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[21] Appl. No. **814,883**  
[22] Filed **Mar. 26, 1969**  
[45] Patented **Feb. 16, 1971**  
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**Continuation of application Ser. No. 676,291, Oct. 18, 1967, which is a continuation-in-part of application Ser. No. 611,610, Jan. 25, 1967, now Patent No. 3,410,458, which is a continuation-in-part of application Ser. No. 587,627, Oct. 18, 1966, now Patent No. 3,422,448, which is a continuation of application Ser. No. 406,682, Oct. 27, 1964, now abandoned, which is a continuation-in-part of application Ser. No. 395,084, Jan. 25, 1966, now Patent No. 3,231,154, which is a continuation of application Ser. No. 150,982, Nov. 8, 1961, now abandoned, which is a continuation-in-part of application Ser. No. 25,592, Apr. 29, 1960, now abandoned, which is a continuation of application Ser. No. 159,818, Dec. 8, 1961, now Patent No. 3,156,252.**

[50] Field of Search..... 222/490;  
239/(Inquired); 251/(Inquired); 137/525.1, 525;  
285/133, 18, 130; 222/400.7, 399, 402.19, 402.25

[56]

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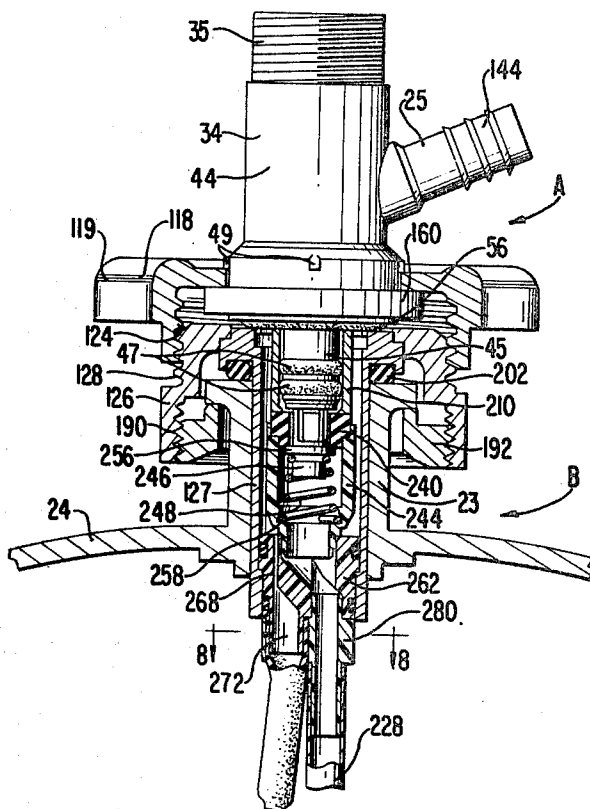
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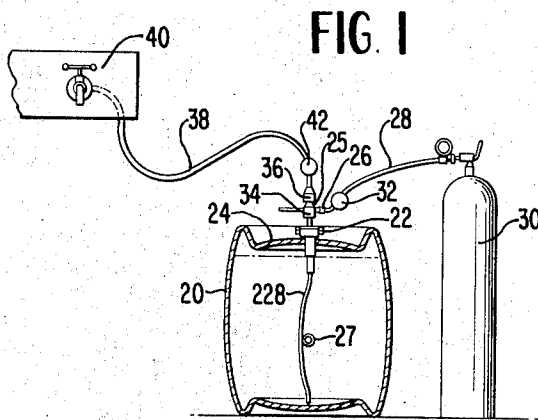
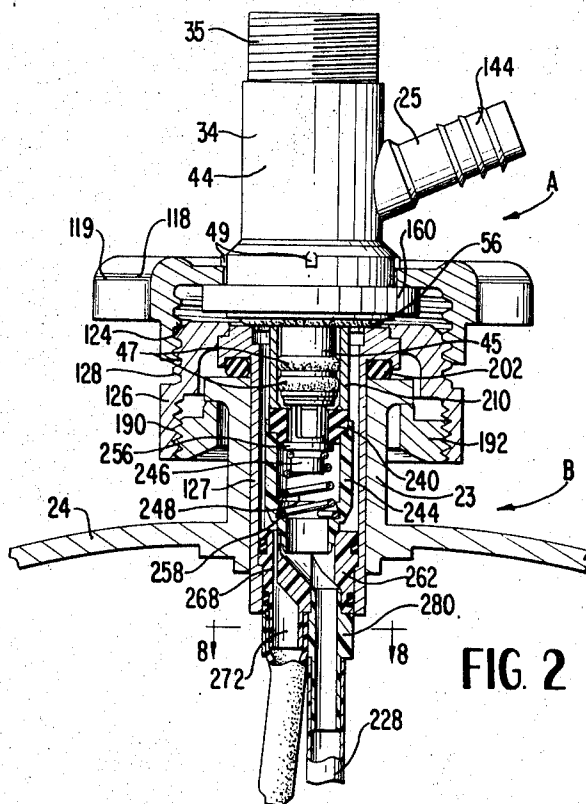
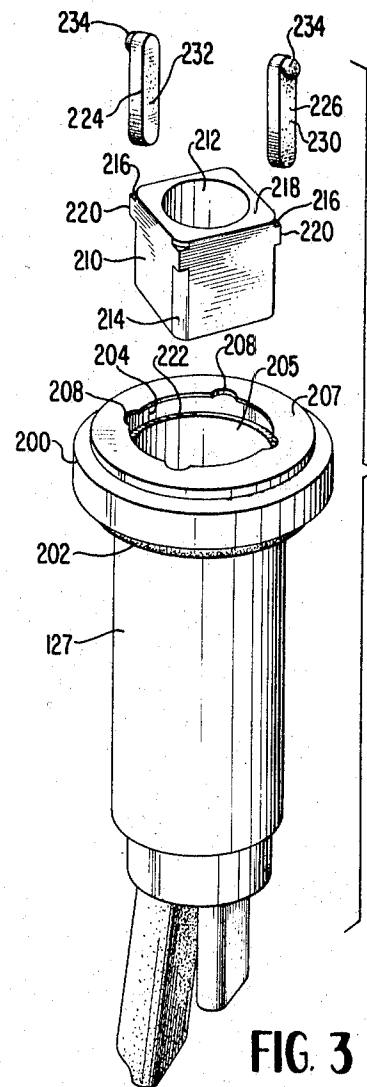
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[54] **BEER TAP**  
23 Claims, 14 Drawing Figs.

