

## [54] TAPPING DEVICE FOR BEER KEGS AND THE LIKE

[75] Inventor: Mack S. Johnston, Rolling Hills, Calif.

[73] Assignee: Draft Systems, Inc., Northridge, Calif.

[22] Filed: Feb. 8, 1971

[21] Appl. No.: 113,570

## Related U.S. Application Data

[60] Division of Ser. No. 773,387, Nov. 5, 1968, Pat. No. 3,591,058, which is a division 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. Nos. 150,982, Nov. 8, 1961, abandoned, and Ser. No. 395,084, Sept. 8, 1964, Pat. No. 3,231,154, said Ser. No. 150,982, is a continuation-in-part of Ser. No. 25,592, April 29, 1960, abandoned, which is a continuation of Ser. No. 159,818, Dec. 8, 1961, Pat. No. 3,156,252.

[52] U.S. Cl. .... 222/400.7

[51] Int. Cl. .... B65d 83/14

[58] Field of Search ..... 222/400.7, 400.8;  
220/DIG. 1, 85 R, 85 F, 39 R, 39 A, 39 B, 5  
R; 137/212, 317, 320-322; 217/99-114

## [56] References Cited

## UNITED STATES PATENTS

3,065,885 11/1962 Chatten ..... 222/400.7

|           |         |                       |            |
|-----------|---------|-----------------------|------------|
| 2,539,349 | 1/1951  | Giles .....           | 222/DIG. 1 |
| 2,638,914 | 5/1953  | Flaith et al. ....    | 222/DIG. 1 |
| 3,231,154 | 1/1966  | Johnston .....        | 222/DIG. 1 |
| 3,422,448 | 1/1969  | Johnston .....        | 222/DIG. 1 |
| 3,567,080 | 3/1971  | Johnston .....        | 222/400.7  |
| 2,110,643 | 3/1938  | Barnes .....          | 217/99     |
| 3,228,413 | 1/1966  | Stevens, Jr. ....     | 222/DIG. 1 |
| 2,223,012 | 11/1940 | Wanderski et al. .... | 222/400.7  |
| 3,173,586 | 3/1965  | Pawson .....          | 222/400.7  |

## FOREIGN PATENTS OR APPLICATIONS

103,116 6/1898 Germany ..... 222/400.7

Primary Examiner—Robert B. Reeves

Assistant Examiner—David A. Scherbel

Attorney—Leblanc &amp; Shur

[57]

## ABSTRACT

The tapping device includes a keg adapter semi-permanently secured within a keg opening and having liquid and gas passages. The keg adapter is secured by an externally threaded ring which locks under the keg flange by cooperation with a collar which locks the keg adapter flange to the keg flange. A coupler having segregated liquid and gas passages and an internally threaded collar is attached to the keg adapter when the keg is tapped with the collar being threadedly secured to the ring.

19 Claims, 19 Drawing Figures

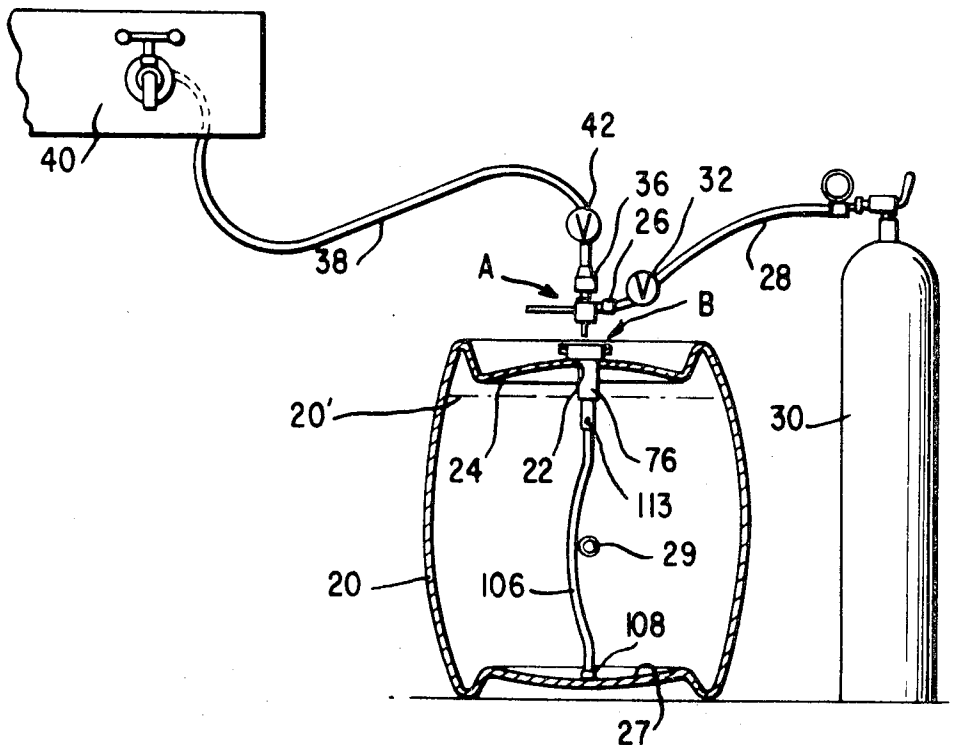


FIG. 1

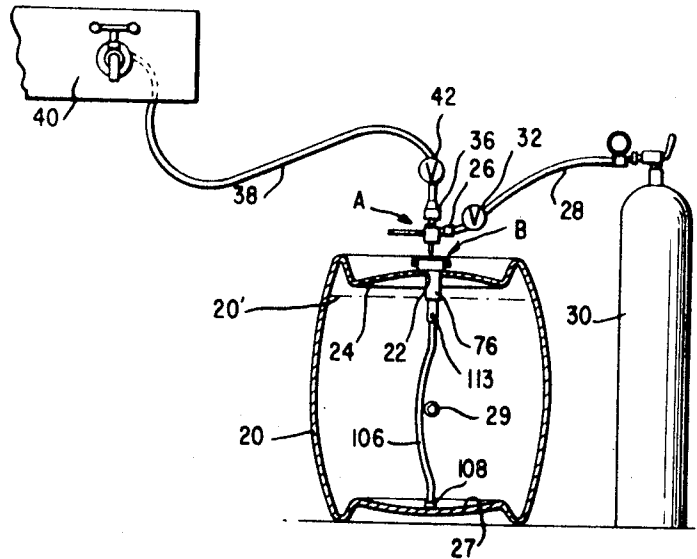


FIG. 5

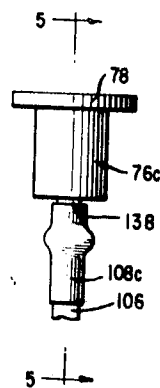
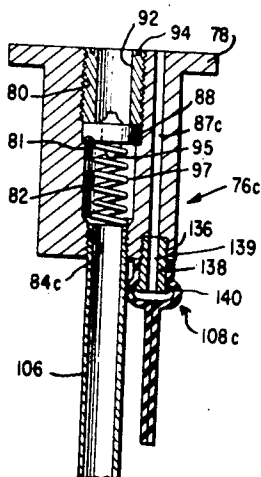


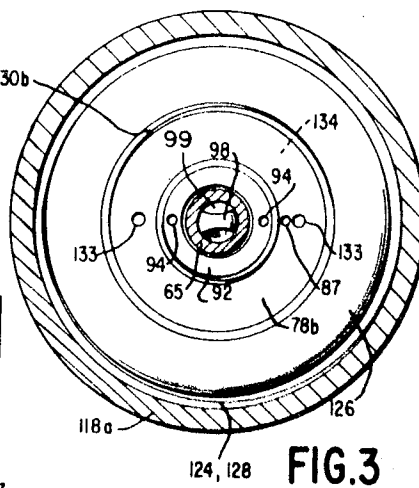
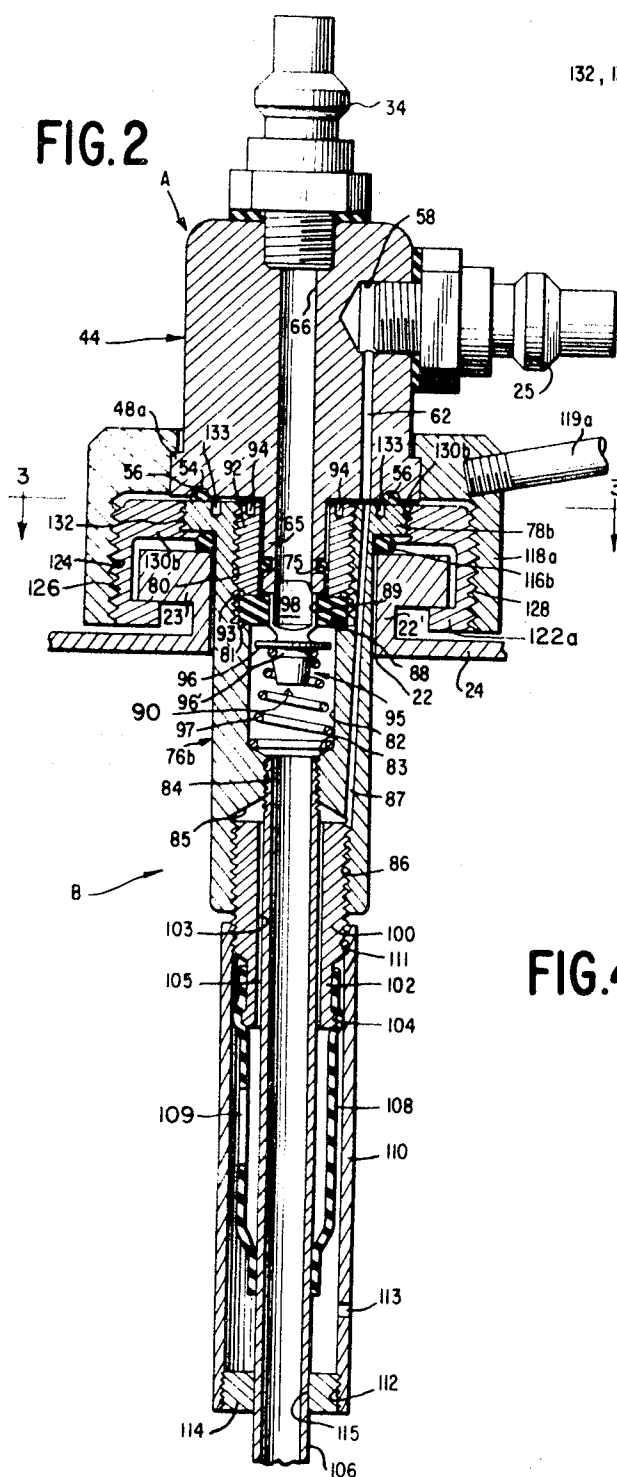
FIG. 5A

