquid and gas passages including bores 42 and 44 which extend longitudinally and eccentrically of the central axis of siphon body 34 and open through the upper face thereof as seen in FIG. 6. The lower portion of bore 42 includes an enlarged diameter cylindrical chamber 46, the axis of which is inwardly offset from the axis of liquid bore 42 and outwardly offset from the central axis of siphon body 34. Chamber 46 further includes an enlarged lower diameter portion 48 forming an annular shoulder 50 with chamber 46, the portion 48 being internally threaded as at 52 adjacent the lower end of siphon body 34. The lower end of bore 44 terminates intermediate the ends of siphon body 34 in a cut-out 54 formed in the side of siphon body 34 as best seen in FIGS. 4 and 6.

Liquid and gas valves, generally indicated at 56 and 58, respectively, are provided in the liquid and gas passages 42 and 44. Particularly, the liquid valve 56 is similar in construction to the liquid valve disclosed in my previous application, Ser. No. 406,682, filed Oct. 27, 1964, which was abandoned in favor of co-pending application Ser. No. 587,627, filed Oct. 18, 1966, issued as U.S. Letters Pat. No. 3,422,448 on Jan. 14, 1969. The disclosure of this patent is incorporated herein by reference in its entirety. Specifically, valve 56 comprises a valve seat 60, comprised of a chuck washer, preferably formed of a plastic material, and having a central opening 62. Valve seat 60 seats against shoul-

der 50. The outer margin of the opposite annular face includes an annular shoulder portion against which the upper end of an externally threaded ferrule 64 bears whereby seat 60 is retained in enlarged diameter portion 28. The washer 60 has a stepped lower annular face. The lower end of the ferrule 64 receives the upper end of a siphon tube 66, the latter being arcuate in configuration and having a flared lower end indicated at 68 in FIGS. 1 and 2. Valve 56 further comprises a valve plate 70 having a lower depending stem 72 about which is received the upper end of a helical spring 74. The lower end of spring 74 seats against an internal shoulder, not shown, formed about the lower end of ferrule 64. Spring 74 biases valve plate 70 into sealing engagement against the lower stepped annular face of valve seat 60.

Valve plate 70 has a bifurcated stem 76 extending through the opening 62 of valve seat 60 with the upper end of stem 72 having shoulder portions indicated at 78. A sleeve 80 is slideably received within liquid bore 42 and includes a lower radially inwardly extending foot portion 82 received within chamber 46. Foot portion 82 is provided with a bore as at 84, the axis of bore 84 being disposed radially inwardly of the axis of sleeve 80. Bifurcated stem 78 includes a pair of fingers 81 extending within bore 84. In the untapped condition of the keg, that is, with the keg adapter A sealing about keg opening 12 as seen in FIG. 3, valve plate 70 is biased into a sealing position about valve seat 60 with the sleeve 80 being disposed in its uppermost position in bore 42. In this position, foot portion 82 seats on shoulder portions 78 with the fingers 81 being disposed within bore 81. The upper end of sleeve 80 terminates short of the upper face of siphon body 34 for reasons hereinafter amplified. It will be appreciated that movement of sleeve 80 inwardly toward the keg depresses valve plate 70 from sealing engagement about valve seat 60 whereby a fluid passage is obtained from the keg through the siphon tube 66 into ferrule 64, between the bifurcated valve stem into sleeve 80 and bore 42.

Referring now particularly to FIGS. 4 and 6, there is provided in the gas passage 44 a sleeve 86, the upper end of which lies flush with the upper end of the siphon body 34. Sleeve 86 terminates at its lower end in an enlarged diameter bore 88 defining a shoulder 90. Sleeve 86 is preferably bonded, as by an epoxy, within bore 44.

Disposed within the lower end of bore 44 and spaced inwardly from the lower end of sleeve 86 is a nipple 92. Nipple 92 is suitably secured within bore 44 as by an epoxy. Nipple 92 is centrally bored, as at 94, and its upper annular face provides a seat for the lower end of a helical spring 96. The upper end of spring 96 engages about the depending stem on a poppet type valve comprised of a valve plate 98 and an upwardly extending cylindrical portion 100. A plurality of radial openings 102 are spaced about the cylindrical portion 100. An O-ring seal 104 seats on the margin of valve plate 98 about cylindrical portion 100, and, in the valve closed position illustrated in FIG. 3, seals against the walls of the enlarged diameter bore 88. Also, in the gas valve closed position illustrated in FIG. 3, the upper end of cylindrical portion 100 seats against shoulder 90 and has a marginal portion which extends radially inwardly beyond the inner wall of sleeve 86.

A gas check valve 106 is provided within cut-out portion 54 of the siphon body 34 adjacent the lower end of the gas passage and comprises a flexible sleeve 108, preferably formed of silicon rubber (gum rubber and other plastic materials may also be employed), having a closed lower end and an open upper end. The sleeve 108 comprises a generally cylindrical upper portion 109 suitably sealed about the lower projecting end of nipple 92 and a tapering flattened lower portion 110. A longitudinally extending slit 111 is formed through the outer wall of the tapered portion 110 of check valve 108 and it will be appreciated that, when gas under pressure is transmitted through sleeve 86 and bore 88, past the open gas valve 58 into nipple 96 and check valve 106, the sides of slit 111 will open permitting the gas to flow outwardly into the keg. When the gas pressure within the keg is equal to or greater than the gas applied through keg adapter A, this external pressure maintains slit 111 closed precluding ingress of liquid from the keg through the slit into the gas passage of the keg adapter. It will be readily appreciated that additional slits may be provided and that a slit through the lower end wall can be formed. It will be further appreciated that the gas check valve 106 and gas valve 58 lie wholly within the cylindrical confines of siphon adapter body 34 whereby the same may be received through the keg opening 12 from without the keg.

To secure keg adapter A within keg opening 12, there is provided a novel, improved securing means described and illustrated in my U.S. Pat. No. 3,422,448, issued Jan. 14, 1969. Particularly, the securing means, as seen in FIGS. 3 and 4, includes a ring 112 which has its lower end spaced slightly above the top wall 14 of the keg and which is internally threaded as at 114 to receive an externally threaded ring 116. Ring 112 is also externally threaded as at 115. The ring 116 includes a thin wall section 118 which has inwardly and upwardly projecting diametrically opposite tabs 120 formed on its inner periphery. Also formed on the upper inner periphery of wall section 118 and spaced circumferentially from the tabs 120 are inwardly extending diametrically opposed abutments, not shown, for engagement with a pair of projections, also not shown, depending from the standard Peerless-type beer keg flange. Thus, after ring 116 is snapped over the keg flange, keg adapter A is inserted through the keg opening with the O-ring seal 40 finally seating on the annular upper surface of the keg flange. Ring 112 is then placed over the upper end of the flange portion 36 of adapter A and threaded down about the externally threaded portion of ring 116. In this fashion, ring 116 is drawn up within the lower inside portion of ring 112 until the upper ends of tabs 120 contact the undersides of the keg flanges. In this fashion, keg adapter A is locked within the keg opening with O-ring seal 40 providing a seal about keg opening 12 between the keg adapter and the keg flange.