[52] U.S. Cl..... 222/400.7  
[51] Int. Cl..... B65d 83/14

**ABSTRACT:** This invention relates to a beer-tapping device and especially to an improved adapter for attachment in the beer outlet of a standard keg. It comprises a metallically enclosed, readily assembled unit, insertable from outside the keg with a laterally offset liquid passageway through the adapter. The offset passage takes optimum advantage of the limited space available while, at the same time, the unit is compatible with existing systems. Also disclosed is a novel metallic locking unit for separating the beer and gas passageways in the adapter as well as a novel flexible resilient check valve for the gas passage through the adapter.





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FIG 4

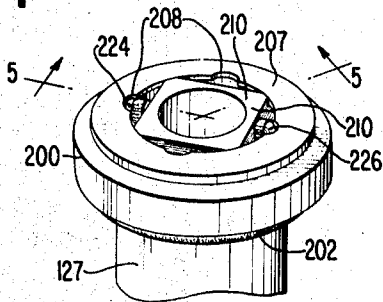


FIG 5

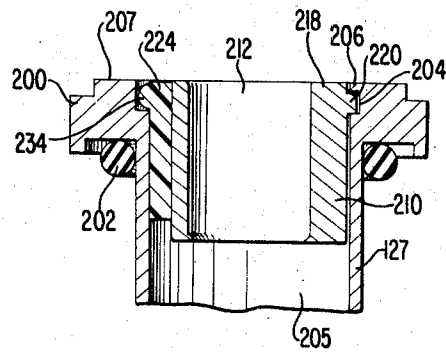
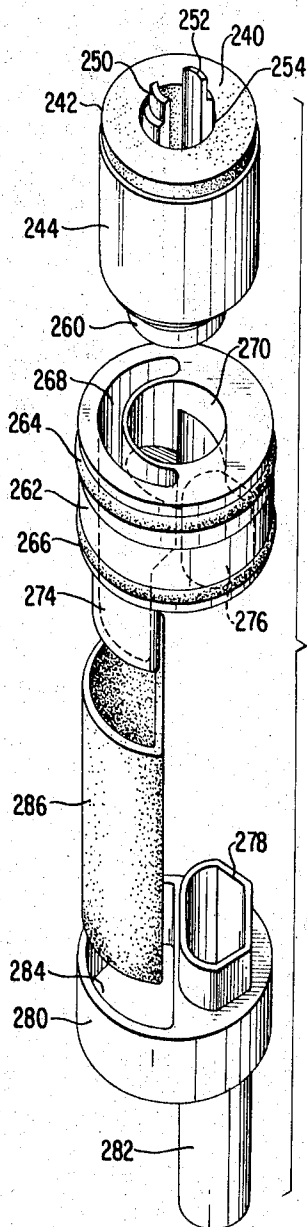


FIG 7

FIG 6

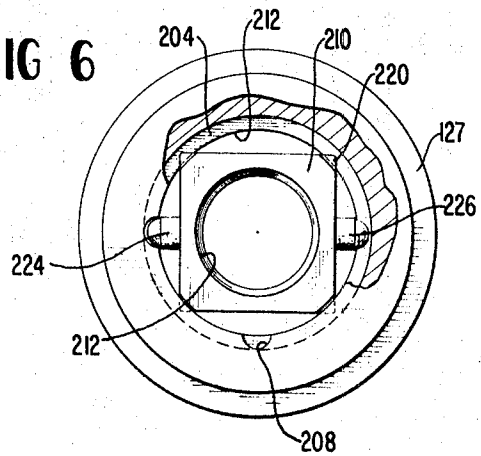
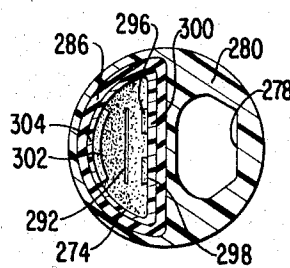