INVENTOR

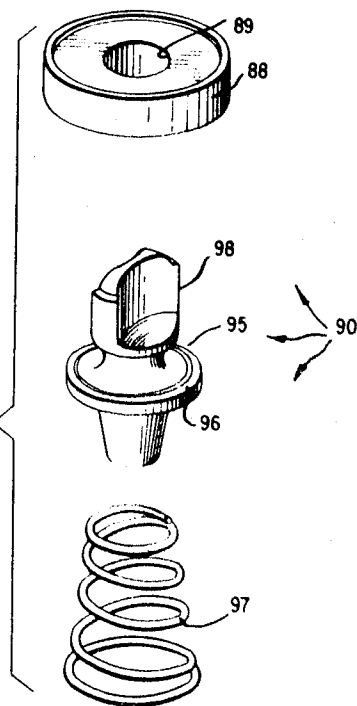
MACK S. JOHNSTON

BY *LeBlanc & Sherr*

ATTORNEY

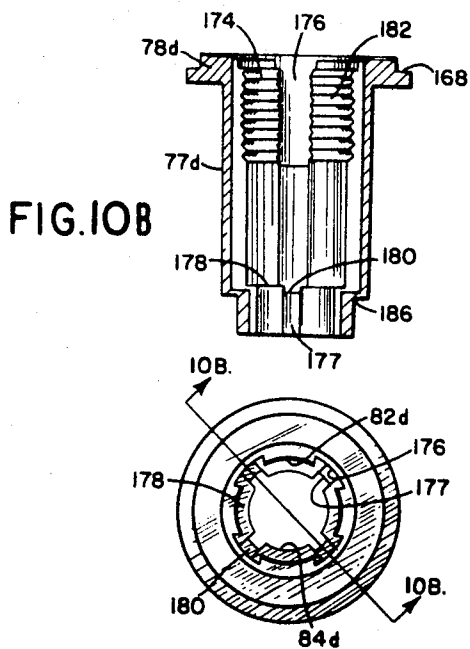
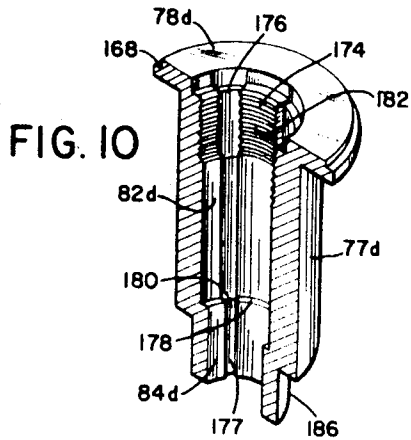


**FIG. 4**

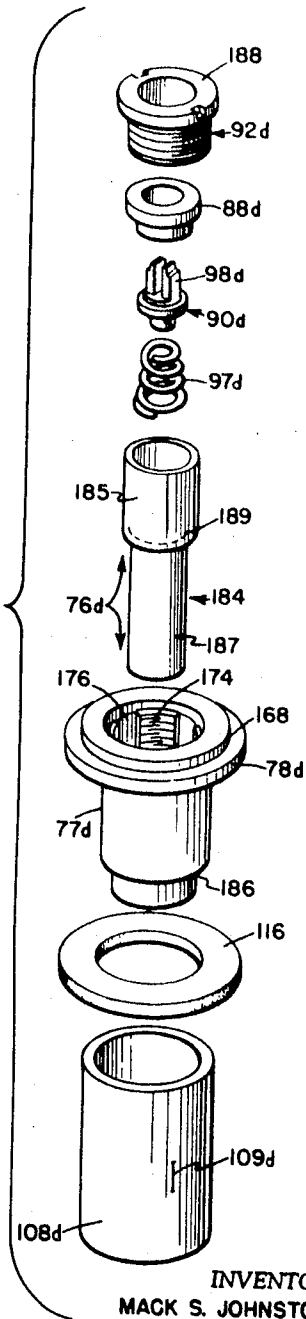


INVENTOR.  
MACK S. JOHNSTON  
BY *LeBlond & Sher*  
ATTORNEY





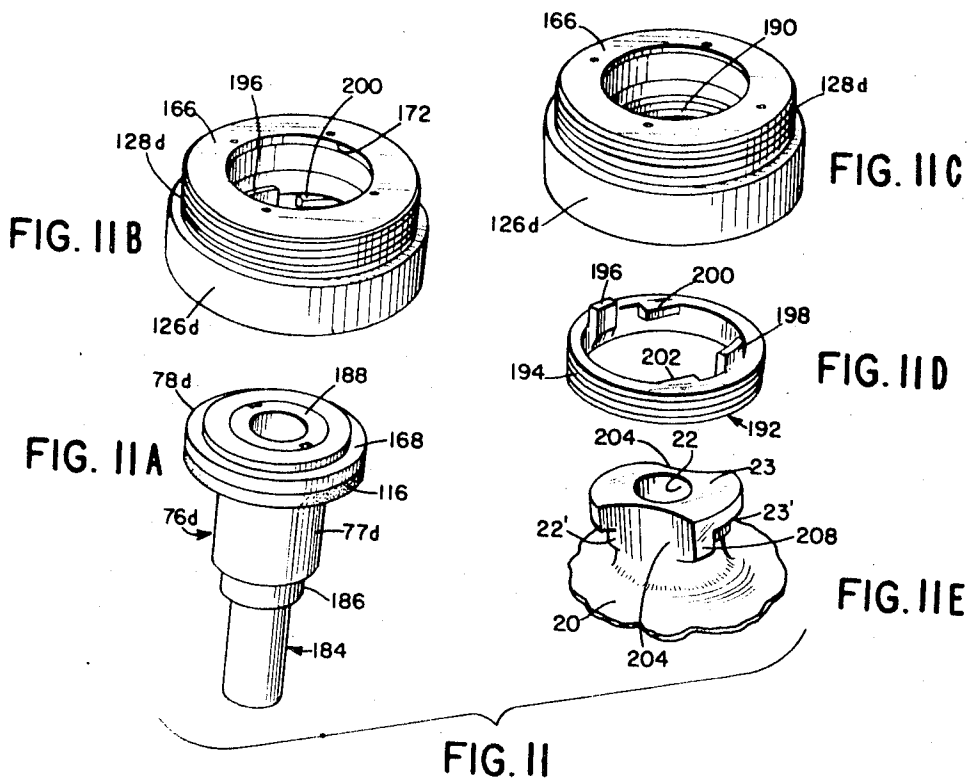
**FIG. 9**



BY

*LeBlanc & Shaw*

ATTORNEYS



INVENTOR  
MACK S. JOHNSTON

BY *Liblone & Shur*

ATTORNEYS

# TAPPING DEVICE FOR BEER KEGS AND THE LIKE

This application is a division of my copending application Ser. No. 773,387 filed Nov. 5, 1968 now U.S. Pat. No. 3,591,058 which application is, in turn, a division of my copending application Ser. No. 587,627, filed Oct. 18, 1966 for "TAPPING DEVICE FOR BEER KEGS AND THE LIKE" now U.S. Pat. No. 3,422,448 issued Jan. 14, 1969, said application Ser. No. 587,627 being, in turn, a continuation of my copending application Ser. No. 406,682, filed Oct. 27, 1964 for SIPHON DEVICE FOR BEER KEGS AND THE LIKE, now abandoned; said application Ser. No. 406,682 being a continuation-in-part of my copending application Ser. No. 150,982 filed Nov. 8, 1961, entitled "SIPHON DEVICE FOR BEER KEGS AND THE LIKE", and also of my likewise entitled copending application Ser. No. 395,084, filed Sept. 8, 1964 as a continuation of my aforesaid application Ser. No. 150,982; said application Ser. No. 150,982 being abandoned (after Notice of Allowance) in favor of said copending application Ser. No. 395,084, which issued as U.S. Pat. No. 3,231,154 on Jan. 25, 1966; said application Ser. No. 150,982 filed Nov. 8, 1961 being itself a continuation-in-part of my then copending application Ser. No. 25,592 entitled "BEER SIPHON ASSEMBLY", filed Apr. 29, 1960, which was abandoned in favor of my application Ser. No. 159,818 entitled "BEER SIPHON ASSEMBLY" 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.