Referring now to FIG. 3, coupler unit B comprises a cylindrical body 130 or annular head having an externally threaded reduced diameter upper end portion 132 and an enlarged diameter lower end portion 134. A bore 136 extends through body 130 and lies in communication with a laterally extending bore 138 formed in a nipple 140. Nipple 140 is adapted for connection with the gas conduit which connects at its opposite end with the source of gas or air under pressure. Body 130 also includes a plurality of outwardly projecting por-

tions 142 for reasons as will become apparent, and more fully described in my U.S. Letters Pat. No. 3,435,997, the disclosure of which is incorporated herein in its entirety by reference thereto. Body 130 is preferably formed of a plastic material but may be formed of other material as desired.

Received within bore 130 is a cylindrical sleeve 144 having an upper flange portion 146 which seats on an annular shoulder 148 formed in body 130. Sleeve 144 has a central passage 150 extending through its upper end portion and lying in communication with an intermediate axially offset passage 152. Sleeve 144 has an axially offset bore 153 opening through its lower end and into passage 152, bore 153 being adapted to receive the upper end of a depending cylindrical probe 154. A second bore is also axially offset from the central axis of sleeve 144 and receives the upper end of a depending gas probe 156. A gas passage 158 is formed in sleeve 144 and opens laterally, as at 158, through sleeve 144 to permit passage of gas or air through the bore 138 of nipple 140, into the annular passage 160, between the wall of bore 136 and sleeve 144, and into bore 158 and gas probe 156. A pair of O-ring seals 162 and 164 are carried about sleeve 144 on opposite sides of opening 159 and bore 138 whereby chamber 160 is sealed. An oval shaped seal 166 in plan view is provided about the lower end of sleeve 144 and about probes 154 and 156. An O-ring 168 is also provided about the annular face of body 130 at its lower end.

A knurled collar 170 is provided about enlarged body portion 134 and includes an inwardly extending flange 172 and an internally threaded depending portion 174. To retain collar 170 on coupler unit B, a ring 176 having an inwardly directed shoulder 178 is disposed about the lower end of body portion 134. A split circular wire 180 is carried within a suitable recess formed about the lower end of body portion 134 and projects outwardly as to engage below shoulder 178. In this fashion, collar 170 may be slipped about the lower end of body portion 134 with the ring 176 then being applied thereabout and the wire 180 being snapped into place. Thus, collar 170 is prevented from slipping off the coupler unit B by ring 176 and the lugs 142 and nipple 140.

To secure the coupler unit B to the keg adapter A and to thereby tap the keg, the probes 154 and 156 are inserted within the respective bore 42 and sleeve 86 and collar 170 is threaded down about the externally threaded portion 115 of ring 112. This draws coupler unit B downwardly into butting and sealing relation against siphon body 34 about the bore and sleeve openings. Particularly, seal 166 bears against the raised portion 177 of siphon body 34 about the bore 42 and sleeve 86. O-ring seal 168 bears against the annular stepped portion 179 of siphon body 34. As will be appreciated, when the coupler unit B is fully secured on the keg adapter A, the tip of probe 156 engages the upper marginal portion of poppet valve 58 to depress the latter against the bias of spring 96. Seal 104 is thereby displaced below sleeve 86 and within the larger diameter bore 44 whereby a gas passage is provided into the keg through the bore 138 in coupler unit B, passage 158, probe 156, the cylindrical portion 100 of poppet valve 58, bore 44, the bore 94 in nipple 92 and the slit 111 in gas check valve 106. Also, upon final securement of the coupler unit B to the keg adapter A, the tip of probe 154 engages the upper end of sleeve 180 to axially displace or depress the latter as well as

the bifurcated valve 70 against the bias of spring 74. In this manner, valve plate 70 is moved inwardly away from sealing engagement with chuck washer 60 thereby to provide a liquid passage from the keg through the siphon tube 66 and ferrule 64, past the open bifurcated valve about plate 70 and into the bore of sleeve 80 and probe 154 for delivery of fluid from the keg through the passages 152 and 150 in coupler unit B to a suitable coupling connected to a faucet, for example, the coupling 26 illustrated in FIG. 1.

Referring now to FIG. 8, there is illustrated a variation of the keg adapter previously described in which the siphon body 34a is reduced in length in comparison with the siphon body 34 of the previous form and in which the gas passage terminates adjacent the lower end of siphon body 34a. Particularly, the liquid valve 56a in and the configuration of the liquid passage through siphon body 34a as well as the location and operation of gas valve 58a are identical to the corresponding parts in the previous form with the exception that passage 42a and sleeve 80a are shortened in length a distance approximately equal to the length of the cut-out 54 in FIG. 6. The construction and operation of these parts are otherwise identical to the construction and operation of the corresponding parts as previously described and illustrated in connection with FIGS. 3-7.

To provide a gas passage terminating adjacent the lower end of siphon body 34a, an offset passage 180a is provided in the lower portion of siphon body 34a in communication with the lower end of gas bore 44. A gas check valve 182 is suitably secured on the lower end of siphon body 34a in communication with bore 180a. The gas check valve 182a comprises a flexible elongated flattened envelope having an open upper end of reduced diameter received and suitably sealed as by an epoxy within the lower end of bore 180. As in the previously described gas check valve 106, valve 182a is provided with a longitudinally extending elongated slit 184a to permit outflow of gas from passage 180a into the keg and to preclude ingress of liquid and gas from the keg into the gas passage. Preferably, a pair of slits 184a are provided on opposite sides of gas check valve 182. Note that, as in the previous form, the keg adapter illustrated in FIG. 8 is also receivable within the keg opening from without the keg. That is to say, all of the parts of the keg adapter lie wholly within the cylindrical confines of the cylindrical siphon body 34a.

It will thus be appreciated that a substantially all metal construction has been provided affording the advantages of a keg adapter compatible with a two-probe coupler unit but which eliminates installation and other problems associated with prior keg adapters useful with two-probe coupling units.

While the foregoing described keg adapter has proved satisfactory, it has been found that a similarly functioning keg adapter can be formed in an all metal construction but at substantially reduced costs. Particularly, it has been found that a similar type keg adapter can be formed primarily of tubular construction with limited use of bar stock which forms the primary material from which the previously described keg adapter is fabricated.

Referring now to FIG. 9, there is again illustrated a conventional beer keg 210 having an opening 212 in its top wall 214 which receives a keg adapter A' of tubular construction in accordance with the present invention, the adapter A' being semi-permanently installed in the

opening 212 of keg 210 at the brewery. A dispenser-coupler unit B' forming a part of the keg tapping device of this form may be readily connected to keg adapter A' at the beer-dispensing establishment similarly as previously described to form a complete tapping assembly as hereinafter amplified. As in the previous form, a coupler unit B' has a gas inlet port 216 adapted to receive a coupler 218 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 222. If desired, a valve 224 may be placed in the hose 220 so that the gas or air pressure may be controlled at the location of keg 210. The coupler B' has a beer exit fitting 226 attachable to the end of a flexible hose 228 by means of which beer is supplied from keg 210 to a dispensing faucet 230. A suitable valve 232 may be provided in the beer dispensing hose 228 as desired for controlling the flow of beer from keg 210. For clarity, the reference numerals applied herein to this embodiment constitute the reference numerals applied in prior application Ser. No. 864,448 as increased by adding 200 thereto.