FIG 8

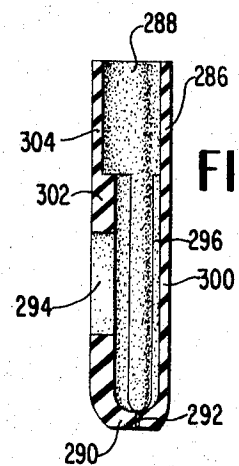


FIG 9

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FIG. 12

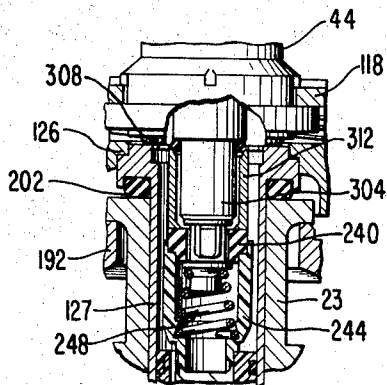


FIG. 13

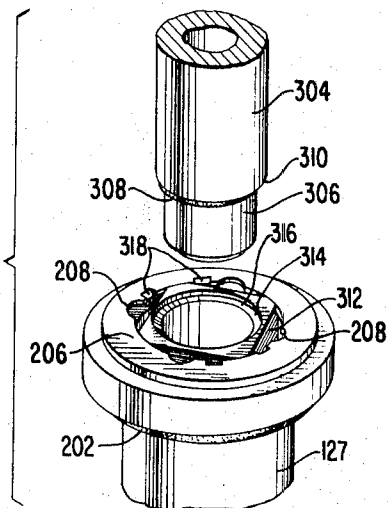


FIG. 10

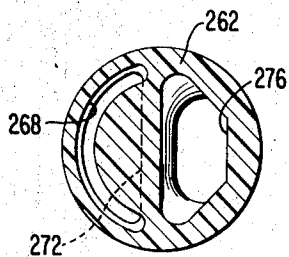


FIG. 11

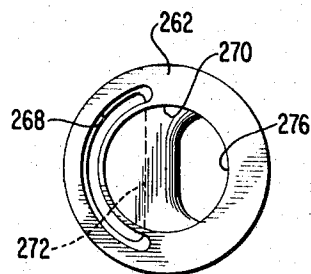
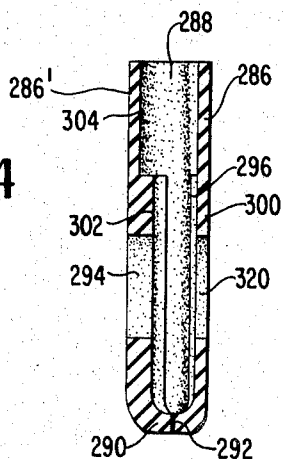


FIG. 14



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## BEER TAP

This application is a continuation of copending application Ser. No. 676,291, filed Oct. 18, 1967, which is, in turn, a continuation-in-part of copending application Ser. No. 611,610, filed Jan. 25, 1967 (issued Nov. 12, 1968 as U.S. Pat. No. 3,410,458), which is, in turn, a continuation-in-part of copending application Ser. No. 587,627, filed Oct. 18, 1966 (issued Jan. 14, 1969 as U.S. Pat. No. 3,422,448); said application Ser. No. 587,627 being, in turn, a continuation of application Ser. No. 406,682 (now abandoned) filed Oct. 27, 1964; 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, and application Ser. No. 150,982 (now abandoned), filed Nov. 8, 1961; said application Ser. No. 395,084 being in turn a continuation of said application Ser. No. 150,982, said application Ser. No. 150,982 being, in turn, a continuation-in-part of copending application Ser. No. 25,592 filed Apr. 29, 1960 which was abandoned in favor of application Ser. No. 159,818 filed Dec. 8, 1961 as a continuation of and copending with said application Ser. No. 25,592; said application Ser. No. 159,818 being issued as U.S. Pat. No. 3,156,252 on Nov. 10, 1964.

## DISCLOSURE OF THE INVENTION

This invention relates to a new and improved tapping device for drawing liquids, such as beer, from containers, such as beer kegs or barrels, using a gas to drive the fluid from the container. In particular, the invention relates to a new improved tapping device completely enclosed in metal and usable with conventional beer kegs such as the so-called "Peerless" systems and particularly to a subunit called a "keg adapter" which constantly seals the keg and cooperates with another subunit called a "coupler" which is attached to the beer-dispensing apparatus in a restaurant or tavern and is readily connected to the keg adapter so that the tapping device is automatically in operating condition.

Today, as in the past, the most widely prevailing practice in the beer industry is for a brewery to provide draft beer to retail outlets in "conventional" kegs which, for the most commonly used "Peerless" system, have a  $\frac{3}{4}$ -inch opening in the top, 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 or pushing 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. This siphon device includes means for injecting compressed air or  $\text{CO}_2$  through the tap rod into the keg to drive the beer through the siphon and also external valve means for respectively controlling flow of gas into the keg and beer from the keg. A gas supply hose connects the siphon to a source of gas, and another hose connects it to the beer-dispensing apparatus mounted on the counter or bar in the restaurant or tavern whereby beer may be dispensed from the keg. When the beer has been withdrawn from the keg to the extent feasible, the bartender then removes the tap and siphon device from the keg, removes the keg from the dispenser cabinet, and installs a new keg and repeats the process of knocking in or pushing in the bung and installing the tap rod and related siphon equipment, etc. The same tap rod and siphon is used for every keg and must be washed and cleaned periodically to prevent fouling and contamination.

The term "siphon" is used herein to describe the tapping devices, such as the tapping devices of this invention, for kegs and like containers in accordance with conventional practice, although the term is technically a misnomer in that such tapping devices do not utilize a siphon or the siphon principle in any way. When the term "siphon" is used herein, it is to be understood that it is used in accordance with accepted practice and refers to a tapping device for beer kegs and the like of the type disclosed and claimed.

The prevailing practice in tapping a beer keg which has been used for 50 years has a number of disadvantages for the

brewery, the dispensing establishment, and the public. These are set forth in more detail in my copending application Ser. No. 587,627, filed Oct. 18, 1966, which application is incorporated herein by reference. Briefly, they include the fact that the kegs often become filled with insects, small animals, and debris of every sort, yeast and other solids from the beer inevitably accumulate with the resultant accumulation of the destructive bacteria and further a substantial quantity of beer is often lost during the tapping process. Other disadvantages include the fact that conventional tapping systems require a certain amount of strength and may be dangerous to the bartender so that it is more difficult to tend bar, especially for a female.

In my aforementioned copending application Ser. No. 587,627, filed Oct. 18, 1966, I have disclosed a new improved beer-tapping device for dispensing beer or like liquids in kegs or barrels which overcomes the above-discussed and other problems and shortcomings of beer-dispensing systems heretofore available and also provides a number of important advantages and improved results as hereinafter set forth. Particularly, the invention of that application provides a new, improved means for packing and dispensing beer and like liquids in kegs utilizing an adapter assembly installed and sealed in the keg at the brewery with an also improved coupler subassembly which is fastened to the keg adapter by the tavern keeper or bartender, thus automatically breaking the seal and readying the keg for dispensing beer. Simple removal of the aforementioned coupler subassembly by the bartender causes the keg to automatically reseal, thereby positively preventing the entry of trash or other foreign objects. In addition, the beer is positively prevented from entering the gas passageway portion of the tapping device, thus preventing contamination or fouling of this portion of the device by dried beer residue, normally accumulating due to the surging of the beer.

In copending application Ser. No. 611,610, filed Jan. 25, 1967, there is disclosed a similar improved tapping device including an adapter subunit having a transition element forming a part of separate liquid and gas passageways. In the device of that application, the liquid passage through the transition element has its lower end offset to take optimum advantage of the limited space available while, at the same time, rendering the unit compatible with existing systems and particularly with existing cleaning equipment.