The present invention relates to a new, improved tapping device for drawing fluid 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 usable with conventional beer kegs and comprising a sub-unit, called a "keg adapter", which constantly seals the keg, and a sub-unit, 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 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 CO<sub>2</sub> through the tap rod into the keg to drive the beer up through the siphon, and also external valve means for respectively controlling the 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, 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.

This prevailing practice, which has been used for fifty years, has a number of disadvantages for the brewery, the dispensing establishment, and the public: The open empty kegs often become filled with debris and trash of every sort. Not infrequently mice or other objectionable things get into the keg and swell and become difficult to remove through the bung hole. Insects which get into the keg and dry on the inside wall are very difficult to wash off. Also, old yeast and other solids from the beer inevitably accumulate within the currently used conventional tap and siphon arrangements, with resultant accumulation of destructive bacteria feeding on this material. When a new keg is tapped and the gas pressure is applied, the fresh beer surges into unclean portions of the tap and siphon devices and this causes the accumulated residue of yeast, bacteria, etc., to be wished down into the keg, thus promptly contaminating the carefully brewed product and also destroying its "brewery-fresh" flavor. This problem is further aggravated by the fact that in dispensing the beer from the keg there is a tendency of the beer to surge back and forth into the tap chamber where the old yeast and destructive bacteria have accumulated as varying gas pressure is applied when the dispensing apparatus is operated. Hence, when a keg is tapped with conventional methods, the great care in preparing pure good quality beer at the brewery promptly goes to naught at the dispensing establishment.

Further, on tapping, a substantial quantity of beer usually surges from the keg, with economic loss and a resulting mess. Then, when the bartender removes the tap rod and siphon arrangement from an empty keg, residual gas pressure in the keg will often cause the tap and siphon unit to pop out suddenly, sometimes injuring the bartender. Moreover, the beer keg is generally kept in a refrigerated unit under the bar, with limited space, as a result of which conventional tapping of the keg by the bartender is somewhat awkward, time-consuming and difficult (especially if the bartender is not too strong).

In an attempt to eliminate some of these aforementioned problems an alternative tapping device was adopted by one of the largest breweries. However, the alternative tapping device utilizes a non-conventional keg having an opening in the top with a fitting therein for receiving gas, plus another opening in the side of the keg near the bottom with a fitting therein for dispensing the beer. This arrangement requires manufacture, installation and coupling of two fittings. Also, the barrel is usually tilted to dispense the beer to maximum extent, which makes handling more difficult and requires more space. Further, the non-conventional keg and its two fittings are not only more expensive, but also introduce problems in high speed automatic cleaning and filling of kegs if the brewery is committed to above-described conventional kegs as is usually the case. Hence, the above-described tapping arrangement is still in common use, notwithstanding its many shortcomings.

However, it should be noted that the fact that these two aforementioned tapping devices are the only ones which have had substantial commercial usage prior to

this invention does not mean that others have not attempted to design and develop tapping devices that would obviate the above-mentioned problems without creating others. Numerous beer tapping devices have been proposed over the last 50-60 years. However, because of various practical short-comings, these numerous proposed devices have not gained substantial acceptance in the draft beer industry. Perhaps the principal reason why these other devices did not replace the present commercial tapping devices is because the designers of these devices did not take into account several important "facts of life" in handling draft beer.

Beer, unlike many other liquids, must be handled with extreme care lest it lose those qualities, such as taste, proper head and foam, and freedom from cloudiness, which the public demands. Thus, if the flow path from the keg to the dispensing apparatus is too tortuous or contorted or if there is too large a pressure drop across the tapping device caused by a restricted flow path, the beer will become "flat" or "wild" (e.g., too much foam).

Also, most (millions) of beer kegs or barrels in use in the United States at the present time have a  $\frac{3}{4}$  inch beer dispensing opening in their top and are designed to have the tapping unit connected to the keg by means of a bayonet-type coupling. Therefore, to gain acceptance in the industry, a new draft beer tapping device must be adapted for use with this small opening, and with the aforesaid means of attachment to the kegs. However, the problem is not merely one of miniaturization; e.g., if substantial industry penetration is to be expected, an improved tapping device must be "universal" for use with both high and low pressure draft beer dispensing systems that are used in different parts of the United States, without adversely affecting the quality of the beer.

Still further, an improved draft beer tapping device must be rugged so as to withstand rough treatment and handling, not only during the travel to and from the breweries, but also at the dispensing establishment. In this regard, the device must not only be constructed of strong, durable non-toxic materials, but it must also be designed so that it will not project from the top of the keg, because it will commonly be knocked off the keg during handling.

However, even if an improved tapping device meets these above criteria and obviates the above-described problems, it must be subject to economical manufacture for sale at a competitive price in order to be successful.

It is an object of the present invention to provide a new tapping device for dispensing liquids including a keg adapter for sealing about the keg opening and a coupler unit having collar means loosely rotatably carried by the coupler unit for easy attachment of the coupler unit to the keg adapter without special fittings.

It is another object of the present invention to provide a new improved beer tapping device which can be used with any standard type of beer keg in common usage, even though the kegs typically vary considerably in configuration and size, according to source and time produced. Further, the keg adapter unit of this invention, which as mentioned above is semi-permanently fastened in a beer keg, does not protrude from the end of the keg thus avoiding damage by rough handling during transit to and from breweries.

A further related object of this invention is to provide a novel and improved means for securing the aforementioned keg adapter in a conventional beer keg by cooperating with the existing keg neck structure to secure firmly the keg adapter in the beer dispensing opening of such kegs, and prevents any rotational or longitudinal movement of the keg adapter once it is in place.

It is still another object of the present invention to provide such a new improved means for packaging and dispensing beer or the like from a keg or like container which achieves the above discussed objects and advantages, yet can be made at a relatively low price with conventional machinery and with a minimum of tooling, whereby widespread use of the invention in its intended field is economically feasible.

Still other objects and advantages of the present invention will be apparent from the following description thereof with reference to the accompanying drawings, and also the appended claims. In the drawings:

FIG. 1 is a schematic view showing the new packaging and dispensing siphon device of the present invention as it would be installed in a beer keg associated with a beer dispenser, and a source of gas under pressure, (the beer keg being broken away and shown in section for clarity);

FIG. 2 is a vertical sectional view of an embodiment of the new improved dispensing device of the present invention, showing a keg adapter unit and dispenser coupler unit in assembled relation;

FIG. 3 is a sectional view of the siphon device of FIG. 2 taken along line 3-3 in FIG. 2;

FIG. 4 is an enlarged perspective view of the spring loaded valve used in the keg adapter unit of the embodiments shown in FIG. 2;

FIG. 5 is a vertical cross sectional view of a modified valve component of the adapter sub-assembly usable in another variation of the siphon device shown in FIGS. 1-4;

FIG. 5a is a side elevation (in reduced size) of the siphon adapter sub-assembly valve component shown in FIG. 5, looking to the left in FIG. 5;

FIG. 6 is a vertical sectional view showing another form of dispensing tapping device according to this invention, and including a modified improved keg adapter unit plus a modified improved dispenser coupler for use in restaurants or the like;

FIG. 7 is a horizontal cross-sectional view taken along line 6-6 in FIG. 6;

FIG. 8 is an exploded perspective view showing principal components of the packaging and dispensing device of FIGS. 6 and 7, it being noted that the portion of FIG. 8 within bracket A<sub>3</sub> constitutes the improved coupler unit applied by the bartender, and that the portion within bracket B<sub>3</sub> constitutes the improved keg adapter unit installed in the keg at the brewery (certain components of the keg adapter unit being unexploded but shown in FIG. 8);

FIG. 9 is an enlarged perspective exploded view showing the valve and related components of the keg adapter unit of FIG. 6;

FIG. 10 is a perspective sectional view of the main portion of the keg adapter unit of FIG. 6 showing in particular the air passages formed by cutting away threaded portions;

FIG. 10A is a top plan view of the main portion of the keg adapter unit shown in FIGS. 9 and 10;

FIG. 10B is a vertical sectional view of the main portion of the keg adapter unit taken along lines 10B; and

FIG. 11 is an exploded perspective view comprising sub-figures 11A, 11B, 11C, 11D and 11E showing the new improved arrangement of the present invention for securing the keg adapter to a conventional collar of a beer keg.

Referring especially now to FIG. 1, there is schematically shown a conventional beer keg 20 having an opening 22 in its top end wall 24, in which opening there is received the siphon keg adapter unit B of the present invention, this unit being semi-permanently installed in the keg 20. The opening 22 includes a radially outwardly directed flange 23. The dispenser coupler unit A in the present invention can be readily connected with the adapter unit B to form a tapping siphon assembly as hereinafter amplified. The siphon dispenser coupler unit A has a gas inlet port and fitting 25 in FIG. 2 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 suitable conventional type may be supplied for the coupler 26, so that the flow of gas may be controlled at the location of the keg 20. The dispenser coupler unit A also has a beer exit fitting 34 which is adapted to receive a suitable conventional coupler 36 at the end of flexible tube 38, through which the beer is conducted to a conventional dispenser 40. If desired, a suitable valve 42 may be associated with the coupler 36, in 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 the siphon units A and B, are conventional, and do not comprise a part of the present invention, further description thereof is believed unnecessary, as dispensing arrangements for use with the new improved siphon device of this invention will be apparent to those skilled in the art in light of the disclosure herein.