Referring now to FIG. 10, keg 210 is illustrated with keg adapter A' being insertable through keg opening 212 from without the keg. That is to say, adapter A' is fully receivable within keg opening 212 from outside the keg and the keg adapter or any part thereof need not be manipulated from within the keg as by through a filling opening indicated at 232, in the side wall of the keg as required by prior devices of this type. It will be appreciated that keg adapter A' is adapted for semipermanent assembly within the keg opening at the brewery prior to filling the keg, similarly as in the prior described embodiments, and this is accomplished by a unique locking assembly generally indicated at C', the keg adapter and locking assembly functioning to seal the keg during the time interval between filling and tapping with the coupler unit B' being connected to the keg adapter A' at the beer-dispensing establishment for withdrawing beer from the keg through the keg adapter under pressure provided by the gas pressure source. The arrangement shown in FIGS. 9 and 10 is merely for the purpose of illustrating the use of the present invention, and the components thereof other than the tapping unit comprising the keg adapter A', the coupler B', and the locking assemblage C' are conventional and do not comprise any part of the present invention.

Referring now to FIG. 11, keg adapter A' comprises an adapter body 234 including an adapter flange 236 preferably formed of bar stock, a pair of tubular members 238 and 240 providing respective liquid and gas passages, a tubular housing 242 and a siphon tube 244. In accordance with the present invention the members 238 and 240, housing 242 and siphon tube 244 are formed of low cost, readily worked tubular stock and accordingly keg adapter A' is formed primarily of tubular stock. Referring to FIG. 16, adapter flange 236 particularly includes a cylindrical disc formed preferably of bar stock and in which is formed a pair of bores 246 and 248, the axes of bores 246 and 248 being offset from the central axis of keg adapter A' as indicated by the dashed line $e-e$ in FIG. 15. A pair of counter-sunk bores 250 and 252 are provided on the underside of adapter flange 236 in communication with bores 246 and 248 respectively. The outer face of adapter flange 236 is stepped to provide a pair of annular shoulders 254 and 256 and a raised portion 257 about bores 246

and 248 for purposes as will become clear. The underside of adapter flange 236 is provided with an annular recess 258 for receiving an O-ring seal 260 (FIG. 11). The upper ends of tubes 238 and 240 are received within the respective counter-bores 250 and 252 and are therein suitably secured as by furnace brazing. The intermediate portion of tube member 240 is diametrically enlarged as indicated at 261 such that, when tubes 238 and 240 are secured to adapter flange 236 to extend therefrom in parallel relation each with the other and with the central axis $e-e$ of adapter body 234, the enlarged diameter portion 261 of tube 240 bears against and is secured, preferably by furnace brazing, to the side of tube 238 as indicated at W in FIG. 15. In this fashion, tubes 238 and 240 mutually reinforce one another as they project inwardly from adapter flange 236.

The upper end of tubular housing 242 is received about and preferably furnace brazed to the lower end of tube 238. The lower end of housing 242 is internally threaded as at 262 to receive the externally threaded portion 263 of a locking nut 264. The upper end of siphon tube 244 is received within the passage 265 through nut 264 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 242 and the lower end of tube 238 as to ensure an effective fluid tight seal. As seen in FIG. 10, the siphon tube 244 extends from adapter body 234 at an angle with respect to the central axis of the keg and then angles back toward the central axis of the keg adjacent the bottom of the keg. Thus, the siphon tube, when adapter A' is installed within the keg, is removed from and does not interfere with keg filling equipment, not shown, which is inserted at the brewery through filling opening 232. Siphon tube 244 terminates adjacent the lower end of the keg in an outwardly flared opening 267 (FIG. 10), whereby beer from the keg can be drawn up into the siphon tube through the keg adapter in a manner to be described.

A liquid valve, generally indicated at 268, is provided in the liquid passage formed by siphon tube 244, housing 242, tube 238 and adapter flange 236. Particularly, liquid valve 268 includes an elongated tubular sleeve 270 disposed within tube 238 with its upper end axially inset from the upper end of adapter A' for purposes as will become clear. A plurality of recesses 272 are formed through the walls at the inner end of sleeve 270 and a valve body 274 is suitably secured to this inner end of sleeve 270 as by a plurality of spot welds. Valve body 274 includes a generally cylindrical member having a pair of axially spaced flanges 276 and 278, flange 276 having a reduced diameter for reception within tube 238. An O-ring seal 280 is disposed about valve body 274 between flanges 276 and 278 and, when the valve is closed, seats against the lower end of tube 238 to form an effective fluid seal thereabout. It will be appreciated that the diameter of flange 278 is larger than the internal diameter of tube 238. Valve 268 is maintained in a normally sealed position as illustrated in FIG. 11 by a coil spring 282, the upper end of which encircles a lower stem portion 284 of valve body 274 in engagement against the underside of flange 278. The lower end of spring 282 seats about the upper end of siphon tube 244. It will be appreciated that axial inward movement of sleeve 270 displaces O-ring seal 280 away from its seat against the bias of spring 282 thereby pro-

viding a through fluid passage from the interior to the exterior of the keg through siphon tube 244, housing 242, past the open valve, through sleeve 270 and tube 238.

Turning now to the gas passage through the adapter A', the lower end of tube 240 is swaged to form a D-shaped cross section spaced laterally from tube 238 as seen in FIG. 11. A gas check valve, generally indicated at 290, is provided at the lower end of gas tube 240 and comprises a flexible sleeve 292, preferably formed of silicone rubber (gum rubber and other plastic materials may also be employed) having a closed lower end and an open upper end. Flexible sleeve 292 is preferably D-shaped in cross section and is received within the correspondingly shaped lower end of tube 240. A D-shaped ring 294 is received within the upper end of flexible sleeve 292 and clamps the latter against the walls of tube 240. Suitable epoxy may be applied about the upper end of the sleeve 292 to insure a fully effective seal. A longitudinally extending slit 296 is formed through the outer wall of sleeve 292 and, it will be appreciated that when gas under pressure is transmitted through tube 240 and into sleeve 292, the sides of slit 296 will open permitting the gas to flow outwardly into the keg. As will be appreciated, when the gas pressure within the keg is equal to or greater than the gas applied through the keg adapter A', this external pressure within the keg maintains slit 296 closed precluding ingress of liquid from the keg through the slit into the tubular gas passage 240. Additional slits may be provided through sleeve 292, for example, a longitudinally extending slit 298 may be provided adjacent the lower end of sleeve 292. It will be noted that gas valve 290 is axially spaced along the adapter body 234 from the liquid valve 268 contained within enlarged diameter housing 242. In this manner, a housing 242 of adequate strength can be provided. Moreover, since the valves 268 and 290 are axially displaced one from the other, the overall width of the adapter body 234 may exceed the diameter of the keg adapter opening with adapter A' still being receivable through the keg opening 212 from without the keg by laterally shifting the adapter as it obtains various axial positions relative to the keg opening.

It is a particular feature of the present invention that a unique locking assemblage is provided whereby keg adapter A', as well as other keg adapters of the type having an external flange for seating about the keg openings, can be readily and easily installed within the keg opening. Particularly, the locking assembly, as illustrated in FIG. 15, includes a ring or collar 300 having a reduced diameter externally threaded outer portion 302 and a lower diametrically enlarged skirt 304 which is internally threaded as at 306. As best illustrated in FIG. 11, collar 300 has an inwardly extending flange 308 adapted to engage over the shoulder 256 on adapter flange 236 when the adapter is finally secured in keg opening 212. A plurality of openings 310 are formed through collar flange 308 and the interior walls of collar 300 are cylindrically grooved as indicated at 312 to provide cylindrical passages vertically through collar 300.