Accordingly, it is an object of the present invention to provide a further novel and improved beer-tapping device and novel improved keg adapter subassembly and components for the same of the general type disclosed and claimed in my aforesaid copending applications Ser. No. 587,627 and Ser. No. 611,610, so as to provide additional improvements in construction, mode of operation and result as below set forth.

It is another object of the present invention to provide a keg adapter of relatively simplified and inexpensively manufactured parts wherein the adapter has improved enlarged liquid and gas passageways uniquely formed to provide an enlarged beer passage and especially an enlarged gas passage adequate for the flow of beer therethrough, particularly when used in a "series" beer keg installation, without structurally weakening the keg adapter unit or enlarging the unit beyond the commercial size limitations imposed by the  $\frac{3}{4}$ -inch standard keg opening of a "Peerless" system for both low- and high-pressure draft beer systems.

It is still another object of the present invention to provide an improved tapping assembly and particularly an improved keg adapter subassembly or unit in which the parts are all surrounded by metal, such as stainless steel or the like. Subassemblies so constructed have increased strength and greater resistance to corrosion, while at the same time present a neater and more attractive unit highly acceptable to the beer-tapping industry. These results are achieved while maintaining enlarged beer and gas passageways without narrow or tortuous paths or undue obstructions which might otherwise tend to render the beer wild, flat, or otherwise less satisfactory and which are most important for series-type connections wherein

several kegs of beer are connected in series, necessitating the passage of beer through both passageways of the adapter unit.

Another object of the present invention is to provide an improved beer-tapping device and adapter subassembly having an improved locking mechanism for locking a metallic insert in place so as to maintain complete separation of the gas and liquid passageways through the adapter. The subassembly can be used with any standard-type beer keg in common usage of the so-called "Peerless" type, even though the kegs typically vary considerably in configuration and size according to source and time produced. The enclosed metallic unit of the present invention has the important advantage that it can be inserted from the top of the keg and avoids the difficulties of prior units, many of which had to be inserted and assembled from the keg interior, access being had to the interior of the keg through a separate outlet or cleaning aperture provided for that purpose. The keg adapter unit of this invention is semipermanently fastened in the beer keg, does not protrude from the end of the keg, and thus avoids damage by rough handling during transit to and from the breweries.

A further object of the present invention is to provide a new and improved arrangement for packaging and dispensing beer or the like from a keg or like container which achieves the above-discussed objects and advantages in terms of a metallurgically enclosed unit having a minimum number of parts which can be simply and economically assembled and manufactured. Important features of the present invention include enlarged beer and gas passageways, and an improved resilient or flexible rubber gas check valve, which cooperates with the enlarged gas passageway to assure adequate flow of fluid through the gas passageway at all times. The gas check valve is particularly designed for not only normal operation but also series-type connections and incorporates spacer ribs and spaced slits to provide for adequate flow of beer when the keg in which the adapter unit is installed is used in a series beer keg connection. The unit is substantially completely enclosed or surrounded by an outer metallic sleeve and is provided with a metallic insert locked in a novel manner so as to at all times insure complete separation and isolation of the liquid and gas passageways through the adapter while, at the same time, providing a clean, modern and attractive appearance to the adapter unit. The adapter is readily insertable from the top of the keg and may be used in all types of the so-called "Peerless" kegs, having a nominal keg aperture in the top of approximately three-fourths inch in diameter.

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

FIG. 1 is a schematic view showing the novel packaging and dispensing tapping device of the present invention as installed in a beer keg associated with the beer dispenser in a so-called "Peerless" type system, in conjunction with a source of gas under pressure, the beer keg being broken away and shown in section for clarity;

FIG. 2 is a vertical cross section through a portion of the tapping device of FIG. 1, particularly showing the details of the novel adapter unit of the present invention, further illustrating the manner in which it is mounted to a beer keg and how it cooperates with the coupler subassembly of the tapping device of FIG. 1;

FIG. 3 is an exploded view of portions of the adapter subassembly of FIGS. 1 and 2, particularly illustrating the novel metallic insert and plastic locking pins which cooperate to provide enlarged but at all times isolated liquid and gas passageways through the adapter;

FIG. 4 is a perspective view showing a top portion of the adapter subassembly of FIGS. 1-3, with the insert and locking pins of FIG. 3 in locking position;

FIG. 5 is a vertical cross section taken along lines 5-5 of FIG. 4 showing the insert and locking pins;

FIG. 6 is a plan view with parts broken away for the sake of clarity showing the assembled adapter, insert, and locking pins particularly illustrated in FIGS. 2-5;

FIG. 7 is an exploded view of the interior portions of the adapter subassembly illustrating the relatively simplified construction permitting large liquid and gas passageways which elements are insertable within the outer metallic housing completely illustrated in FIG. 3;

FIG. 8 is a horizontal cross section taken along line 8-8 of the lower end of the adapter unit of FIG. 2 illustrating the enlarged liquid and gas passageways and the improved spacing structure of the rubber or resilient gas check valve permitting use of the device for series beer keg connections;

FIG. 9 is a vertical cross section through the gas check valve further illustrating the improved interior spacing structure and double gas valve slit particularly suited for series operation;

FIG. 10 is a horizontal cross section through the transition element of FIG. 2 taken along line 10-10 of that figure;

FIG. 11 is a top plan view of the transition element of FIG. 2;

FIG. 12 is a vertical cross section through a portion of a modified tapping device constructed in accordance with the present invention;

FIG. 13 is an exploded perspective view of the modified device of FIG. 12; and

FIG. 14 shows a modified resilient check valve constructed in accordance with this invention.

The beer or similar tapping device of the present invention is, in many respects, similar to that disclosed and claimed in my copending application Ser. No. 587,672, filed Oct. 15, 1966, and Ser. No. 611,610, filed Jan. 25, 1967. Like parts bear like reference numerals. All the drawings and the entire specification of both of those applications are incorporated herein by reference as though here fully set forth.