Referring particularly to FIGS. 2-4, the new improved siphon device of this invention comprises two main units A and B herein generally called the "dispenser siphon coupler" and "siphon keg adapter", respectively. Siphon dispenser coupler unit A comprises a main cylindrical head portion 44 which is provided with an internal bore 66. The underside of head 44 is provided with an annular groove 54, in which there is suitably secured a sealing ring or gasket 56 (by press-fit and/or adhesive). This sealing ring 56 may be made of neoprene rubber or other suitable material, and it normally extends outwardly from the lower surface of head 44, whereby the ring 56 will form a seal around the components inside ring 56 when the siphon dispenser coupler unit A is assembled with the siphon keg adapter unit B, as is particularly apparent from FIG. 2.

A hole 55 is drilled transversely into the upper portion of coupler head 44, the hole 58 being threaded to receive a threaded portion of coupler 25, which in turn is connected to previously mentioned coupler 26 of the air supply conduit 28. (A typical suitable coupling 25, 26 is the "Flomatic coupler" made and sold by the Superior Products of Minneapolis, Minn.) Another small hole 62 is drilled in coupler head 44 from its bottom side, vertically, inside of sealing ring 56, and in communication with the transversely extending hole 58. This provides a gas or air passage-way whereby gas from the cylinder 30 fed through tubing 28 is caused to enter

head 44 through coupler 25-26 and pass down through head 44 via conduit 58,62, to drive the beer from the keg, as below amplified.

The siphon coupler head 44 also includes a tubular "probe" 65 projecting from its underface and through which a bore 66 passes. The probe 65 is provided with a groove for seating a sealing ring 75, which may be an O-ring of neoprene rubber. As is especially apparent from FIG. 2, the sealing ring 75 provides a seal between the probe and the related component of the adapter unit B for functional purposes hereinafter amplified. The top of the coupler unit is internally threaded to receive, for example, the beer exit fitting 34. Coupler head 44 carries an enlarged annular shoulder forming ring 48a at its lower end. Coupler head 44 also loosely rotatably supports an annular retaining collar 118 which is internally threaded as at 124, collar 118 carrying a turning handle 119a projecting therefrom.

Still referring to FIG. 2, the siphon keg adapter B will now be particularly described. The adapter unit B comprises a main fitting generally indicated at 76, which has a cylindrical section 77 with an enlarged flange 78 externally threaded as at 132 extending outwardly from the upper end thereof. The entire center of fitting 76 is drilled out to provide four aligned bores 80, 82, 84 and 86, of different diameters. Chamfered portions 83 and 85 interconnect bore 84 with bores 82 and 86, respectively, and a shoulder 81 is provided between bores 80 and 82. Bores 80, 84 and 86 are threaded, as shown particularly in FIG. 2, for reasons amplified hereinafter; it is noted, however, that bore 80 need not be threaded for its entire length since the bottom of this bore accommodates a rubber or like seating ring or washer 88 which forms a part of a spring-loaded valve sub-assembly 90 received within bore 82. (See especially FIG. 4.) The threaded portion of upper bore 80 receives an annular valve retainer ring 92, which is provided on its top surface with a pair of aligned indentations 94, whereby a spanner wrench can be used to screw ring 92 into threaded bore 80 so that the bottom of ring 92 tightly engages the top of the rubber valve seat 88. It will be noted that the shoulder 81 which supports the lower edge of valve seat 88 is preferably cut at an angle as shown in FIG. 2 and that the lower edge of the retaining ring 92 is preferably provided with a peripheral shoulder recess 93, whereby the rubber ring 88 is held in place with a better seal.

Referring to FIG. 4, the valve 90 comprises a closure member 95 which has a plate-like section 96 adapted to engage the underside of ring 88 and thus close off its central aperture 89, with a groove 96' below plate section 96 for securing member 95 to the top coil of compression spring 97. The lower end of spring 97 rests against the chamfered portion 83 at the bottom of bore 82. The valve closure member 95 has a stem portion 98 extending upwardly from its central sealing plate section 96, and this stem portion 98 has a cross-section as shown particularly in FIG. 3, whereby fluid may pass through the resultant spaces 99 between valve stem portion 98 and the inside walls of aperture 89 in valve seating ring 88. Thus, when the closure plate 96 of valve member 95 abuts the underside of the sealing ring 88 due to the action of compression spring 97, as is normally the case when the siphon dispenser coupler unit A is not assembled on the siphon keg adapter unit B, the described valve 90,88 will prevent passage of fluid or the like from or into chamber 82. On the other hand,

when the valve stem portion 98 is depressed (as by probe 65 of the head 44 when units A and B are assembled) fluid may flow from chamber 82 through the openings 99 in the valve seating ring 88, as amplified hereinafter in description of the operation of the complete siphon assembly.

There is received in the threaded aperture 86 at the lower end of fitting 76 a ferrule having an upper enlarged threaded section 100 and a smaller unthreaded cylindrical section 102, at the lower end of which is an annular lip 104. The threaded aperture 84 receives the threaded upper end of an elongated tube 106 known as a "restrictor rod" or "tap rod". Referring back to FIG. 1, this tap rod 106 is of sufficient length so as to substantially reach the bottom 27 of beer keg 20 for the purpose of siphoning beer from the keg. Beer tap rod 106 can be straight, but is preferably provided with a slight curve in the middle as shown in FIG. 1, so as to permit non-interfering insertion of an elongated nozzle or hollow rod into hole 29 in the side of keg 20 for the purpose of filling the keg with beer, in accordance with current conventional brewery practice. The lower end of the tube 106 may be provided with any suitable strainer, as schematically shown at 108 in FIG. 1.

The siphon keg adapter B includes a cylindrical gum rubber valve 108 (such as fully disclosed in my aforementioned application Ser. No. 25,592), as shown especially in FIG. 2. Cylindrical rubber valve 108 has its reduced upper end fitted tightly in sealing relation over lip 104 of ferrule section 102, and has its lower end fitted tightly in sealing relation around the outside of restrictor or tap rod 106. The enlarged intermediate section of rubber valve 108 is provided with one or more longitudinal slits 109 to permit compressed gas or air to pass from the inside of the valve to its outside, while preventing beer (or other fluid) in keg 20 from passing to the inside of rubber valve 108.

A hollow member 110, which has its upper end internally threaded at 111, is mounted on the upper threaded ferrule portion 100. Tube 110 is also internally threaded at its lower end 112 to receive a small annular bushing 114 which has a central aperture 115 surrounding the exterior of restrictor rod 106 with a close, but not tight, bite. Tubular member 110 is also provided with at least one aperture 113 (FIG. 2), whereby gas passing from the inside of rubber valve 108 through valve slit 109 may exit from aperture 113 into the keg 20. The main purpose of tube 110 is to cover and protect the rubber valve 108. (Since the nature and operation of rubber valve 108 is fully explained in my aforementioned application Ser. No. 25,592, further detailed description thereof is deemed unnecessary.)

It will be noted that ferrule 100, 102 is provided with an axially extending inside bore 103 which is of larger diameter than the outside diameter of tap rod 106, whereby there is a gas passageway 105 between ferrule 100, 102 and the tap tube 106.

The main fitting 76 of adapter B is also provided with an air passage 87 extending vertically from the top of fitting member 76 to the chamber formed within the upper end of bore 86, as is especially apparent from FIG. 2.

In the embodiment of FIGS. 1-4, the exterior periphery of flange 78 is threaded at 132, as previously described, for cooperation with the threads 130b of the inwardly extending flange of ring 126. An O-ring 116b

of rubber or like material is secured, as by suitable adhesive, to the main fitting 76 beneath annular flange 78, as shown particularly in FIG. 2, to serve as a keg sealing ring as below explained. The upper surface of flange 78 is provided with a pair of aligned apertures 133 adapted to receive the prongs of a spanner wrench for installation of the main fitting 76, as below described. The coupler unit A also includes an annular internally threaded retainer ring 118a with a handle 119a. Annular ring 126 is externally threaded at 128 for cooperation with the threaded portion 124 of the retaining collar 118 comprising part of dispenser coupler unit A. The lower part of ring 126 is provided with a pair of inwardly projecting lips 122a, for the purpose of effecting a bayonet type mounting of adapter B on laterally extending beer keg flange 23. Ring 126 also includes an upper annular flange 130 adapted to threadedly engage the externally threaded flange 78.