A locking ring 314 is provided for connection with collar 300 and engagement below the flanges of the keg opening (to be described) to clamp the flange 236 of keg adapter A' between collar 300 and the keg opening flange. Particularly, locking ring 314 is externally

threaded as at 316 and has a pair of diametrically opposed inwardly extending lugs 318. Lugs 318 project outwardly or upwardly from one side of locking ring 314 for engagement against the underside of the flanges 320 about keg opening 212. Particularly, as seen in FIG. 15, keg opening 212 is a standard beer keg opening employed with the conventional Peerless type keg and comprises a pair of interrupted flanges 320 adjacent the outer edge portion of the cylindrical keg neck 322. At like ends of flanges 320 are provided abutments 324 which project radially outwardly beyond flanges 320 and extend the full length of keg neck 322. The opposite ends of flanges 320 also form a pair of abutments 326. Abutments 324 and 326 on opposite flanges 320 form the opposite ends of recesses or slots 328 between the flanges 320.

To install keg adapter A' within keg opening 212, keg adapter A' is inserted within keg opening 212 from without the keg by first inserting siphon tube 244 and the remaining portions of keg body 234 into the keg opening until O-ring seal 260 bears against the inner margin of flanges 320 about keg opening 212. Locking ring 314 may then be slipped over adapter flange 236 (it being appreciated that the internal diameter between the inner faces of lugs 318 is slightly larger than the diameter of keg adapter flange 326) and about keg neck 322 with lugs 318 in alignment with the slots 328 between the abutments 324 and 326 of flanges 320. When ring 314 rests on the upper wall of the keg about keg neck 322, the upper ends of lugs 318 are spaced below the underfaces of flanges 320 as illustrated by the dashed lines in FIG. 17. Collar 300 may then be applied over adapter flange 236 about the keg opening 212 and rotated such that the internally threaded portion 306 threadedly engages the externally threaded locking ring 314. It will be appreciated that initial rotation of collar 300 as by a spanner wrench, not shown, will rotate locking ring 314 in a clockwise direction as seen in FIG. 19 to locate lugs 318 in underlying relation to keg flanges 320. Further rotation of collar 300 draws the locking ring 314 upwardly such that the outer end portions of lugs 318 engage the underside of flanges 320. Continued rotation of locking ring 314 as it is being drawn outwardly and into engagement with flanges 320 is prevented by the engagement of lugs 318 against the lower portion of abutments 324 whereby locking ring 314 is held against further rotation. Continued rotation and tightening down of collar 300 thus clamps adapter flange 236 between the inner flange 308 on collar 300 and the marginal of keg neck 322 about keg opening 212. Note that, when the adapter A' is finally secured, O-ring 260 effectively seals between the keg neck and the flange 236.

It is a particular feature of the present locking assemblage that collar 300 is precluded from substantial rotation in either direction once the keg adapter has been secured within the keg whereby the adapter A' is effectively and semi-permanently secured within keg opening 212. It will be noted in FIG. 20 that, when collar 300 has been fully threadedly engaged about locking ring 314, at least a pair of openings 310 will be aligned with the slots 328 between the abutments 324 and 326 on keg flanges 320. These particular openings can be readily ascertained by visual observation. To preclude substantial rotation of collar 300 and thereby to maintain adapter A' installed within keg opening 212, a pin is driven as by a hammer, not shown, into each of the

aligned openings 310. Pins 330 comprise split tubes having slightly larger diameters than openings 310 whereby pins 330 contract slightly when driven into openings 310. Pins 330 thus expand against and automatically lock themselves within openings 310. The pins 330 have a length such that, when they are inserted into openings 310 and driven such that their upper ends lie flush with the upper flange 308 of collar 300, their intermediate portions extend within slots 328 and their lower ends terminate above locking ring 314. Accordingly, rotation of collar 300 a distance as to realign lugs 318 with slots 328 is precluded as pins 330 will engage abutments 324 prior to such realignment. Thus, the keg adapter A' is securely and effectively locked within keg opening 212 and cannot be removed therefrom or its seal with the keg neck broken except by extraction of pins 330. Inasmuch as keg adapter A' is semipermanently installed within the keg opening, that is, the keg adapter A' is installed within the keg opening for the life of the keg with the keg being cleaned and refilled with the adapter in the keg, the locking pins effectively preclude inadvertent removal of or tampering with the keg adapter.

Should it be desired to remove adapter A' from keg opening 212, pins 330 can be driven inwardly through openings 310 into the space between locking ring 314 and keg neck 322. Pins 330 can thus be fully disengaged from opening 310. With the pins 330 lying between ring 314 and neck 322, collar 300 can be rotated in a direction as to unthread it from locking ring 314 whereby keg adapter A' can be removed from keg opening 212.

Referring now to FIG. 11, the improved coupler unit B' comprises a cylindrical body 331 having an enlarged diameter lower end portion 334. A bore 336 extends through body 331 and lies in communication with a laterally extending bore 338 formed in a nipple 340. Nipple 340 is adapted for connection with the gas circuit 228 which connects at its opposite end with the source of gas or air under pressure. Body 331 also includes a plurality of outwardly projecting portions 342 for reasons as will become apparent and more fully described in my U.S. Pat. No. 3,435,997, the disclosure of which is incorporated herein in its entirety by reference thereto. Body 331 is preferably formed of a plastic material but may be formed of other materials such as stainless steel as desired.

Received within bore 336 is a cylindrical sleeve 344 having an upper flange portion 346 which seats on an annular shoulder 348 formed in body 331. Sleeve 344 has a central passage 350 extending through its upper end portion and lying in communication with an intermediate axially offset passage 352. Sleeve 344 has an axially offset bore 353 opening through its lower end and into passage 352, bore 352 being adapted to receive the upper end of a depending cylindrical probe 354. A second bore 355 is also axially offset from the central axis of sleeve 344 and receives the upper end of a depending gas probe 356. A gas passage including a reduced diameter bore 357 is formed in sleeve 344 and opens into a radial slot 358 to permit passage of gas or air through the bore 338 of nipple 340 into the annular passage 360 between the wall of bore 336 and sleeve 344 and into bore 358 and gas probe 356. A pair of O-ring seals 362 and 364 are carried about sleeve 344 on opposite sides of opening 358 and bore 338 whereby chamber 360 is sealed except for the gas pas-

sage through probe 356. An oval shaped seal 366 is provided about the lower end of sleeve 344 and about probes 354 and 356. An O-ring seal 368 is also provided about the base of body 331 at its lower end.

A knurled collar 370 is provided about enlarged body portion 334 and includes an inwardly extending flange 372 and an internally threaded depending portion 374. To retain collar 370 on coupler unit B', a ring 376 having an inwardly directed shoulder 378 is disposed about the lower end of the body portion 334. A split circular wire 380 is carried within a suitable recess formed about the lower end of body portion 334 and projects outwardly as to engage below shoulder 378. In this fashion, collar 370 may be slipped about the lower end of body portion 334 with the ring 376 then being applied thereabout and the wire 380 being snapped into place. Collar 370 is thus prevented from slipping off coupler unit B' by ring 376 and lugs 342 and nipple 340.