Referring to the instant drawings and especially to FIG. 1, there is schematically shown a conventional beer keg of the so-called "Peerless" type having an opening 22 in its top wall 24 in which opening there is received the adapter unit B of the present invention, this unit being semipermanently installed in the keg 20. A normally closed cleaning opening 27 is formed in the sidewall of the keg. The coupler unit A of the present invention can be readily connected with the adapter unit B to form a tapping assembly as hereinafter amplified. The dispenser coupler unit A has a gas inlet port and fitting 25 adapted to receive a coupler 26 at the end of a gas supply tube 28 which communicates with a gas supply tank 30. If desired, a valve 32 of conventional type may be controlled at the location of the keg 20. The dispenser coupler unit also has a beer exit fitting 34 threaded as at 35 in FIG. 2 which is adapted to receive a conventional coupler 36 at the end of a flexible tube 38 through which the beer is conducted to a conventional dispenser 40. If desired, a suitable valve 42 may also be associated with the coupler 36 in a conventional manner for control of the beer flow at the keg 20. The arrangement of FIG. 1 is shown merely for the purpose of illustrating usage of the present invention. Since the components thereof, other than units A and B, and particularly adapter B, do not comprise a part of the present invention, further description thereof is believed unnecessary as dispensing arrangements for use with the new improved tapping device of this invention will be apparent to those skilled in the art in light of the disclosure herein.

Referring particularly to FIG. 2, the new improved tapping device of this invention comprises two main units A and B, herein generally called the "dispenser-coupler" and "keg adapter," respectively. Dispenser coupler unit A is similar to that shown in my above-mentioned two copending applications, Ser. Nos. 587,627 and 611,610. It comprises a main cylindrical head portion 44 which is provided with an internal bore and carries a threaded collar 119 for fastening to the keg adapter unit B as explained below.

A tubular arm 144 having a central bore is preferably formed integral with the head 44 and is adapted to receive the end of a piece of tubing that connects the coupler unit A to the tank of pressurized gas or air, such as the tank 30 shown in FIG. 1. The coupler unit A also includes a generally hollow

probe 45 which is positioned within the bore provided in head 44. The central bore of the probe forms the sole liquid passageway through the coupler unit A and incoming gases pass through the coupler around the probe. The probe is surrounded by a pair of sealing rings 47 and these sealing rings preclude the escape of gas in a manner more fully set forth in said copending applications. Coupler head 44 is also provided with a plurality of projections 49 for positioning and aligning collar 118 on the head. Reference may be had to said copending applications for a more detailed description and explanation of the coupler unit A of the present invention.

An annular member 160 is secured above the slightly enlarged lower end of the coupler head 44 by a snapping and retains collar 118 between it and projections 49 which collar is rotatably mounted on the coupler head 44. The collar 118 has a plurality of handle portions 119 formed integrally therewith, is internally threaded at 124 for cooperation with the threaded portion 128 of an annular ring 126 and fits loosely on the head, thereby permitting relative rotation between the collar and head. The bottom of the head carries an annular seal 56 which may be an O-ring of neoprene rubber for providing an annular seal between the coupler unit A and the upper surface of a metallic sleeve 127 (FIG. 3) of adapter unit B surrounding the beer and gas passages.

An important feature of the present invention is the provision of an improved adapter unit B and particularly one provided with a surrounding metal sleeve such as sleeve 127 which may be made of stainless steel or the like and which encloses the elements forming the gas and liquid passages through the adapter unit B. This metallic encased unit is provided with enlarged liquid and gas passageways, while, at the same time, it is adapted for insertion from the top of the keg into a standard "Peerless"-type opening having a nominal diameter of three-fourths inch. The adapter of the present invention is particularly suited for series connections wherein both the liquid and gas passageways must be relatively large and unobstructed to avoid excessive foaming and wildness in the beer and at the same time is manufactured from inexpensive elements which may be economically machined or molded and may be readily disassembled for cleaning, particularly cleaning of the elements forming the liquid valve in the adapter.

The keg adapter unit B is held in the standard opening 22 in a conventional beer keg 20 by means adapted to cooperate with the standard flange or collar 23 in a manner more clearly shown in FIGS. 6a-6e of application Ser. No. 587,627. This securing means includes the previously described ring 126 which has its lower ends spaced slightly above the top of the keg 20 in FIG. 2 and which is internally threaded at 190 to receive an externally threaded ring 192. As more fully described in the aforementioned copending applications, ring 192 includes a thin walled section and upwardly projecting diametrically opposite tabs formed on its inner periphery. This ring 192 is snapped over the keg flange so that it rests on the top 24 of keg 20 with the tabs extending upwardly and the ring 192 is aligned so that the projections of the flange fit between adjacent tabs and abutments on the ring. The keg adapter unit is checked to be sure that the adapter is properly positioned within keg opening 22. The ring 126 is then placed over the upper end of the adapter and aligned with the keg flange. Thereafter, the ring 126 is threaded on ring 192 so that the ring 192 is drawn up within the lower inside portion of ring 126 until the upper ends of the tabs on ring 192 contact the underside of the keg flange. Thus, when the rings 126 and 192 are assembled, they cooperate with the keg flange to securely lock the keg adapter unit within the keg opening 22 to prevent any longitudinal or rotational movement of the adapter unit relative to the opening. Ring 192 may be inexpensively molded of plastic without sacrificing strength or ruggedness of the keg adapter unit B since the metal ring 126 completely protects plastic securing ring 192, as well as the adapter unit. By removing one of the lugs and abutments, ring 192 may be made of metal and still slipped over the "Peerless" collar 23 to act in a similar manner.

Referring particularly to FIGS. 3-5, the keg adapter unit B is provided with a surrounding metal sleeve 127 to protect the components forming the liquid valve, liquid passageway, and gas passageways through the adapter. For this purpose, it is provided with an upper stepped flange 200 which engages with the securing ring 126 and when this ring is clamped to the beer keg flange, presses down on an annular sealing O-ring 202 to seal the sleeve 127 against the upper surface of the beer keg flange or collar 23.