In usage, the keg adapter unit B of this embodiment is assembled on the flange 23 of the beer keg by first applying the ring 126b to keg flange 23, utilizing the aforementioned bayonet type connection. As will be apparent, at this point the ring 126 will fit somewhat loosely on the beer keg flange 23. The rest of the keg adapter unit B, comprising the main fitting 76 and tap rod 106 extending therefrom, etc., is then installed in the keg through opening 22, and the threaded exterior of flange 78 is screwed into the internally threaded flange of ring 126, using a spanner wrench with prongs in apertures 133. The fitting 76 is turned until its top is substantially flush with the top of ring 126, and the parts are so sized that the O-ring 116b will compress sufficiently against the top of the keg flange 23 to provide a good seal. Preferably O-ring 116b is compressed with sufficient force so that the fitting 76 and ring 126 are held against displacement from keg flange 23, with the inwardly extending lips of ring 126 firmly engaging the underside of keg flange 23, when the adapter unit B is installed as described.

The dispenser coupler unit A is then assembled on the keg adapter unit B by screwing collar 118 onto the threaded exterior of adapter unit collar 126 until the O-ring 56 is caused to compress in sealing engagement against the top of flange 78. At the same time, probe 65 of head 44 depresses the stem 98 of the valve 95, thereby displacing the sealing ring 96 of valve member 95 from the underside of rubber seating gasket or ring 88, as shown in FIG. 2. This allows beer entering spring valve chamber 82 via tap rod 106 from keg 20 to pass through aperture 89 of valve seating ring 88 into the central bore 66 of the coupler unit probe 65 and thence through the dispensing hose 38 to the dispenser 40. Since the O-ring 75 is in sealing engagement with the inside of retainer ring 92, beer is prevented from escaping to the outside of probe 65.

The faucet at dispenser 40, and the valve 42 is dispensing line 38 (if included) are used to suitably control withdrawal of beer from the keg 20. When the keg 20 is first tapped, the natural pressure of gas within the keg will drive beer up through tap rod 106 through siphon assembly A-B. The described siphon A-B of the present invention provides such an effective means for initial tapping of the beer keg that the loss of draft beer upon tapping is automatically kept to a minimum (for example, one glass), whereas typical loss upon tapping of a keg with described conventional means presently

used may run in the order of a gallon, due to excess pressure of CO<sub>2</sub> which has escaped from the beer.

The air supply fitting 26 is secured to coupler 25 of siphon unit A, and compressed air or gas is supplied at a controlled rate to the siphon A-B. Since the lower surface of head 44 of coupler unit A is sealed tightly against the upper surface of flange 78 of adapter unit B, and since the probe 64 is also sealed with respect to the adapter unit B by O-ring 75, the gas or air fed into aperture 58 is forced down through passage 62 into the small hole 87 and thence into the upper portion of bore 86 just above the ferrule 100. (It will be noted that, due to the described arrangement of sealing rings 56 and 75, it is not essential for said hole 87 in adapter sub-component 76 to be in line with hole 62 in head 44 of coupler unit A, and that such alignment is shown merely for convenience of illustration in the drawings.) The compressed gas or air passing into the upper end of bore 86 cannot pass back upward into the valve chamber 82, through which beer is passed via tap rod 106, because the tap rod 106 is tightly screwed into threaded aperture 84 of adapter sub-component 76, thus providing a complete seal at this point. Because there is a spacing 105 between ferrule 100, 102 and tap rod 106, the gas or air is in turn forced down through passageway 105 into the center belly of rubber valve 108. When the pressure in the keg 20 is less than the gas pressure fed to siphon A-B, the rubber valve 108 expands, thereby releasing gas into the keg through the valve slit(s) 109 and vent(s) 113 in covering sleeve 110. The pressure of the gas thus injected into the keg 20 forces the beer through strainer 108 into the lower end of the tap rod 106, and up through tubular rod 106 directly into the spring valve chamber 82, whence it passes through openings 99 within ring 88 into central aperture 66 of coupler unit A to the dispensing line 38, as previously discussed.

It is noted that the opening 120 of the adapter unit B would normally be covered at the brewery with a suitable means, such as a plastic cover or plug which could be screwed or snapped into or over opening 120, thus protecting the valve and other parts of adapter unit B from ingress of dirt or the like. Preferably, this cover would have a spring loaded cover plate over opening 120 which is moved out of the way when the bartender taps the keg and then automatically again covers opening 120 when coupler unit A is removed after the keg is emptied so dirt will not get in during subsequent storage.

Referring now to FIGS. 5 and 5A, there is shown at 76c a modified type of main fitting with a different one-way gas valve 108c which can be used in lieu of the main fitting 76 disclosed and described in connection with the latter figures.

Fitting 76c comprises a main cylindrical section with a flange 78 extending laterally from the upper end thereof, and is provided with three axial bores 80, 82 and 84c of different sizes as shown in FIG. 6. The lower and smaller bore 84c is threaded and receives the upper end of the restrictor or tap rod 106, similarly to bore 84 in the embodiments of FIGS. 1-4 and 7-7A. The upper part of bore 80 is threaded for at least part of its length and a rubber seating ring 88 is supported on the shoulder 81, at the lower end of this bore. Ring 88 is held in place by an annular retaining ring 92 threaded into the upper part of bore 80, ring 92 having spanner wrench indentations 94 for the purpose of

tightening it against the sealing ring 88. There is disposed within the bore 82 a valve member 95 urged against the underside of ring 88 by a spring 97 in like manner as in the previously described embodiment. (It will be noted, however, that fitting 76c does not include bore 86 and ferrule 100, 102, etc., as in the prior embodiments.

Fitting 76c is provided with a small vertical bore 87c, and a coaxial enlarged threaded bore 136 at the lower end thereof. Bore 136 receives the threaded end of a small cylindrical ferrule 138 which has an axial bore 139 in communication with bore 87c, and a peripheral lower lip 140. The previously mentioned one-way gas valve 108c is made of a short length of flattened rubber tubing, one end of which is secured in sealing engagement around the lip 140 on ferrule 138. The remainder of the flat rubber tube has its sides pressed together (as shown in section in FIG. 5) to form a "flap valve".

The flange 78 of the fitting 76c will be provided with peripheral threads, like threads 132 on flange 78b, when fitting 76c is used in lieu of fitting 76.

When the modified fitting 76c is used as part of the keg adapter unit, air or gas fed through the aperture 62 of the head of the coupler unit will pass through aperture 87c due to cooperating seals formed by O-rings such as shown at 56 and 75 in FIG. 2. When the pressure of the gas fed into the aperture 87c exceeds pressure within the beer keg, the flap valve 108 will distend slightly, so that the gas will pass into the keg and drive the beer up to the tap rod 106. Since the probe of the assembled coupler unit will have depressed the valve member 95, beer forced up the tap rod 106 will pass through the aperture in seating ring 88 and thence through the coupler unit head to the dispenser. However, when the pressure in the beer keg is greater than the pressure of the gas fed to bore 87c, the sides of the flap valve 108c will be pressed together and this will prevent gas or beer in the keg from passing back up into the bore 87c and into related parts of the siphon assembly through which compressed air or gas is supplied to the beer keg.

Referring now to the embodiment hereof illustrated in FIGS. 6-11, there is disclosed another form of keg tapping unit comprising a coupler unit A<sub>3</sub> and a keg adapter B<sub>3</sub>. Coupler unit A<sub>3</sub> includes a generally cylindrical head 44d which has a central vertically extending bore 136 of three diameters, indicated at 138, 140 and 152. A tubular arm 144, having a central bore 146, is preferably formed integrally with the head 44d and is adapted to receive the end of a piece of tubing that connects coupler unit A<sub>3</sub> to a tank of pressurized gas or air, such as the tank 30 shown in FIG. 1 hereof. The coupler unit A<sub>3</sub> also includes a generally tubular probe 64d which is positioned within the bore 136 and which has a central bore 66d that forms the sole liquid passageway through the coupler unit. The exterior of the probe 64d is provided with grooves 137 and 139 for sealing rings 141 and 143, which may be "O-rings" of neoprene rubber. The sealing rings 141 preclude the escape of gas from passageway defined by bores 146, 136 and 142; and the unique cooperation between head 44d, probe 64d, seals 141 and 143, eliminates the necessity of drilling a separate gas passageway in the head 44d as in the previous embodiment with resultant savings in manufacturing costs and easier cleaning and maintenance.

The upper end of the probe 64d has an outwardly extending flange 148 having an outer diameter and thickness substantially equal to the inner diameter and depth of bore 138 whereby when the probe is positioned within the head 44d, the upper end of the probe 148 is aligned with the top of the head as shown in FIG. 6. When dispenser coupler unit A<sub>3</sub> is used in a restaurant, a conventional cap 152, not shown, is connected to the externally threaded portion 150 of head 44d, and this cap, used with a sealing ring, holds the probe 64d within bore 136 in coupler head 44d, thereby forcing the lower end of the probe 64d to project sufficiently below the bottom of the coupler head portion 44d so as to open the beer valve in the keg adapter unit B<sub>3</sub> when the coupler unit A<sub>3</sub> is connected thereto.

An annular member 160 is secured about the slightly enlarged lower end of the coupler head 44d by a snap ring 162 and retains collar 118d rotatably mounted on coupler head 44d. The snap ring 162 allows the member 160 to be quickly removed from the head 44d so that collar 118d can be slipped off head 44d for easy repair or replacement when necessary. The collar 118d has a plurality of handle portions 119d formed integrally therewith, is internally threaded at 124d for cooperation with the threaded portion 128d of the annular ring 126d, as shown in FIG. 1, and fits loosely on the head thereby permitting relative rotation between the collar and the head. The ring 126c forms the outer portion of the means (shown particularly in FIGS. 11B, C and D) for securing the keg adapter unit B<sub>3</sub> in the standard 3/4-inch diameter opening in a conventional beer keg 20. The bottom of the head 44d carries an annular seal 56d which may be of an "O-ring" of neoprene rubber, for providing an annular seal between the coupler unit A<sub>3</sub> and the upper surface 166 of the ring 126d of adapter unit B<sub>3</sub>, surrounding the beer and gas passages.