To secure coupler unit B' to keg adapter A' (the latter being secured within keg opening 212 in the manner previously described) and thereby tap the keg, the probes 354 and 356 are inserted within the respective tubes 238 and 240 through the openings 246 and 268 in adapter flange 236. Collar 370 is threaded down about externally threaded portion 302 of collar 300 drawing coupler unit B' downwardly into butting and sealing relation against adapter body 234 about the openings 246 and 248. Particularly, seal 366 bears against the raised portion 257 of siphon body 238 about openings 246 and 248. O-ring seal 368 bears against annular shoulder 254 on adapter flange 236. As will be appreciated, when coupler unit B' is fully secured to keg adapter A', the tip of probe 354 engages the upper end of sleeve 270 to inwardly axially displace or depress the latter as well as the valve body 274 connected therewith against the bias of spring 282. In this manner, valve O-ring 280 is moved inwardly away from sealing engagement about the lower end of tube 238 thereby to provide a liquid passage from the keg through siphon tube 244, housing 242, sleeve 270 and into the probe 254 for delivery of fluid from the keg through the passages 352 and 356 in coupler unit B' to a suitable coupling connected to a faucet, for example, the coupling 226 illustrated in FIG. 9. Similarly, a gas passage into the keg is formed when the coupler unit B' is finally secured on the adapter A'. Particularly, gas or air, for example, from the gas or air pressure source 322 as seen in FIG. 9, may pass through passage 338, into slit 358 and through reduced bore 357 into depending probe 356 for delivery of gas within sleeve 292. When the pressure of the gas exceeds the internal keg pressure, the gas flowing in the above described gas passage urges the edges of slits 296 away from one another to provide a through passage into the keg. In this fashion, gas is provided the keg to drive the beer from the keg through the liquid passage to the dispensing faucet 230.

It will be appreciated that the coupling and uncoupling of coupler unit B' to keg adapter A' tends to rotate collar 300. However, by employing the unique locking assemblage C' including pins 330 to secure keg adapter A' within keg opening 212, collar 300 cannot be rotated as to loosen or break the seal between keg adapter A' and the keg opening 212. It is only when the pins 330 have been ejected through collar 300 that the latter is permitted to rotate.

Accordingly, there has been provided in accordance with this latter embodiment of the present invention a tapping unit comprised of a substantially all metal construction formed primarily of tubular stock whereby a drastic reduction in the cost of manufacture of such units is effected. Moreover, the parts of this embodiment are of simple manufacture and assembly and are mutually reinforcing with respect to one another whereby a particularly strong unit is effected. Additionally, there is provided a unique and effective locking assemblage whereby the keg adapter cannot be inadvertently dislodged from the keg opening.

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: claim:

1. A liquid dispensing apparatus adapted for use with a keg or like container for liquids, which keg has top, bottom and side walls with a generally cylindrical opening in one wall surrounded by a keg flange comprising: a keg adapter including a body adapted to be secured within the keg wall opening whereby the adapter body is insertable directly within the keg opening from without the keg, said body having a pair of laterally spaced passages extending through said body in the general direction of the longitudinal axis thereof for the respective transfer of liquid from the inside to the outside of the keg and gas from the outside to the inside of the keg; at least portions of said passages adjacent the outer portion of said body defining a pair of bore holes spaced to extend eccentrically of the central axis of said body and in general parallel relation to said axis; normally closed valve means in said liquid passage adjacent the inner portion of said body, a member movable longitudinally in said liquid passage, said member being cooperable with said liquid valve means to open the latter in response to inward movement of said member in said liquid passage, and gas valve means in said gas passage for permitting ingress of gas into the keg, said liquid valve means and said gas valve means being axially spaced one from the other; a coupler unit having liquid and gas passages therethrough terminating respectively at the inner end of said coupler unit in a pair of tubular probes, means for releasably securing said coupler unit to said keg adapter with said liquid and gas probes receivable in the respective liquid and gas bore holes in said adapter body for providing ingress of gas into the keg through the respective gas passages of said coupler unit and said keg adapter and egress of liquid from the keg through the respective liquid passages of said keg adapter and said coupler unit, said keg adapter including a flange about the outer end portion of the adapter body and 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 ring having a flange and an internally threaded skirt portion, an externally threaded second ring engageable below the keg flange and threadedly engageable with said first ring whereby said adapter flange is releasably clamped between said first ring flange and

the keg flange upon threaded engagement of said first and second rings, said first ring having an externally threaded portion, said releasable securing means including a collar about said coupler unit, said collar having an internally threaded portion threadedly engageable with said externally threaded portion of said first ring.

2. A liquid dispensing apparatus adapted for use with a keg or like container for liquids, which keg has top, bottom and side walls with a generally cylindrical opening in one wall surrounded by a keg flange comprising: a keg adapter including an elongated body adapted to be secured within the keg wall opening whereby the adapter body is insertable directly within the keg opening from without the keg, said body having a pair of laterally spaced passages extending therethrough in the general direction of the longitudinal axis thereof for the respective transfer of liquid from the inside to the outside of the keg and gas from the outside to the inside of the keg; at least portions of said passages adjacent the outer portion of said body defining a pair of bore holes spaced to extend eccentrically of the central axis of said body and in general parallel relation to said axis; normally closed valve means in said liquid passage adjacent the inner portion of said body for permitting, when open, egress of liquid from the keg, and gas valve means in said gas passage for permitting ingress of gas into the keg, said liquid valve means and said gas valve means being axially spaced one from the other; said keg adapter including a flange about the outer end portion of the adapter body having a diameter greater than the diameter of the keg opening, collar means for releasably securing said keg adapter in said keg opening and including a laterally inwardly extending projection engageable along the underside of the keg flange, said collar means having portions engageable with said keg adapter flange to releasably clamp the keg flange and said keg adapter flange between said collar means and said projection, said collar means including a ring having an externally threaded portion; a coupler unit having liquid and gas passages therethrough terminating respectively at the inner end of said coupler unit in a pair of tubular probes, means for releasably securing said coupler unit to said keg adapter with said liquid and gas probes receivable in the respective liquid and gas bore holes in said adapter body for providing ingress of gas into the keg through the respective gas passages of said coupler unit and said keg adapter and egress of liquid from the keg through the respective liquid passages of said keg adapter and said coupler unit, said releasable securing means including a collar about said coupler unit, said collar having an internally threaded portion threadedly engageable with said externally threaded portion of said ring.

3. Apparatus according to claim 2 in combination with a keg having top, bottom and side walls, a keg neck defining a generally cylindrical opening and having a keg flange projecting radially outwardly adjacent its outer terminus, said opening having a diameter of about 0.75 inch.

4. Apparatus according to claim 2 including a member movable longitudinally in said liquid passage and engageable by said liquid probe, said member being cooperable with said liquid valve means to open the latter in response to axial inward movement of said liquid probe and said member in said liquid passage.

5. Apparatus according to claim 2 in combination with a keg having top, bottom and side walls, a keg neck defining a generally cylindrical opening and having a keg flange projecting radially outwardly adjacent its outer terminus, said opening having a diameter of about 0.75 inch, a member movable longitudinally in said liquid passage and engageable by said liquid probe, said member being cooperable with said liquid valve means to open the latter in response to axial inward movement of said liquid probe and said member in said liquid passage.