The upper interior portion of metal sleeve 127 is provided with an annular groove 204 which extends 360° completely around the upper end of the central bore 205 of the sleeve. Cut out from the overhang 206 left by annular groove 204, are four notches 208, spaced 90° about the central longitudinal axis of the sleeve and extending from groove 204 to the upper surface 207 of stepped flange 200.

Received in the central bore 205 of sleeve 127 is a metal insert 210 having a cubic configuration as illustrated and a square cross section, as well as a central tubular bore 212 in coaxial alignment with the central bore 205 of sleeve 127. Insert 210 has the lower end of each of its four edges cut away as at 214 in FIG. 3 to form curved or arcuate corners. The four corners are further notched as at 216 adjacent the upper surface 218 of the insert to define a projecting shoulder 220 at each corner. Insert 210 is placed into the bore 205 of sleeve 127 and rotated until the shoulders 220 of the insert are aligned with and passed through the respective notches 208 in the top of the sleeve. Shoulders 220 are further inserted into the bore 205 until they engage the lower edge 222 of annular groove 204 to prevent the insert from further travel into the bore to the sleeve. The insert is then rotated through approximately 45° into the position illustrated in FIGS. 4-6 with the shoulders 220 riding in the annular groove 204.

Insert 210 may be locked in place in the position illustrated in FIGS. 4-6 by passing a pair of plastic locking pins 224 and 226 through two diametrically opposite ones of the notches 208 to prevent rotation and/or withdrawal of the insert 210. Each of the pins is provided with a slightly outwardly curved front surface 230 conforming to the inner curvature of bore 205 in sleeve 127 and with a flat rear surface 232 for engaging one of the flat sides of insert 210. The upper end of each locking pin is beaded as at 234 to pass through one of the notches 208 and rest within the groove 204 of the sleeve. The pins may be manually pressed into the positions illustrated in FIGS. 4-6 to tightly lock insert 210 within sleeve 127 against both rotational and longitudinal movement. Beads 234 are preferably of sufficient size to engage overhang 206 left by the slot 204, but are not of such size as to extend beyond the top surface 207 of the sleeve. The upper notches 216 on the four corners of the insert 210 are preferably of a length equal to the depth of the overhang 206 so that when the sleeve and insert are assembled in the manner illustrated in FIGS. 4-6, the top surface 218 of the insert is flush with the top surface 207 of the sleeve flange 200.

Referring to FIGS. 2-7, the lower end of insert 210 seals against a chucking washer 240 which has an enlarged upper end forming a flange 242 clamped between the lower end of insert 210 and the upper end of a plastic valve housing 244. Received within the valve housing is a bifurcated valve 246 around the lower end of which is wrapped one end of a helical compression spring 248. Bifurcations 250 and 252 on the valve project upwardly through a central aperture 254 in the chucking washer for engagement with the nose of the probe 45 in FIG. 2. The valve is normally urged closed by spring 248 pushing flange 256 of the valve against the underside of chucking washer 240, which washer forms a valve seat. The bifurcations or upwardly extending arms are notched at their upper ends to receive the lower end of the hollow probe 45 of the coupler unit A. When the spring 248 is compressed by the probe 45, beer is free to flow upwardly through the valve, i.e., around flange 256 and through the area left by the bifurcated arms 250 and 252 into the hollow end of the probe 45. The lower end of compression spring 248 bears against an internal shoulder 258 formed in plastic valve housing 244.

Plastic valve housing 244 is preferably made of a suitable plastic, such as a polycarbonate sold under the trade names "Lexan" and "Mobney." It tapers to a hollow lower end 260 in FIG. 7 of reduced diameter which projects into a plastic transition element 262, similarly preferably formed of a plastic such as polycarbonate sold under the trade name "lexan." Transition element or member 262 is provided with spaced annular grooves in its outer surface receiving sealing O-rings 264 and 266. It is also provided at its upper end with an arcuate gas passage 268 partially surrounding a central circular liquid passageway or opening 270. Near the lower end of transition element 262, gas passageway 268 is enlarged as at 272 and communicates with the interior of an integral lower projection 274 on the transition element in the form of a hollow half-circular tube. Partway through the transition element 262 the liquid passageway 270 gradually becomes laterally offset and changes in a gradual manner to the generally elliptical shape illustrated in dashed lines at 276 in FIG. 7 such that it is adapted to receive the upper end of a generally elliptical tube 278 formed integral with a lower plastic ring 280. Tube 278 is integral with the ring 280 and with a lower tube 282 which projects beneath the ring and is adapted to receive the upper end of the preferably flexible plastic siphon tube 228. Ring 280 is also provided with a semicircular aperture 284 adapted to receive a resilient and flexible rubber or plastic gas check tubular valve member 286 preferably made of surgical gum rubber or silicon rubber.

As best seen in FIGS. 8 and 9, gas check valve 286 is in the form of an elongated tube having the cross-sectional shape of a half circle open at its upper end 288 where it is adapted to slip over tubular projection 274 of transition member 262 and closed at its lower end 290. The closed end 290 of the resilient rubber or plastic gas check valve 286 is provided with a single elongated slit 292. Formed in the curved vertical wall 304 of gas check valve 286 is a second elongated vertical slit 294. These two slits permit gas under pressure to pass outwardly of the gas check valve 286 into the interior of the beer keg 20 but prevent either gas or liquid from flowing outwardly of the keg. In order to insure that the gas check valve 286 will never be completely collapsed by the internal pressure of the gas and liquid within the beer keg, check valve 286 is provided with spacers in the form of a pair of integral vertical ribs 296 and 298 formed on its flat side 300 and a wider flat vertical rib 302 formed on its curved side 304. Flat rib 302 curves through a substantial arc within the interior of the gas check valve 286 and vertical slit 294 passes through the curved wall 304 and the center of rib 302. Should pressure within the beer keg compress check valve 286, pushing walls 300 and 304 together ribs 296 and 298 abut against the edges of opposing rib 302 to at all times space walls 300 and 304 so that gas at all times has access from the interior of the check valve to the slits 292 and 294 through which it may pass outwardly of the valve into the beer keg.