While the keg adapter unit B<sub>3</sub> is somewhat similar to the keg adapter unit shown in FIGS. 1-4 hereof, the keg adapter unit B<sub>3</sub> has a unique gas passageway formed therein permitting an enlarged beer withdrawal passage, with an improved beer check valve arrangement providing a number of important advantages, as amplified herein.

Thus, the keg adapter unit B<sub>3</sub> comprises a main fitting 76d which includes a generally cylindrical body section 77d having an enlarged flange 78d extending radially outwardly from the upper end thereof. The outer periphery of the flange 78d is notched, as shown at 168, and cooperates with a reversed notched portion 170 formed about the edge of the central aperture 172 in the ring 126d to prevent the fitting 76d from passing upward through the ring aperture 172. These notched portions of the flange 78d and ring 126d are arranged so that when the keg adapter unit B<sub>3</sub> is positioned in a keg, the upper surface of the flange 78d lies in the same horizontal plane as the upper surface 160 of ring 126d, as shown in FIG. 6, whereby metal ring 126d protects the adapter fitting 76d, particularly when the latter is made of plastic.

The body section 77d of main fitting 76d has a pair of centrally disposed, coaxial bores 82d and 84d formed therein. As shown in FIGS. 10, 10A and 10B, there are four longitudinally extending segments 174 positioned evenly about the inner periphery of these two bores and defining between them four substantially identical upper slots or grooves 176 and lower slots or grooves 177. The upper ends of the segments 174 in the

lower bore 84d protrude longitudinally, slightly above the shoulder 178 formed between the two bores 82d and 84d thereby forming four radial grooves 180 in the shoulder 178 that interconnect the slots 176 and 177 in the two bores 82d and 84d. The upper portions of the segments 174 in the upper bore 82d are provided with interrupted threads 182 adapted to receive an externally threaded retainer ring 92d, the lower end of which tightly engages annular rubber valve seat 88d to secure valve seat 88d between the ring 92d and the upper end of a tubular member 184. Member 184 includes an upper portion 185 which fits within the bore 82d and a lower portion 187 which fits within the lower bore 84d and extends beyond the lower end of the main fitting 76d. A compression spring 97d fits within the upper portion of the member 184 and its lower end rests on the shoulder 189 formed by the juncture of the two portions 185 and 187 of member 184. The spring 97d biases a beer valve 90d upwardly against the underside of the rubber valve seat 88d in a manner like that described in the previous embodiment. The improved valve 90d differs from valve 90 shown in FIG. 4 in that the middle part of the stem portion 98d has been removed as shown in FIGS. 6 and 9, so as to enlarge the beer passage space 99d when the valve 90d is displaced from seat 88d by application of the coupler. This provides superior beer flow characteristics making the keg adapter unit B<sub>3</sub> universal for low- and high-pressure beer systems, while avoiding making the beer "wild" as it is drawn from the keg.

Referring again especially to FIG. 6, a beer tap rod 106d is frictionally or otherwise secured around the lower end 187 of member 184, and extends to the bottom of the keg. Tap rod 106d may be made of a suitable flexible material, in which case it need not be bent to permit insertion of a rod through side opening 29 of typical beer keg 20.

A resilient gas check valve 108d is positioned with a lower portion tightly engaging a peripheral portion of tap rod 106d; and the lower end of the keg adapter fitting body section 77d is chamfered at 186 to receive the upper end of the gas check valve 108d which tightly fits around part 186. A slit 109d is formed in the intermediate portion of valve 108d to permit gas or air to pass from the inside of the valve to the interior of the keg when the pressure of the gas is greater than the pressure inside the keg; whereas the ends of valve 108d and slit 109d prevent gas or beer from passing from the interior of the keg to the inside of valve 108d and thus preclude contamination of the gas feed portions of the tapping device comprising keg adapter B<sub>3</sub> and coupler dispenser A<sub>3</sub>.

The improved keg adapter unit B<sub>3</sub> of this invention including main fitting 76d achieves an increased gas passageway through which gas or air under pressure may pass from dispenser coupler unit A<sub>3</sub> to the inside of valve 108d, via grooves 176 and 177 and radial grooves 180 formed in the interrupted threads 182 of body section 99d in cooperation with ring 92d, valve seat 88 and member 184. The outwardly extending flange 188 on the upper end of the ring 92d protects the upper end of this passageway from the entry of dirt, etc., without causing undue restriction of the gas passageway. Thus, the improved gas passageway in the adapter unit B<sub>3</sub> is formed through the unique utilization of existing structure of the fitting 76d and obviates the necessity of drilling an extra, separate bore for the gas

passageway in the adapter unit as in the prior embodiment. This not only leads to savings in the manufacturing costs; but, more importantly, given the maximum limit of a  $\frac{3}{4}$ -inch beer keg passage, it makes it possible to provide a larger beer passage in the keg adapter main fitting 76d to reduce pressure drop and enable use in both high- and low-pressure systems. Moreover, use of this feature in conjunction with the beer valve 90d having a cut-out stem 98d in main fitting 76d has provided an unexpectedly improved keg adapter unit B<sub>3</sub>.

The keg adapter B<sub>3</sub> having the described arcuate slotted gas passages extending around the beer valve, as shown particularly in FIGS. 5-10B, has a relatively small radial dimension but relatively large annular dimension, thus providing a quite large cross-sectional area within the total overall  $\frac{3}{4}$ -inch diameter size limit imposed on a tapping device for conventional "Peerless" type beer kegs, which are the most numerous in use in the U.S. beer industry. A gas passage arrangement such as shown at 87 in the prior embodiment is fully satisfactory for a single beer keg installation, which is typical of most U. S. draft beer dispensing installations. However, said gas passage arrangement is not fully suitable for certain types of "Series Taps", wherein a plurality (e.g., four) draft beer kegs are connected in series, according to marketing practices in some parts of the United States. In such "Series Tap" installations, the beer must be driven from the most remote keg in the series through all the intermediate kegs to the first keg connected to the dispensing faucet, via the gas valve passages in the tapping devices. The disclosed and described novel arrangement of arcuate elongated gas passages having a large cross sectional area, with minimal radial dimension makes it possible to use the new improved embodiment of FIGS. 6-10B in series tap draft beer systems. This affords important competitive advantages, since a single model draft beer tapping device according to this invention can be used for both single beer kegs and multiple keg series tap installations. Among other things, this new improvement simplifies production, inventory, marketing, achieving increased trade acceptance, as well as reducing costs, etc.

It is noted, however, that the above described arrangement shown in FIGS. 6-10B is a preferred form of the improved gas passageway per this invention, but that it would be possible to form grooves like 176 and 177 on the exterior of ring 92d and in member 184 rather than in the interior of body section 77d of the fitting 76d.

As hereinbefore mentioned, the key adapter unit B<sub>3</sub> of FIGS. 6-10B is held in the standard opening 22 in a conventional beer keg 20 by means of a novel and improved securing means shown particularly in FIG. 11, as well as FIGS. 6-8, adapted to cooperate with the standard so-called "Peerless" beer keg flange or collar 23 found on conventional beer kegs in most common use. This improved securing means includes the ring 126d which, as shown in FIG. 6, has its lower end spaced slightly above the top of the keg 20, and which is internally threaded at 190 to receive an externally threaded ring 192, as shown in FIG. 11D. The ring 192 includes a thin wall section 194 which has inwardly and upwardly projecting, diametrically opposite tabs 196 and 198 formed on its inner periphery. Also formed on the upper inner periphery of the wall section 194 and spaced circumferentially from the tabs 196 and 198 are

inwardly extending, diametrically opposite abutments 200 and 202. As shown more clearly in FIG. 11E, the standard "Peerless" beer keg flange 23 has two diametrically opposite cut-away portions 204, and at one end of each of these cut-away portions, has a lower depending projection 208 formed integrally with the flange 23 and the short, cylindrical wall 22' of the opening 22. These two projections 208 have an outer diameter equal to the outer diameter of the flange 23 and the lower end of each is spaced above the top of the keg 20, a distance slightly greater than the height of the wall section 194 of ring 192.