6. A liquid dispensing apparatus adapted for use with a keg or like container for liquids, which keg has top, bottom and side walls with an opening in one wall surrounded by a neck having a pair of interrupted flanges extending outwardly from the neck with at least one lug extending radially outward from the neck below its flange comprising: a keg adapter having a body portion adapted to be secured within the keg opening and having a pair of segregated passages extending there-through for the respective transfer of liquid from the inside of the keg to the outside of the keg and gas from outside to the inside of the keg; normally closed valves in said liquid and gas passages; said keg adapter having a radially outwardly projecting flange for overlying the container flanges; and means for securing said keg adapter body portion to the container opening including a first externally threaded ring having means for cooperating with the lug extending radially from the neck to preclude rotation of said ring from a non-rotatable position, said first ring being disposed between the container flanges and the one container wall, a second ring having an internally threaded portion adapted to threadedly engage said first ring with said second ring overlying said keg adapter flange and the flanges of the container to clamp the keg adapter flange between said second ring and the container flanges when said second ring is threaded onto said first ring, and means carried by said second ring and extending between the interrupted flanges of the container to preclude unthreading action between said second ring and said first ring.

7. Apparatus according to claim 6 wherein said second flange includes an inwardly directed flange having an opening, said means including a pin engageable in said opening and depending from said second ring flange between the interrupted container flanges

8. Apparatus according to claim 6 wherein said second ring includes an inwardly directed flange having a plurality of openings spaced circumferentially thereabout, said means including a pin engageable in the flange opening overlying one of the spaces between the interrupted container flanges, said pin depending from the second ring flange into the one space to preclude unthreading action of the first and second rings by engagement of said pin laterally against the ends of the container flanges defining the one space, and means for releasably retaining said one pin in the opening in the second ring flange.

9. Apparatus for locking a keg adapter having a radially outwardly projecting flange within the cylindrical opening through the top wall of the container, the opening being surrounded by a neck having a pair of interrupted flanges extending outwardly from the neck with at least one lug extending radially outwardly from the neck below its flanges comprising: a first externally threaded ring having means for cooperating with the lug extending radially from the neck to preclude rota-

tion of said ring from a non-rotatable position, said first ring being disposed between the container flanges and the top container wall, a second ring having an internally threaded portion adapted to threadedly engage said first ring with said second ring overlying the flange of the keg adapter and the flanges of the container to clamp the flange of the keg adapter between said second ring and the flanges of the container when said second ring is threaded onto said first ring, and means carried by said second ring and extending between the interrupted flanges of the container to preclude unthreading action between said second ring and said first ring.

10. Apparatus according to claim 9 wherein said first ring member has at least one lug extending therefrom in an axial direction and engageable along the underside of one of the container flanges.

11. Apparatus according to claim 9 wherein said cooperating means on said first ring includes a radially inwardly extending lug which cooperates with the container lug to prevent rotational movement of the locking apparatus when said first and second ring members are threadedly engaged.

12. Apparatus according to claim 9 wherein said second ring has an externally threaded portion.

13. Apparatus according to claim 9 wherein said first ring has a pair of circumferentially spaced lugs extending therefrom in an axial direction and engageable with the underside of the container flanges.

14. Apparatus according to claim 9 in combination with said neck opening including said flanges and said lug, said first ring having a diameter greater than the diameter of said container flanges, said container flanges having at least one radially cut-out portion, said cooperating means including a radially inwardly extending lug receivable between said flanges when said first ring is inserted about said neck opening, said lug cooperating with said container lug to prevent rotational movement of the locking apparatus when said first and second rings are threadedly engaged.

15. Apparatus according to claim 9 wherein said second ring includes an inwardly directed flange having an opening, said means including a pin engageable in said opening and depending from said second ring flange between interrupted flanges of the container.

16. Apparatus according to claim 15 wherein said pin comprises a split cylinder having a diameter slightly larger than the diameter of the opening through said second ring flange, said cylindrical pin clamping outwardly against the wall of said opening when received therein thereby to retain said pin within said openings.

17. Apparatus according to claim 15 wherein said pin has a length such that, when the outer end of the pin lies substantially flush with the outer face of said second ring flange, the distance between the inner end of the pin and the top wall of the container exceeds the axial length of the opening in the second ring flange whereby the pin can be displaced inwardly from the opening to release said second ring for unthreading action.

18. Apparatus according to claim 9 wherein said second ring includes an inwardly directed annular flange having a plurality of openings spaced circumferentially thereabout, said means including a pin engageable in the flange opening overlying one of the spaces between the interrupted container flanges, said pin depending from the second ring flange into the one space to pre-

clude unthreading action of the first and second rings by engagement of said pin laterally against the ends of the container flanges defining the one space.

19. A liquid dispensing apparatus adapted for use with a keg or like container for liquids, which keg has top, bottom, and side walls with an opening in one wall surrounded by a keg flange comprising: a keg adapter having a body adapted to be secured within the keg opening and having a pair of laterally spaced passages extending therethrough for the respective transfer of liquid from the inside to the outside of the keg and gas from outside to the inside of the keg; said adapter body including elongated discrete first and second tubes extending in non-coaxial, side-by-side relation one to the other and providing laterally spaced Passageways respectively forming at least portions of said liquid and gas passages through said adapter; the outer portion of said adapter body defining a pair of openings having axes extending in general parallel relation one to the other and comprising respective portions of said liquid and gas passages, normally closed valve means in said liquid and gas passages, said keg adapter including a radially outwardly directed flange portion having a diameter greater than the diameter of the keg opening, and means for releasably securing said keg adapter in the keg opening including means engageable with said adapter flange portion and having a flange engageable with and below the keg flange.

20. Apparatus according to claim 19 including a member movable longitudinally in said liquid passage and cooperable with said liquid valve means to open the latter in response to axial movement of said member in said liquid passage.

21. Apparatus according to claim 19 wherein said liquid valve means and said gas valve means are axially spaced one from the other.

22. Apparatus according to claim 19 including a tubular housing secured adjacent the inner end of said first tube, a siphon tube secured about the other end of said housing, said liquid valve means being disposed in said housing and including a valve seat, a movable valve element and a spring for biasing said valve element into sealing engagement against said seat.

23. Apparatus according to claim 22 including a member movable longitudinally in said liquid passage and operable to move said valve element away from said valve seat against the bias of said spring.

24. Apparatus according to claim 23 wherein said liquid valve means and said gas valve means are axially spaced one from the other, and wherein the keg wall opening is about $\frac{3}{4}$ inch in diameter, the tubes defining the keg adapter body having a combined maximum lateral dimension at any axial position therealong receivable within the keg wall opening less than the diameter of the keg wall opening whereby the adapter body is receivable within the keg wall opening directly from outside of the keg, said tubular housing having a lateral extent equal to or greater than $\frac{1}{2}$ the diameter of the keg opening, the portions of said adapter body carrying both said liquid valve means and said gas valve means being receivable within the keg wall opening.

25. Apparatus according to claim 19 wherein said gas valve means includes a gas check valve comprising a closed flexible envelope in communication with said gas passage, said envelope having an elongated slit formed through a wall thereof.