Referring to FIGS. 12 and 13, there is shown a modified tapping construction with like parts bearing like reference numerals. In this embodiment the adapter again comprises a metal sleeve 127 sealed by O-ring 202 in the keg opening. The sleeve is clamped in position by the rings 192 and 126 as in FIG. 2 and the coupler is attached to the adapter by the threaded collar 118.

Within the head 44 of the coupler is a modified probe 304 similar to the hollow probe 45 of FIG. 2 but having a reduced diameter lower end 306 (FIG. 13) over which is slipped a sealing O-ring 308. This O-ring abuts against an external shoulder 310 and eliminates the need for the double-sealing O-rings 47 of FIG. 2.

Received within the upper end of the sleeve 127 in FIGS. 12 and 13 is an insert 312 in all respects similar to the insert 210 of FIG. 3 with the exception that it is provided with an annular depression 214 in its upper end forming an internal shoulder 316 against which O-ring 308 presses to seal the gas passageway when the coupler is tightened onto the adapter by the collar 118. As before, the nose of the hollow probe 304 en-

gages the beer valve and depresses spring 248 to open the valve.

Insert 312 is passed into the sleeve 127 through notches 208 and then rotated as in the previous embodiment about 45° beneath rim 206 in the groove 205 (see FIG. 3). After the insert has been properly positioned portions of the rim 206 are bent over to form tabs 318 locking or staking the insert in position so that it will not rotate within the sleeve. In this embodiment, the staking eliminates the need for the plastic pins 224 and 226 of the previous embodiment. To remove the insert, the tabs 318 are simply straightened by prying them up with a suitable tool and the insert rotated until it clears the rim through notches 308.

FIG. 14 shows a modified gas check valve similar to valve 286 of FIG. 9 and labeled 286'. This valve differs from that previously described by the addition of a third vertical slit 320 in its back wall 300 directly across from valve slit 294. This provides an additional valve flow path through the resilient tube and the modified construction with three valve slits is particularly suited for series beer keg connections where additional flow through the check valve is desirable.

As can be seen, the keg adapter B of the present invention provides enlarged liquid and gas passageways through the unit to prevent foaming or wildness in the beer, while at the same time taking optimum advantage of the space available in a conventional "Peerless"-type beer keg having a nominal diameter of three-fourths inch. An important feature of the present invention is that the interior plastic elements of the adapter are protected and substantially surrounded by metal and the unit is insertable from the top of the keg through the conventional keg aperture 22, thus eliminating the necessity for manipulating the adapter into position from the interior of the keg such as by reaching through the cleaning opening as that illustrated at 27 in FIG. 1. This is made possible by the provision of angular or offset flow passages through a transition element such as a plastic transition element 262 of the present invention whereby the lower ends of both the liquid and gas passageway through the transition element are offset and enlarged to provide an increased flow area therethrough. The central circular liquid aperture 270 at the top of the transition element makes it possible for the unit to be cleaned with conventional equipment since the valve assembly and communicating liquid flow passages are located along the axial centerline of the keg opening with the eccentric or offset portions of the liquid flow path occurring only at the lower end of the adapter, i.e., near the bottom of transition element 262.

The interior elements of the adapter, including valve housing 244, transition element 262, and ring 280, are preferably formed of plastic and preferably of a polycarbonate such as "Lexan." These units may be inexpensively molded as separate plastic elements and permanently joined together in final assembly as by plastic welding, with adhesives or the like. Because of the simplified and essentially three-piece molded plastic structure of the interior assembly of the adapter, it may be simply and inexpensively manufactured and at the same time provides enlarged liquid and gas passageways making the unit particularly adapted for series beer-keg-type connections wherein, particularly the gas passageway, should be relatively large to permit the flow of liquid therethrough. The novel metallic insert and plastic locking pins complete the metallic casing of the enclosed interior plastic elements so as to protect those elements and to provide a neat, clean, and attractive appearance. The surrounding sleeve 127 and insert 210 are preferably formed of suitable metal and in the preferred embodiment are both made of stainless steel. Plastic locking pins 224 and 226 may similarly be formed of polycarbonate and may be readily inserted to lock the insert in a single position wherein the insert 210 tightly clamps the chucking washer forming the liquid valve seat in sealing engagement with the valve housing to provide complete isolation between the liquid and gas passageways through the adapter. These pins may be readily inserted and later removed for disassembly and cleaning.

Beer exits from the keg through the siphon tube 228 which is either slightly spaced from the bottom of the keg or suitably notched at its lower end so that beer may gain access to it and pass upwardly through the siphon tube, through the tubes 282 and 278 of ring 280, transition element 262, and upwardly through the valve housing and around the valve to the interior of the probe 45 of the coupler A. The beer passes outwardly through a central passageway in head 44 of the coupler and outwardly outwardly through beer line 38 to the dispensing faucet 40 of FIG. 1. Gas, such as CO<sub>2</sub> or the likes, from pressurized container 30, enters the coupler head 44 through tube 144 and passes downwardly through an annular passageway in the head surrounding the liquid passageway in probe 45. Gas enters the adapter B through the space between the flat sides of insert 210 and the circular inner walls of the sleeve 127. It passes downwardly within the sleeve around chucking washer 240, and valve housing 244, the lower end of which is suitably tapered to the reduced diameter tubular bottom 260 such that the gas may pass around this taper into the arcuate opening 268 of transition member 262. Gas passes through the transition member by way of passageways 268 and 272 to the interior of gas check valve 268 from which it passes between the ribs to exit into the interior of the keg through one or both of the slits 292 and 294.