To utilize this improved securing means, the ring 192 is snapped over the flange 23 so that it rests on the top of keg 20 with the tabs 196 and 198 extending upwardly; and the ring 192 is aligned so that the projections 208 of the flange 23 fit between adjacent tabs 196 and 198 and abutments 200 and 202. The keg adapter unit is checked to be sure that main fitting portion 76d is properly positioned within the keg opening 22 and that a sealing ring 116 is correctly positioned between the top of keg flange 23 and the bottom of adapter fitting flange 78d. The ring 126d is then placed over the upper end of the adapter fitting portion 76d and aligned with the flange 78d so that the respective notched portions 168 and 170 of each will properly fit together. Thereafter, the ring 126d is threaded on ring 192 so that the ring 192 is drawn up within the lower inside portion of ring 126d until the upper ends of the tabs 196 and 198 contact the undersides 23' of keg flange 23 (FIGS. 6 and 11). The height of the wall section 194 is such that when the ends of the tabs 196 and 198 contact the underside 23' of keg flange 23, the entire wall section 194 is completely within and protected by the ring 126d. Thus, as shown in FIGS. 6 and 7, when the rings 126d and 192 are assembled, they cooperate with the flange 23 to securely lock the keg adapter unit within the opening 22 to prevent any longitudinal or rotational movement of the adapter unit relative to opening. Moreover, due to the unique construction of this arrangement for securing a keg adapter unit B<sub>3</sub> and its main portion 76d in a keg, the relatively complex portion of the securing means, namely, ring 192, may be inexpensively molded of plastic, without sacrificing strength or ruggedness of the keg adapter B<sub>3</sub>, which encounters considerable abuse in draft beer commercial operations, since the metal ring 126d completely protects plastic securing ring 192 as well as adapter main unit 76d.

Thus, it is readily apparent that the improved securing means of this invention provides a simple and inexpensive, yet sure way of locking the keg adapter units of this invention in the standard  $\frac{3}{4}$ -inch diameter openings of the conventional beer kegs without requiring any modification of the openings or flanges of the kegs.

Operation of the above described new improved tapping devices of the present invention will now be summarized with particular reference to FIGS. 6-11E.

The keg adapter B<sub>3</sub> is installed in keg 20 ("Peerless" type), shown in FIG. 1 of my said U.S. Pat. No. 3,231,154, and FIG. 1 herein, by inserting the main fitting 76d and tap rod 106d extending therefrom through the aperture 22 of keg 20, and then securing this adapter unit B<sub>3</sub> to flange 23 of keg 20 by applying the keg adapter inner locking ring 192 and outer keg lock nut 126d as above described with particular reference to FIG. 11. Keg adapter B<sub>3</sub> can be washed and sterilized

in place in the keg, while the latter is being sterilized, either on automatic equipment or by hand, using means to shoot cleaning solution and then hot water or steam through keg adapter B<sub>3</sub>. The keg 20 is filled with beer by means of a filling rod inserted through side aperture 29. Unless and until the coupler unit A<sub>3</sub> is installed at the tavern, the pressure of the spring 97d on the underside of the valve closure member 90d forces the latter to engage the rubber seating ring 88d, thus sealing keg opening 22 to prevent either gas or beer from escaping. When the keg 20 incorporating the keg adapter B<sub>3</sub> is installed in the beer dispensary, the bartender assembles the coupler A<sub>3</sub> on the keg adapter B<sub>3</sub> by the simple expedient of screwing the wing nut 118d of coupler head 44d onto the threaded exterior 128d of keg adapter outer lock nut 126d, until the O-ring 56d is sufficiently compressed into good sealing engagement with the top surface of flange 78d of the main fitting 76d of keg adapter B<sub>3</sub>. Meanwhile, the end or tip of coupler unit probe 64d is inserted within the axial bore of seating ring 92d, with probe O-ring 143 sealingly engaging the same, whereby the lower end or tip of probe 64d depresses the vertical sides of bifurcated stem portion 98d of the valve 90d, thereby displacing the sealing plate of beer valve 90d from the underside of rubber seating gasket or ring 88d, as shown in FIG. 1. This allows beer to flow into the interior of valve spring retaining section 184 via tap rod 106d from keg 20 and to pass through the central aperture of valve seating ring 88d and bifurcated valve stem 88d into the central bore 66d of coupler probe 64d and thence through a dispensing hose secured to the conventional cap on coupler head 44d to a dispenser faucet i.e., 40 in FIG. 1 thereof. Since the O-ring 143 is in sealing engagement with the inside of retainer ring 92d, beer is prevented from escaping to the outside of coupler probe 64d. The faucet at the dispenser is used to suitably control withdrawal of beer from the keg 20 in known manner. When the keg 20 is first tapped, the natural pressure of gas within the keg will drive beer up through tap rod 106d through tapping assembly A<sub>3</sub>-B<sub>3</sub>. The described assembly A<sub>3</sub>-B<sub>3</sub> of the present invention provides such an effective means for initial tapping of the beer keg that the loss of draft beer upon tapping is automatically kept to a minimum (for example, one glass), as compared to typical loss of a quart with prior conventional tapping means. An air supply fitting is secured to extension 144 of coupler head 44d of unit A<sub>3</sub>, and compressed air or gas is supplied at a controlled rate to the tapping assembly A<sub>3</sub>-B<sub>3</sub>. Since the lower surface of head 44d of coupler unit A<sub>3</sub> is sealed tightly against the upper surface of flange 78d of adapter unit B<sub>3</sub>, and since the probe 64d is also sealed with respect to keg adapter B<sub>3</sub> by O-ring 143, the gas or air fed into aperture 146 of extension 144 is forced down through passages 136 and 142 through the air grooves 176 in keg adapter B<sub>3</sub> into the interior of slit gas valve 108d. The compressed gas or air passes out through slit (s) 109 of gas valve 108d but cannot pass back through gas valve 108d or into the liquid valve chamber through which beer is passed via tap rod 106d. When the pressure in the keg 20 is less than the gas pressure fed to the tapping assembly A<sub>3</sub>-B<sub>3</sub>, the rubber valve 108d expands, thereby releasing gas into the keg through the valve slit(s) 109, and the gas thus injected into the keg 20 forces the beer through the tap rod 106d, and up through tubular tap rod 106d directly into the beer

valve chamber, whence it passes through central aperture 66d of coupler unit A<sub>3</sub> to the dispensing line, as previously discussed.

Summarizing the mode of operation of the unit of FIGS. 6-11, the keg adapter unit B<sub>3</sub> is installed in the keg 20 at the brewery as above explained. The beer valve 90d is normally biased closed against seat 88d by spring 97d, thus sealing the keg 20, preventing loss of beer or ingress of foreign objects, etc., as discussed above. To tap a keg full of beer, the bartender applies to the adapter unit B<sub>3</sub>, the coupler unit A<sub>3</sub> having a cap connected to a beer outlet conduit, with gas inlet 144 connected to a gas supply. This is done by merely inserting coupler probe 64d in the aperture of ring 92d and rotating coupler collar 118d to thread it on adapter unit collar 126d. The "O-rings" 143, 141 and 56d seal off the gas passage 146-140-142-176-180-177 to the inside of gas check valve 108d. The probe 64d depresses the split valve stem 98d to open the beer dispensing passage through 106d-187-185-88d-66d, while "O-rings" 141 and 143 and slit valve 108d prevent beer from surging into any part of the gas passageways in either the keg adapter B<sub>3</sub> or the coupler unit A<sub>3</sub>. Removal of coupler unit A<sub>3</sub> by unthreading collar 118d automatically reseals the keg adapter B<sub>3</sub> and thus the keg 20.

In recapitulation, it is apparent from the foregoing that the present invention provides a new improved gas pressure tapping device for drawing fluids such as beer from containers such as beer kegs; said tapping device utilizing a new improved keg adapter unit which remains in the beer keg at all times keeping it sealed and a new improved dispenser coupler unit which is semi-permanently connected to the conventional dispensing apparatus at a tavern or restaurant and which can be readily and easily connected to the keg adapter unit by a bartender. While keeping within the ¾ inch outer diameter limitation dictated by the size of beer openings in conventional beer kegs, the improved keg adapter units of this invention have a relatively large, nontortuous and unobstructed liquid passage 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 this invention universally usable with low and high pressure beer systems. Moreover, the improved keg adapter units of this invention also include a gas passage which is completely segregated from the liquid passage therein, and with the beer being positively prevented from entering any part of the gas passage from within the keg, thus preventing contamination of the beer. In addition, the keg adapter units include new improved means for securing said adapter units within the beer openings in conventional beer kegs (e.g. so-called "Peerless" system kegs) without modification of openings in these beer kegs. The new improved coupler units of this invention can be easily and quickly attached to the keg adapter units and permit the tapping of beer kegs without the mess and economic loss heretofore common in tapping beer kegs using the prior tapping devices. The arrangement of the dispenser coupler units of this invention is such that it can be easily maintained and cleaned and can be manufactured competitively. Thus, the new, improved tapping device of this invention, with all its herein-disclosed novel and improved features, clearly achieves

the various important objects and advantages set forth above.

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

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

1. A liquid dispensing apparatus adapted for use with a keg or like container for liquid which has top, bottom and side walls with an opening in one wall comprising: a keg adapter including a generally cylindrical main body having an externally threaded portion disposed outwardly of the keg opening, said adapter having gas and liquid passages therethrough for the respective transfer or gas from the outside to the inside of the keg and of liquid from the inside to the outside of the keg, normally closed valves in said liquid and gas passages, means for securing said body in the keg wall opening including an externally threaded ring, and means on said ring for threadedly engaging the externally threaded portion of said adapter body, a dispensing coupler unit including a generally cylindrical coupler head having gas and liquid passages therethrough, means for releasably securing said coupler unit to said keg adapter with the gas and liquid passages in said keg adapter and said coupler unit in respective communication one with the other, said securing means including an internally threaded collar, means for loosely retaining said collar on said coupler head whereby said collar can be rotated relative to said coupler head, the internally threaded portion of said collar being threadedly engageable with the externally threaded portion of said ring to secure said coupler unit to said keg adapter, and means sealing between the said coupler unit and said body portion external to the keg opening.

2. The apparatus according to claim 1 wherein the key opening is surrounded by a keg neck having a radially outwardly directed flange about the outer terminus of the opening and spaced from said one keg wall, said ring including at least one radially inwardly extending projection for engagement below the keg flange.

3. The apparatus according to claim 1 wherein said outwardly disposed portion of said body includes a radially outwardly projecting flange having a diameter greater than the diameter of the keg opening, said flange carrying the externally threaded portion of said body.

4. The apparatus according to claim 1 wherein said retaining means includes an annular shoulder about said coupler head of larger diameter than the diameter of said head.

5. Apparatus according to claim 4 wherein the gas passage in said coupler unit includes a bore extending generally parallel to and to one side of the axis of said body, said gas passage opening through the lower end of said head at a location radially offset from the axis thereof.

6. The apparatus according to claim 1 wherein said gas passage in said adapter extends through said body in generally parallel relation to and to one side of the axis of said body, said gas passage opening through the

outwardly disposed portion of said body at a location radially offset from the axis thereof.

7. The apparatus according to claim 6 wherein said coupler unit has a depending probe forming a part of the liquid passage therethrough, said liquid valve having a valve element movable substantially axially between a first position preventing flow of liquid from the keg through said liquid passage and a second position permitting flow of liquid from the keg through said liquid passage, means in said adapter body for biasing said element into said first position, said probe being engageable with said element when said coupler unit is secured to said keg adapter to move said element from said first position to said second position.

8. Apparatus according to claim 7 including sealing means carried by said coupler unit for maintaining said liquid and gas passages segregated one from the other when said coupler unit is secured to said keg adapter.

9. Apparatus according to claim 1 wherein said gas valve comprises a check valve for permitting passage of gas through said gas passage into the keg and preventing passage of liquid from the keg through the gas passage.

10. Apparatus according to claim 1 in combination with said keg, the opening in said one keg wall being surrounded by a keg neck having a radially outwardly directed flange about the outer terminus of the opening and spaced from said one keg wall, said ring including at least one radially inwardly extending projection for engagement below the keg flange.

11. The apparatus according to claim 1 wherein one of said valves includes a valve seat and an element movable in a generally axial direction between a first position engaging said seat to seal the passage containing said one valve and a second position spaced from said seat to open the passage containing said one valve, means carried by said coupler head and engageable with said one valve to displace said element from said first to said second position, and means sealing between said coupler unit and said keg adapter prior to movement of said element from said first position for maintaining said liquid and gas passages segregated one from the other.

12. The apparatus according to claim 11 wherein said coupler head includes a probe engageable with said one valve, said sealing means being, in part, carried by said probe.

13. A liquid dispensing apparatus adapted for use with a keg or like container for liquid which has top, bottom and side walls with an opening in one wall surrounded by a neck having a flange extending radially outwardly of the neck adjacent its outer terminus comprising a keg adapter having discrete gas and liquid passages therethrough for the respective transfer of gas from the outside to the inside of the keg and of liquid from the inside to the outside of the keg, normally closed valves in said liquid and gas passages, and means for securing said keg adapter in the keg wall opening including a ring structure, means carried by said ring structure including radially inwardly projecting tabs for engaging the underside of the keg flange and for limiting rotation of said ring structure in one direction, further means carried by said ring structure for limiting rotation thereof in the opposite direction.

14. The apparatus according to claim 13 wherein the keg neck has at least one projection extending radially

outwardly thereof, said further means comprising an abutment engageable against said projection.

15. The apparatus according to claim 14 wherein said abutment and one of said tabs are engageable against the keg neck projection on opposite sides thereof.

16. The apparatus according to claim 14 wherein said ring structure comprises discrete first and second ring-like members, said first member carrying said tabs and encompassing the keg neck.

17. A liquid dispensing apparatus adapted for use with a keg or like container for liquid which has top, bottom and side walls with an opening in one wall comprising: a keg adapter including a generally cylindrical main body having gas and liquid passages therethrough for the respective transfer of gas from the outside to the inside of the keg and of liquid from the inside to the outside of the keg, normally closed valves in said liquid and gas passages, one of said valves including a valve seat and an element movable in a generally axial direction between a first position engaging said seat to seal the passage containing said one valve and a second position spaced from said seat to open the passage containing said one valve, means for securing said body in the keg wall opening, a dispensing coupler unit including a generally cylindrical coupler head having gas and liquid passages therethrough, means for releasably securing said coupler unit to said keg adapter with the gas and liquid passages in said keg adapter and said coupler unit in respective communication one with the other, means carried by said coupler head and engageable with said valve element to displace said element from said first to said second position, and means sealing between said coupler unit and said keg adapter prior to movement of said element from said first position for maintaining said liquid and gas passages segregated one from the other, said means for securing said coupler unit to said keg adapter including an internally threaded collar carried by said coupler unit and threadedly engageable with the first mentioned securing means, said collar being freely rotatable about said head, and means retaining said collar on said coupler head including an annular part removably attached to said coupler head.

18. A liquid dispensing apparatus adapted for use with a keg or like container for liquid which has top, bottom and side walls with an opening in one wall comprising: a keg adapter including a generally cylindrical main body having gas and liquid passages therethrough for the respective transfer of gas from the outside to the inside of the keg and of liquid from the inside to the outside of the keg, normally closed valves in said liquid and gas passages, one of said valves including a valve seat and an element movable in a generally axial direction between a first position engaging said seat to seal the passage containing said one valve and a second position spaced from said seat to open the passage containing said one valve, means for securing said body in the keg wall opening, a dispensing coupler unit including a generally cylindrical coupler head having gas and liquid passages therethrough, means for releasably securing said coupler unit to said keg adapter with the gas and liquid passages in said keg adapter and said coupler unit in respective communication one with the other, means carried by said coupler head and engageable with said valve element to displace said element from said first to said second position, and means sealing between said coupler unit and said keg adapter prior to

movement of said element from said first position for maintaining said liquid and gas passages segregated one from the other, said valve engageable means carried by said coupler including a generally tubular probe, said sealing means being in part carried by said probe, the interior and exterior walls of said probe defining respective portions of said liquid and gas passages through said coupler unit, said keg adapter including means defining with said cylindrical main body an annular space forming a part of the gas passage through said adapter, means interrupting said annular space to define at least a pair of circumferentially separated gas passage portions, said latter securing means including a collar carried by said coupler unit and freely rotatable about said head, means retaining said collar on said coupler head including a ring removably attached to said coupler head, means sealing between said coupler unit and said keg adapter at the juncture thereof, and sealing means carried by said keg adapter for sealing between said keg adapter and the one wall when said adapter body is secured in the keg wall opening.

19. A liquid dispensing apparatus adapted for use with a keg or like container for liquid which has top, bottom and side walls with an opening in one wall comprising: a keg adapter including a generally cylindrical main body having gas and liquid passages therethrough for the respective transfer of gas from the outside to the inside of the keg and of liquid from the inside to the outside of the keg, normally closed valves in said liquid and gas passages, one of said valves including a valve seat and an element movable in a generally axial direction between a first position engaging said seat to seal the passage containing said one valve and a second position spaced from said seat to open the passage containing said one valve, means for securing said body in the keg wall opening, a dispensing coupler unit including a generally cylindrical coupler head having gas and liquid passages therethrough, means for releasably securing said coupler unit to said keg adapter with the gas and liquid passages in said keg adapter and said coupler unit in respective communication one with the other, means carried by said coupler head and engageable with said valve element to displace said element from said first to said second position, and means sealing between said coupler unit and said keg adapter prior to movement of said element from said first position for maintaining said liquid and gas passages segregated one from the other, said coupler head including a probe engageable with said one valve element with said sealing means being in part carried by said probe, said first mentioned securing means including an externally threaded ring, said second mentioned securing means including an internally threaded collar rotatably carried by said coupler head, the internally and externally threaded portions of said collar and said ring being threadedly engaged to orient said probe relative to said main body such that said probe and said main body are substantially axially coincident one with the other, said probe moving said element to open said one valve in response to threading said collar about said retaining ring in a direction tending to finally secure said coupler to said adapter, said sealing means between said coupler and said adapter including means sealing therebetween prior to opening said one valve and after obtaining substantial axial coincidence of said probe and said main body by threaded engagement of said collar and said ring.

\* \* \* \* \*

UNITED STATES PATENT OFFICE  
CERTIFICATE OF CORRECTION

Patent No. 3,743,145 Dated July 3, 1973

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:

Column 7, line 44, "bite" should read --bit--.

Column 8, line 57, "is" should read --in--.

Column 10, line 31, "up to the" should read --up the--.

Column 13, line 51, "key" should read --keg--.

Column 14, line 19, "than" should read --that--.

Column 15, line 34, "thereof" should read --hereof--; lines 41, 42, 50 and 64, "A<sub>3-b3</sub>" should read --A<sub>3</sub> - B<sub>3</sub>--.

Column 20, line 41, Claim 19, "outer" should read --other--.

Signed and sealed this 12th day of March 1974.

(SEAL)

Attest:

EDWARD M. FLETCHER, JR.  
Attesting Officer

C. MARSHALL DANN  
Commissioner of Patents