26. Apparatus according to claim 19 including a member movable longitudinally in said liquid passage and cooperable with said liquid valve means to open the latter in response to axial inward movement of said member in said liquid passage, said liquid valve means and said gas valve means being axially spaced one from the other, said gas valve means including a gas check valve comprised of a closed flexible envelope in communication with said gas passage, said envelope having an elongated slit formed through a wall thereof.

27. Apparatus according to claim 19 together with a coupler unit having liquid and gas passages therethrough terminating respectively at the inner end of said coupler unit in a pair of tubular probes, means for releasably securing said coupler unit to said keg adapter with said liquid and gas probes receivable in the respective liquid and gas passageways in said adapter body for providing ingress of gas into the keg through the respective gas passages of said coupler unit and said keg adapter and egress of liquid from the keg through the respective liquid passages of said keg adapter and coupler unit.

28. Apparatus according to claim 27 wherein said coupler unit includes an annular head and a stem receivable within said head and mounting said probes, said stem being spaced from the walls of said head to define an annular passage, means sealing between said head and stem at opposite ends of said annular passage, conduit means through said head in communication with said annular passage, and a passageway in said stem in communication between said annular passage and said gas probe.

29. Apparatus according to claim 27 wherein said keg adapter securing means includes an externally threaded ring, said coupler unit securing means including an internally threaded collar rotatably carried by said coupler unit and threadedly engageable with said ring for securing said coupler unit to said keg adapter.

30. Apparatus according to claim 29 including a member movable longitudinally in said liquid passage and cooperable with said liquid valve means to open the latter in response to axially inward displacement of said member by said liquid probe when said coupler unit is threaded to said keg adapter.

31. A coupler unit for use with a keg adapter having liquid and gas passages comprising: an annular head and a stem receivable within said head, said coupler unit having liquid and gas passages therethrough terminating respectively at the inner ends of said coupler unit in a pair of tubular probes carried by said stem, said stem being spaced from the walls of said head to define an annular passage therewith, means sealing between said head and said stem at opposite ends of said annular passage, conduit means through said head in communication with said annular passage, said stem having a passageway in communication between said annular passage and said gas probe, and means carried about said annular head for releasably securing said coupler unit to the keg adapter with the liquid and gas probes being receivable in the respective liquid and gas passageways of the keg adapter.

32. A liquid dispensing apparatus adapted for use with a keg or like container for liquids, which keg has top, bottom, and side walls with an opening in one wall surrounded by a keg flange comprising: a keg adapter having a body adapted to be secured within the keg opening and having a pair of laterally spaced passages

extending therethrough for the respective transfer of liquid from the inside to the outside of the keg and gas from outside to the inside of the keg; said adapter body including elongated discrete first and second tubes extending in non-coaxial, side-by-side relation one to the other and providing laterally spaced passages respectively forming at least portions of said liquid and gas passages through said adapter; the outer portion of said adapter body defining a pair of openings having axes extending in general parallel relation one to the other and comprising respective portions of said liquid and gas passages; normally closed valve means in said liquid and gas passages, said keg adapter including a flange about the outer 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 a radially inwardly directed flange and an internally threaded depending skirt portion for threaded engagement with said first 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.

33. Apparatus according to claim 32 wherein the keg flange is interrupted, and means carried by said second ring and extending between the interrupted flanges of the container to preclude unthreading action between said second ring and said first ring.

34. A liquid dispensing apparatus adapted for use with a keg or like container for liquids, which keg has top, bottom, and side walls with an opening in one wall surrounded by a keg flange comprising: a keg adapter having a body adapted to be secured within the keg opening and having a pair of laterally spaced passages extending therethrough for the respective transfer of liquid from the inside to the outside of the keg and gas from outside to the inside of the keg; said adapter body including elongated discrete first and second tubes extending in non-coaxial, side-by-side relation one to the other and providing laterally spaced passages respectively forming at least portions of said liquid and gas passages through said adapter; the outer portion of said adapter body defining a pair of openings having axes extending in general parallel relation one to the other and comprising respective portions of said liquid and gas passages; normally closed valve means in each said liquid and gas passages, said liquid and gas valve means being axially offset one from the other, a tubular housing secured adjacent the inner end of said first tube, a siphon tube secured about the other end of said tubular housing, said liquid valve means being disposed in said housing and including a valve seat, a movable valve element, and a spring for biasing said valve element into sealing engagement against said seat.

35. Apparatus according to claim 34 including a member movable longitudinally of said first tube, said member being operable to move said valve element away from said seat against the bias of said spring.

36. Apparatus according to claim 34 wherein said gas valve means includes a gas check valve comprising a closed flexible envelope in communication with said gas passage, said envelope having an elongated slit formed through a wall thereof.

37. Apparatus according to claim 34 together with a coupler unit having liquid and gas passages there-through terminating respectively at the inner end of said

coupler unit in a pair of tubular probes, means for releasably securing said coupler unit to said keg adapter with said liquid and gas probes receivable in the respective liquid and gas passages in said adapter body for providing ingress of gas into the keg through the respective gas passages of said coupler unit and said keg adapter and egress of liquid from the keg through the respective liquid passages of said keg adapter and coupler unit.

38. Apparatus according to claim 34 wherein the outer portion of said keg adapter body includes a radially outwardly directed flange portion having a diameter greater than the diameter of the keg opening and greater than three quarters inch, means for releasably securing said keg adapter in the keg opening including collar means engageable with said adapter flange portion and having a flange engageable below the keg flange.

39. Apparatus according to claim 34 wherein the keg wall opening is about $\frac{3}{4}$ inch in diameter, the tubes defining the keg adapter body having a combined maximum lateral dimension at any axial position therealong receivable within the keg wall opening less than the diameter of the keg wall opening whereby the adapter body is receivable within the keg wall opening directly from outside of the keg, said housing having a lateral extent equal to or greater than one-half the diameter of the keg opening, the portions of said adapter body carrying both said liquid valve means and said gas valve means being receivable within the keg wall opening.

40. Apparatus according to claim 34 wherein said gas valve means includes a gas check valve comprising a closed flexible envelope in communication with said gas passage, said envelope having an elongated slit formed through a wall thereof.

41. Apparatus according to claim 34 including a member movable longitudinally in said first tube, said member being movable axially inwardly to open said liquid valve means.

42. Apparatus according to claim 41 wherein said gas valve means includes a gas check valve comprising 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.

43. Apparatus according to claim 34 including means for reinforcing said first and second tubes one to the other.

44. A liquid dispensing apparatus adapted for use with a keg or like container for liquids, which keg has top, bottom and side walls with a generally cylindrical opening about three quarters inch in diameter in one wall surrounded by a keg flange comprising: a keg adapter including a body defining a central longitudinally extending axis and adapted for insertion directly within the keg opening from outside of the keg and for securement substantially coaxially within the keg opening, said body having its largest lateral dimension at any axial position therealong receivable within the keg and the keg wall opening less than about three quarters inch, said body having a pair of laterally spaced passages extending in the general direction of the longitudinal axis thereof for the respective transfer of liquid from the inside to the outside of the keg and gas from the outside to the inside of the keg; at least portions of said passages adjacent an outer portion of said body defining a pair of passageways spaced to extend eccentrically

cally of the central axis of said body and in general parallel relation to said axis; normally closed valve means in said liquid passage adjacent an inner portion of said body, a member movable longitudinally in said liquid passage, said member being cooperable with said liquid valve means to open the latter in response to inward movement of said member in said liquid passage in an axial direction, and gas valve means in said gas passage for permitting ingress of gas into the keg, said liquid valve means and said gas valve means being axially spaced one from the other, said liquid valve means including a valve seat having an opening therethrough, a valve plate having a bifurcated stem extending from one side thereof, and means normally biasing said valve plate against said seat to close said valve means with said bifurcated stem extending through said opening in said seat, said movable member being annular and engageable with said bifurcated stem to space said valve plate from said seat to open said liquid valve means.