The improved keg adapter unit of this invention has a relatively large nontortuous unobstructed liquid passageway through which the beer is withdrawn from the keg with a minimum of expansion and contraction, thereby substantially obviating the problem of beer becoming wild or flat during withdrawal and making the invention universally usable with low- and high-pressure beer systems. Moreover, the improved keg adapter unit of this invention also includes an enlarged gas passageway which is completely segregated from the liquid passage therein with the beer positively prevented from entering any part of the gas passageway from within the keg to prevent contamination of the beer. The keg adapter unit includes means for securing the unit within the beer opening of conventional "Peerless"-type beer kegs without modification in the openings of the beer kegs. The improved adapter unit herein disclosed is a universally usable unit with the coupler units particularly shown and described in copending application Ser. No. 587,627 and can be quickly and easily attached to these coupler units to permit tapping of the beer kegs without the economic loss of beer heretofore occasioned in tapping beer kegs using prior tapping device. The arrangement of the device is such that all elements may be easily maintained and cleaned and can be manufactured competitively with the interior parts of the unit molded from suitable rigid plastic, such as "Lexan."

I claim:

1. A liquid-dispensing apparatus for use with a keg or like container for liquids which has top, bottom, and sidewalls with an opening in one wall of said keg characterized in that it comprises: a keg adapter comprising an outer sleeve insertable into the opening in said one wall from outside said keg and adapted to be secured within the keg wall opening, a gas passage through said sleeve, a gas check valve in fluid communication with said gas passage through said sleeve, a liquid passage through said sleeve for the transfer of liquid from the inside to the outside of said keg, said liquid passage bypassing said gas passage, a normally closed liquid valve in said liquid passage, a valve retainer insert in said sleeve, said insert having a hollow generally polygonally-shaped cross section defining a central liquid passage and gas passageways between its sidewalls and the interior of said sleeve, and means for retaining said insert in said sleeve.

2. Apparatus according to claim 1 wherein said insert is generally rectangular in cross section.

3. Apparatus according to claim 1 including at least one locking pin between said insert and sleeve for locking said insert against rotation in said sleeve.

4. Apparatus according to claim 1 wherein said retaining means comprises a portion of said sleeve staked to said insert.

5. Apparatus according to claim 1 wherein said insert is made of metal.

6. Apparatus according to claim 5 wherein said insert is made of stainless steel.

7. Apparatus according to claim 1 wherein said sleeve is provided on its inner surface with an annular groove adjacent its upper end, said insert having shoulders rotatable in said groove, said sleeve including notches permitting passage of said shoulders into said groove, and removable means receivable through said upper end of said sleeve for retaining said shoulders in said groove.

8. Apparatus according to claim 7 wherein said removable means comprise locking pins having a curved outer surface and a flat inner surface wedged between said insert and said sleeve, said locking pins being receivable through said notches.

9. Apparatus according to claim 8 wherein said pins are made of plastic.

10. Apparatus according to claim 7 including a valve housing within said sleeve, a resilient valve seat clamped between said housing and said insert, and spring means within said sleeve resiliently urging said valve against said valve seat.

11. Apparatus according to claim 10 wherein the central liquid passage through said insert is of circular cross section.

12. Apparatus according to claim 1 wherein portions of said liquid passage and said gas passage through said sleeve are radially offset from the axis of said sleeve.

13. Apparatus according to claim 1 including a liquid valve housing in said sleeve about said liquid valve, said liquid passage including a first passage in said housing coaxial with said sleeve and a second passage in communication with said first passage and radially offset therefrom.

14. A liquid-dispensing apparatus for use with a keg or like container for liquids which has top, bottom, and sidewalls with an opening in one wall of said keg characterized in that it comprises: a keg adapter comprising an outer sleeve insertable into the opening in the one wall from outside said keg and adapted to be secured within the keg wall opening; a gas passage through said sleeve, a liquid passage through said sleeve for the transfer of liquid from the inside to the outside of said keg, a normally closed liquid valve in said liquid passage, a valve retainer insert in said sleeve, means retaining said insert in said sleeve, said gas passage through said sleeve being separate from said liquid passage, and a resilient gas check valve communicating with the inner end of said gas passage, said check valve comprising a resilient member having spaced walls with a slit in at least one of said walls, said walls being movable under external pressure toward one another, one of said walls including rib means for preventing collapse of said member.

15. Apparatus according to claim 14 wherein said gas passage terminates in a tubular projection and said gas check valve is a tubelike member having an open end received about said projection.

16. Apparatus according to claim 14 wherein the other end of said gas check valve is closed, said closed end including an elongated slit.

17. Apparatus according to claim 14 wherein said gas check valve is made of silicone rubber.

18. Apparatus according to claim 14 wherein said gas check valve is made of gum rubber.

19. Apparatus according to claim 14 including a pair of vertical valve slits on opposite sidewalls of said gas check valve.

20. A liquid-dispensing apparatus for use with a keg or like container for liquids which has top, bottom, and sidewalls with an opening in one wall of said keg characterized in that it comprises a keg adapter unit including: a metal outer sleeve insertable into the opening in said one wall from outside said keg and adapted to be secured within the keg wall opening; a liquid passage through said sleeve for the transfer of liquid from the inside to the outside of a keg; a normally closed liquid valve in said liquid passageway, a valve retainer insert in said sleeve; a gas passage through said sleeve separate from said liquid passageway; a plastic valve housing surrounding said liquid passageway and cooperating with said valve retainer insert to maintain said normally closed liquid valve in

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said liquid passageway, a plastic transition member in said liquid passageway and said gas passage, said transition member having gas and liquid apertures therethrough offset at its lower end, a flexible gas check valve communicating with said gas aperture at the lower end of said transition member, and a plastic retainer ring having a liquid tube secured to said transition member and surrounding said gas check valve.

21. Apparatus according to claim 20 wherein said transition member includes a tubular projection at its lower end, said gas check valve is in the form of a resilient sleeve with its upper end slipped over said projection, said retainer ring clamping the upper end of said sleeve to said projection.

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22. Apparatus according to claim 21 wherein said liquid tube is integral with said retainer ring and has its upper end telescoped into said transition member, the lower end of said liquid tube projecting beneath said ring, and a siphon tube coupled to the projecting lower end of said liquid tube.

23. Apparatus according to claim 22 wherein the other end of said resilient sleeve is closed, said closed end including an elongated slit, a vertical wall of said sleeve including a second elongated slit, and a pair of spaced vertical ribs on the inner vertical wall opposite said second slit.

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