45. Apparatus according to claim 44 wherein said liquid valve means is inwardly offset from the axis of said liquid passageway in a direction toward the central axis of said adapter body.

46. Apparatus according to claim 45 wherein said adapter body is formed of cylindrical bar stock.

47. A liquid dispensing apparatus adapted for use with a keg or like container for liquids, which keg has top, bottom and side walls with a generally cylindrical opening about three quarters inch in diameter in one wall surrounded by a keg flange comprising: a keg adapter including a body defining a central longitudinally extending axis and adapted for insertion directly within the keg opening from the outside of the keg and for securement substantially coaxially within the keg opening, said body having its largest lateral dimension at any axial position therealong receivable within the keg and the keg wall opening less than about three quarters inch, said body having a pair of laterally spaced passages extending in the general direction of the longitudinal axis thereof for the respective transfer of liquid from the inside to the outside of the keg and gas from the outside to the inside of the keg; at least portions of said passages adjacent an outer portion of said body defining a pair of passageways spaced to extend eccentrically of the central axis of said body and in general parallel relation to said axis; normally closed valve means in said liquid passage adjacent an inner portion of said body, a member movable longitudinally in said liquid passage, said member being cooperable with said liquid valve means to open the latter in response to inward movement of said member in said liquid passage in an axial direction, gas valve means in said gas passage for permitting ingress of gas into the keg, said liquid valve means and said gas valve means being axially spaced one from the other, said body being comprised of elongated discrete first and second thin wall tubes extending in non-coaxial side-by-side relation one to the other and defining at least portions of said liquid and gas passages through said adapter body, a cylindrical member having a diameter greater than the diameter of the keg opening, said member having a pair of openings formed therethrough and extending eccentrically of the axis of said cylindrical member for respectively receiving the outer end portions of said first and second tubes, and means for securing latter tubular end portions within said latter opening with radially outer marginal portions of said

cylindrical member about said tubes forming a flange for overlying the keg flange.

48. A liquid dispensing apparatus adapted for use with a keg or like container for liquids, which keg has top, bottom and side walls with a generally cylindrical opening about three quarters inch in diameter in one wall surrounded by a keg flange comprising: a keg adapter including a body defining a central longitudinally extending axis and adapted for insertion directly within the keg opening from outside of the keg and for securement substantially coaxially within the keg opening, said body having its largest lateral dimension at any axial position therealong receivable within the keg and the keg wall opening less than about three quarters inch, said body having a pair of laterally spaced passages extending in the general direction of the longitudinal axis thereof for the respective transfer of liquid from the inside to the outside of the keg and gas from the outside to the inside of the keg; at least portions of said passages adjacent an outer portion of said body defining a pair of passageways spaced to extend eccentrically of the central axis of said body and in general parallel relation to said axis; normally closed valve means in said liquid passage adjacent an inner portion of said body, a member movable longitudinally in said liquid passage, said member being cooperable with said liquid valve means to open the latter in response to inward movement of said member in said liquid passage in an axial direction, gas valve means in said gas passage for permitting ingress of gas into the keg, said liquid valve means and said gas valve means being axially spaced one from the other, said body being comprised of elongated discrete first and second thin wall tubes extending in non-coaxial side-by-side relation one to the other and defining at least portions of said liquid and gas passages through said adapter body, a cylindrical member having a diameter greater than the diameter of the keg opening said members having a pair of openings formed therethrough and extending eccentrically of the axis of said cylindrical member respectively receiving the outer end portions of said first and second tubes, means for securing said tubular end portions within said latter openings with radially outer marginal portions of said cylindrical member about said tubes forming a flange for overlying the keg flange, means for reinforcing said first and second tubes one to the other, a tubular housing secured adjacent the inner end of said first tube, a siphon tube secured about the other end of said tubular housing, said liquid valve means being disposed in said housing and including a valve seat, a movable element, and a spring for biasing said valve element into sealing engagement against said seat.

49. A liquid dispensing apparatus adapted for use with a keg or like container for liquids, which keg has top, bottom, and side walls with an opening in one wall surrounded by a keg flange comprising: a keg adapter having a body adapted to be secured within the keg opening and having a pair of laterally spaced passages extending therethrough for the respective transfer of liquid from the inside to the outside of the keg and gas from outside to the inside of the keg; said adapter body including elongated discrete first and second tubes extending in non-coaxial, side-by-side relation one to the other and providing laterally spaced passages respectively forming at least portions of said liquid and gas passages through said adapter; the outer portion of said

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adapter body defining a pair of openings having axes extending in general parallel relation one to the other and comprising respective portions of said liquid and gas passages; normally closed valve means in said liquid and gas passages, a coupler unit having liquid and gas passages therethrough terminating respectively at the inner end of said coupler unit in a pair of tubular probes, means for releasably securing said coupler unit to said keg adapter with said liquid and gas probes receivable in the respective liquid and gas openings in said adapter body for providing ingress of gas into the keg and egress of liquid from the keg through the re-

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spective communicating liquid and gas passages of said keg adapter and said coupler unit, said coupler including an annular head and a stem receivable within said head and carrying said probes, said stem being spaced from the walls of said head to define an annular passage, means sealing between said head and said stem at opposite ends of said annular passage, conduit means through said head in communication with said annular passage and a passageway in said stem in communication at opposite ends with said annular passage and said gas probe.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,905,522 Dated September 16, 1975

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:

- Col. 1, line 11, "copening" should read --copeniding--.
Col. 1, line 15, "appllication" should read --application--.
Col. 1, line 17, "appllication" should read --application--.
Col. 2, line 58, "freedome" should read --freedom--.
Col. 4, line 5, "sifficient" should read --sufficient--.
Col. 4, line 15, "expends" should read --extends--.
Col. 4, line 25, "adajcent" should read --adjacent--.
Col. 4, line 63, "adater" should read --adapter--.
Col. 5, line 17, "adaptages" should read --advantages--.
Col. 8, lines 6 & 7, between "and" and "upper" insert --the--.
Col. 8, line 17, "or" should read --of--.
Col. 14, line 32, "siphonn" should read --siphon--.
Col. 19, line 5 "themsleves" should read --themselves--.
- Col. 21, line 23, delete "claim:"
Col. 23, line 18, claim 6, "flange" should read --flanges--.
Col. 23, line 43, claim 7, "second flange" should read
--second ring flange--.
Col. 23, line 62, claim 9, "of the container" should read
--of a container--.
Claim 19, line 15, "Passageways" should read --passageways--.
Claim 20, line 33, "axial movement" should read --axial
Col. 29, inward movement--.
Claim 44, line 3, "aadjacent" should read --adjacent--.
Claim 47, line 47, "liqud" should read --liquid--.
Claim 47, line 67, "latter" should read --said--.
Claim 47, line 67, "ltter" should read --latter--.

Signed and Sealed this

Twenty-seventh Day of July 1976

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks