

[54] KEG CLOSURE AND COUPLER ASSEMBLY

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[51] Int. Cl.² B65D 83/00

[58] Field of Search 222/400.7, 400.8; 137/212

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Primary Examiner—Robert B. Reeves

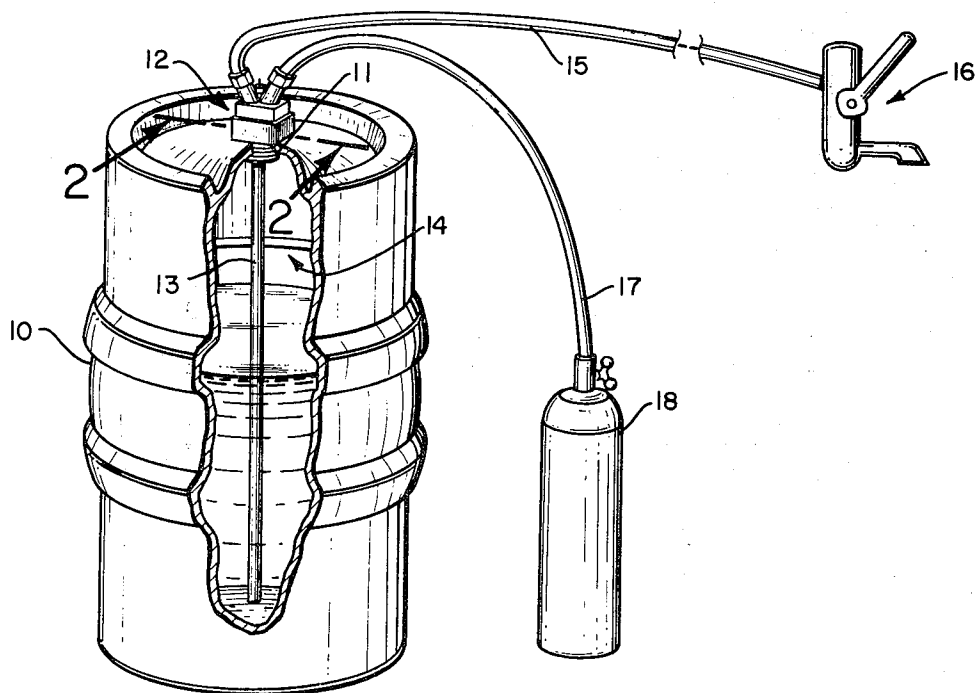
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[57] ABSTRACT

The assembly includes a keg connector body having first and second passages communicating with the interior of the keg and a dispensing line connector body having first and second passages communicating with a dispensing line and a source of compressed gas. Lower and upper separable plates having registering bores are disposed between the two bodies. Relative movement between the plates and the bodies enables closing off of both the interior of the keg and the dispensing line and source of compressed gas, the plates then being separable with the respective closures still in effect.

13 Claims, 10 Drawing Figures



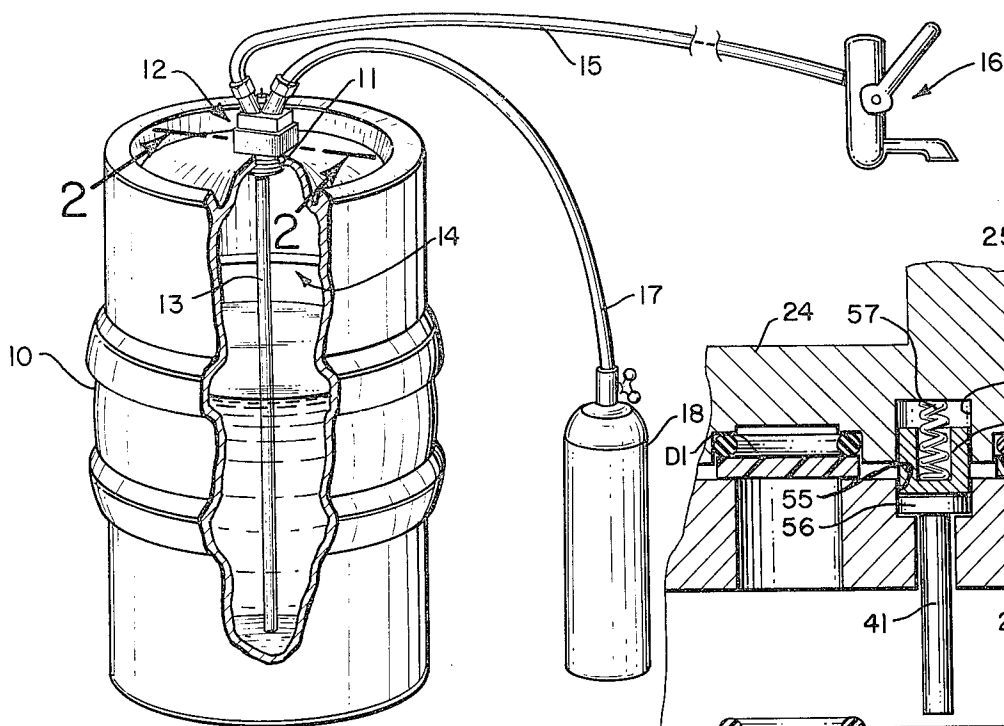


FIG. 1

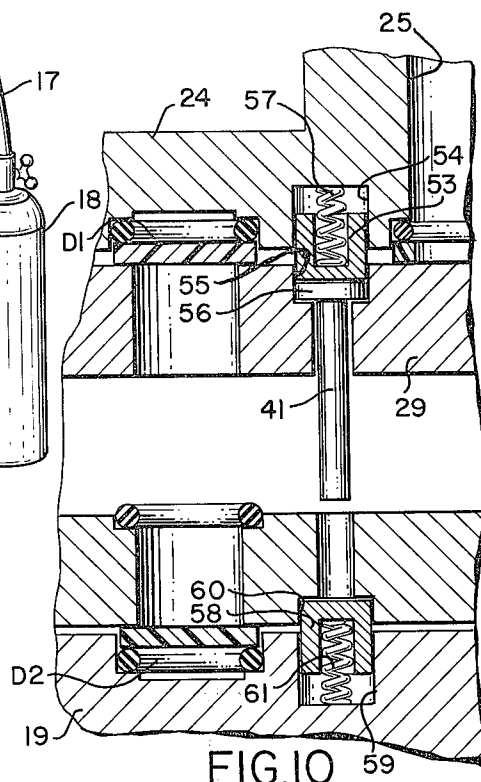


FIG. 10

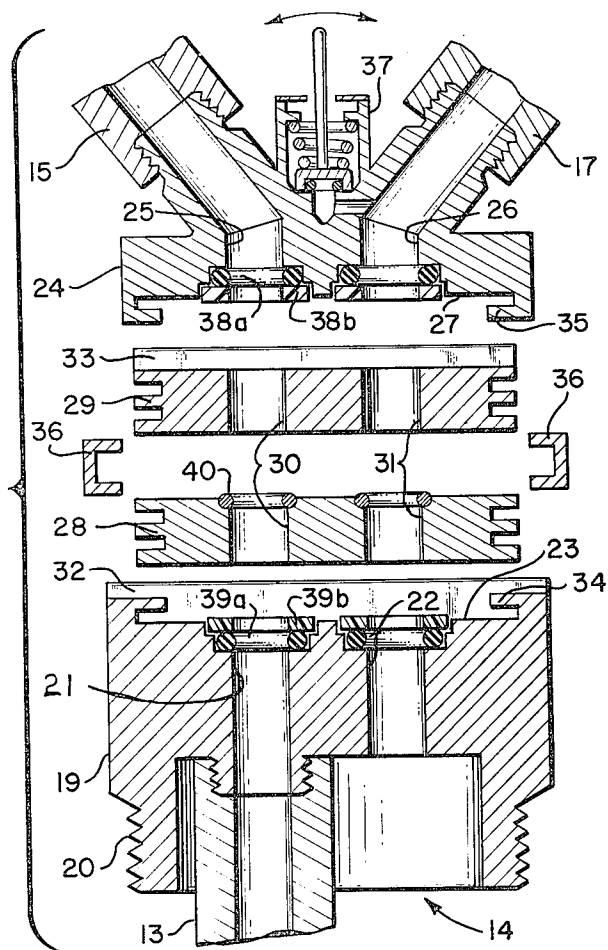


FIG. 2

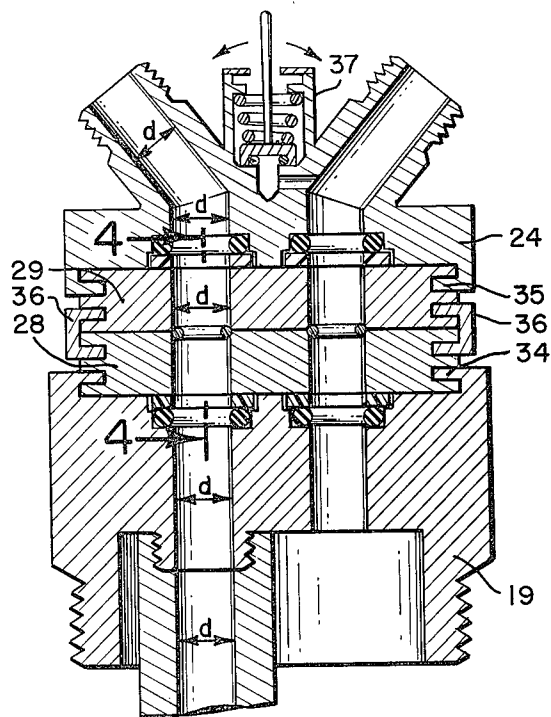


FIG. 3

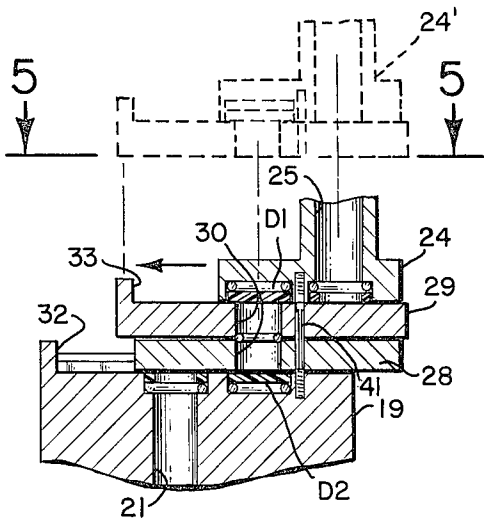


FIG. 4

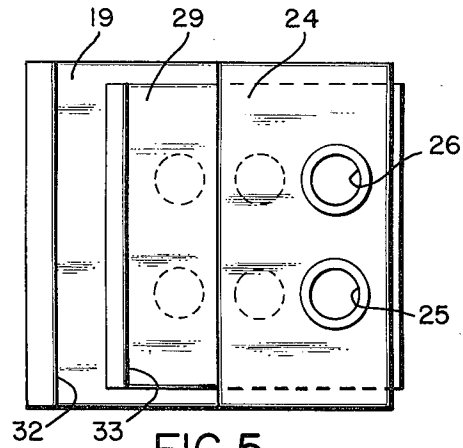


FIG. 5

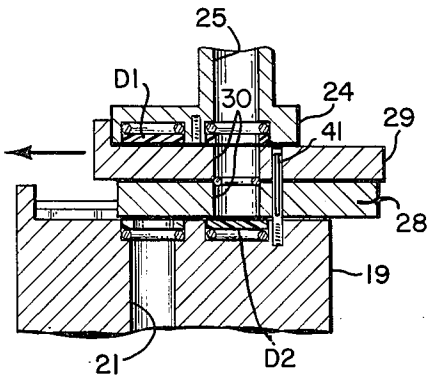


FIG. 6

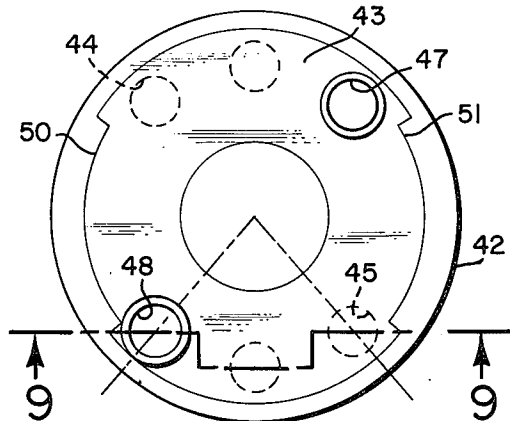


FIG. 8

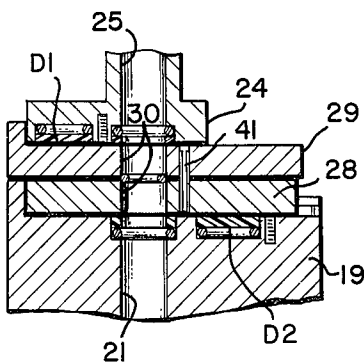


FIG. 7

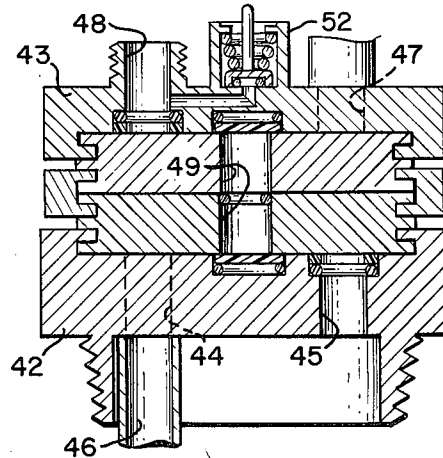


FIG. 9

KEG CLOSURE AND COUPLER ASSEMBLY

This invention relates generally to closure and coupler assemblies and more particularly to an improved closure and coupler assembly for a beer keg.

BACKGROUND OF THE INVENTION

Draft beer is normally supplied in large drum-like kegs provided with an upper opening within which there is fitted a closure and coupler assembly. This assembly includes a liquid delivery tube which extends interiorly of the keg downwardly towards the bottom together with a gas inlet passage for receiving compressed gas to thereby force the liquid or beer up through the delivery tube and out a dispensing line, to a suitable spigot at the bar.

While the foregoing type closures function to dispense the liquid, there are three basic problems. First, spring loaded check valves and the like are usually provided so that pressure will not be lost from the keg when decoupling the dispensing line; these valves include many component parts and as a result, require periodic maintenance and are difficult to clean. Second, the valve structures as characterize presently known keg closures define restricted passages which result in pressure drops across the valve thereby decreasing the efficiency of the dispensing of the liquid. Third, when the closure coupler is separated from the keg, while keg pressure is maintained by the check valve portion of the coupler, any beer or liquid remaining in the dispensing line can drip from the disconnected portion. Moreover, the source of compressed gas must first be closed before separating the couplers.

BRIEF DESCRIPTION OF THE PRESENT INVENTION

With the foregoing in mind, the present invention contemplates a greatly improved keg closure and coupler assembly wherein the above-noted three problems are substantially overcome.

Briefly, the keg closure and coupler assembly of this invention connects the interior of a keg with a liquid dispensing line and source of compressed gas, the assembly including a keg connector body having first and second passages arranged to be secured in a keg opening. A dispensing line connector body in turn also includes first and second passages for connection to the dispensing line to the spigot and a source of compressed gas. Lower and upper separable plates are provided with registering bores in a position between the keg connector body and dispensing line body. The arrangement is such that relative movement between the plates and the bodies in one direction positions the registering bores in registration with each of the first and second passages to place them in communication with each other, relative motion in an opposite direction positioning the registering bores out of registration with each of the first and second passages to close off communication therebetween.

With the passages closed off, the lower and upper plates can be separated, each plate assuring that the first and second passages in its associated body are closed. As a result, pressure is maintained in the keg and no dripping from the dispensing line or escape of compressed gas from the source of compressed gas can occur. Further, there is eliminated the need for spring loaded check valves and the like in the main passages

so that a far simpler design results which is easy to maintain and clean. Finally, by making the passages of uniform dimensions corresponding to the fluid lines involved, there is substantially no pressure drop across the coupler assembly.

BRIEF DESCRIPTION OF THE DRAWINGS

A better understanding of the invention will be had by now referring to preferred embodiments thereof as illustrated in the accompanying drawings in which:

FIG. 1 is a perspective view partly broken away showing the keg closure and coupler assembly in position on a keg;

FIG. 2 is an enlarged exploded cross section of the assembly itself looking generally in the direction of the arrows 2—2 of FIG. 1;

FIG. 3 is a view similar to FIG. 2 but illustrating the various components in assembled relationship;

FIG. 4 is a fragmentary cross section taken in the direction of the arrows 4—4 of FIG. 3 showing relative positions of the various components when the coupler bodies are completely closed;

FIG. 5 is a plan view looking in the direction of the arrows 5—5 of FIG. 4;

FIG. 6 is a view similar to FIG. 4 but illustrating an intermediate relative position of the components wherein partial communication is established;

FIG. 7 is a view similar to FIG. 6 but showing the relative positions of the components when complete communication is established;

FIG. 8 is a plan view of a second embodiment of the invention;

FIG. 9 is a cross section in the direction of the broken lines 9—9 of FIG. 8; and,

FIG. 10 is a fragmentary cross-section of a portion of the structure of FIG. 4.

DETAILED DESCRIPTION OF THE INVENTION

Referring first to FIG. 1, there is shown a beer keg 10 having an upper opening 11 within which the keg closure and coupler assembly, designated generally by the numeral 12, is secured.

A liquid delivery tube 13 is shown within the interior of the keg, this tube extending downwardly below the level of liquid therein to terminate in an open end. The closure assembly 12 when in open condition defines two main passages connecting respectively the delivery tube 13 and the upper interior portion of the keg 14 to a dispensing line 15 passing to a spigot 16 and to a gas line 17 connecting to a source of compressed gas 18.

With the foregoing arrangement, the compressed gas from the tank 18 will pressurize the upper interior portion 14 of the keg thereby forcing liquid up the delivery tube 13 and to the dispensing line 15 and spigot 16 when the spigot is opened.

Referring now to FIG. 2, further details of the closure assembly 12 will be evident. As shown, this assembly includes a keg connector body 19 having means such as screw threads 20 for securing it to the opening 11 of the keg 10 of FIG. 1. This connector body includes first and second passages 21 and 22 terminating at their upper ends in a top flat surface 23 and communicating at their lower ends with the liquid delivery tube 13 and the upper interior portion 14 of the keg, respectively, as described.

Referring to the top portion of FIG. 2, the assembly further includes a dispensing line connector body 24

having first and second passages 25 and 26 terminating at their lower ends in a bottom flat surface 27 and communicating at their upper ends with the dispensing line 15 and with the source of compressed gas from the line 17, respectively, as also described heretofore.

A plate assembly shown in the central portion of FIG. 2 includes lower and upper separable plates 28 and 29 having first and second registering bores 30 and 31. This plate assembly is arranged to be disposed between the top and bottom flat surfaces 23 and 27 respectively in such a manner that they can slide relative to these surfaces in a direction into and out of the plane of the drawing as viewed in FIG. 2.

Lower and upper stop means 32 and 33 are provided on the keg connector body 19 and upper plate 29 respectively.

The lower and upper plates 28 and 29 are arranged to be keyed to the keg connector body and dispensing line body as by key means shown at 34 and 35. Further, the lower and upper plates themselves are keyed together for sliding movement as by keying means 36. Any suitable keying arrangement may be provided which will permit sliding movement and yet hold the plates from separating in a vertical direction as illustrated in FIG. 2.

The assembly is completed by a further optional feature, in the form of a relief valve 37 in the dispensing line connector body 24 as shown in FIG. 2. This relief valve communicates with the second passage 26; this is, with the line 17 connecting to the gas source 18 and simply serves to relieve gas pressure should it exceed a given safe value. The valve is automatically opened when the pressure exceeds the spring force. However, the valve can be manually operated by rocking or tilting the valve head on the valve seat in any direction as by the handle stem.

FIG. 3 illustrates the various components of FIG. 2 in assembled relationship wherein the interfitting of the keying means 34, 35 and 36 will be evident. In FIG. 3, it will be noted that the various first and second passages are in alignment or registration with the registering bores in the lower and upper plates 28 and 29 and in this position, there is provided communication between the interior of the keg and the exterior spigot and source of gas as described in FIG. 1.

In order to assure proper sealing, and in accord with an important feature of this invention, there are provided O-ring biased Teflon seals surrounding the openings of the bores and passages at their registration points. These sets of rings and seals are illustrated in FIG. 2 at 38a, 38b and 39a, 39b for the first registering passages and bores, the second registering passages and bores similarly including rings and seals. The arrangement is such that the Teflon seals are biased against the flat bottom and top surfaces of the plates 28 and 29 by the O-rings throughout relative sliding movement between these surfaces and surfaces 23 and 27 to assure proper sealing at all times. Plastic seals other than Teflon could be used. An O-ring 40 is disposed between the lower and upper plates 28 and 29 at the registration points of the bores 30 and 31. No Teflon seal is required since these plates normally do not slide relatively to each other.

Referring now to the cross section of FIG. 4 which is a view looking in the direction of the arrow 4-4 of FIG. 3 but showing the plates and dispensing line body in different relative positions to provide complete clo-

sure, the manner in which the assembly of this invention operates will become clear.

Thus as illustrated in FIG. 4, the dispensing line connector body 24 is shown disengaged from the upper stop means 33 on the upper plate 29 such that the passage 25 is out of registration with the registering bores 30 of the lower and upper plates 28 and 29. Further, the lower plate 28 is shown disengaged from the first stop means 32 on the keg connector body 19 so that the passage 21 is also out of registration with the registering bores 30. In these positions, the plates 28 and 29 may be separated from each other by sliding the keying channels 36 shown in FIG. 3 out of the key ways in the plates and simply lifting the upper plate 29 and dispensing line connector body 24 up from the lower plate 28 and keg closure connector body 19. There is illustrated in phantom lines in FIG. 4 the separated dispensing line connector body as at 24'. Upon separation, a pin means 41 functions to prevent relative sliding movement between the separated plates and their associated bodies 19 and 24, as will be explained in greater detail with respect to FIG. 10.

In the view of FIG. 4, only the first passages in the bodies are visible since the second passages are disposed behind the first passages, the foregoing arrangement being clear from the top plan view of FIG. 5. However, there are provided dummy sockets including O-rings and Teflon seals as shown at D1 and D2 to stabilize the sliding action. It will be appreciated that when the plates 28 and 29 are separated from each other as described in FIG. 4 by the phantom line showing, not only are the passages in the keg connector body 19 closed off as by the lower plate 28 but also the passages in the dispensing line body 24 are closed off as by the upper plate 29. Thus pressure is preserved in the keg when separation takes place and in addition, liquid is prevented from dripping from the end of the connector and in the event the source of compressed gas is not turned off, it is also sealed closed.

Referring to FIG. 6, there is illustrated a first step in providing communication with the assembly wherein it will be noted that the line dispensing connector body 24 has been moved to the left to engage the stop 33 so that the first and second passages therein are in alignment with the registering bores 30 in the lower and upper plates.

FIG. 7 shows a relative position of the components after further sliding the lower plate 28 against the stop 32 wherein all of the passages and registering bores are in alignment to define the completely open position.

It will be appreciated that the pin 41 holds the lower and upper plates 28 and 29 for sliding movement as a unit so that the registering bores 30 remain in registration when operating the closure from its completely closed position to its completely open position.

Summarizing the foregoing, the lower and upper stop means 32 and 33 limit to given distances respectively the relative movement between the lower plate and the top flat surface and relative movement between the bottom flat surface and the upper plate in one direction such that when the stop means are both engaged in this one direction, the first and second passages in the keg connector body and dispensing line connector body are in registration with the registering bores. When these stop means are disengaged by relative movement away from the stop means in an opposite direction, the first and second passages in the keg connector body and dis-

pensing line connector body are out of registration with the registering bores.

Referring now to FIGS. 8 and 9, there is shown a second embodiment of the invention wherein rather than the relative motion taking place in a back and forth rectilinear direction, the relative motion is effected in a clockwise and counterclockwise rotary direction.

Thus, referring to both FIGS. 8 and 9, there is shown a keg connector body 42 and dispensing line connector body 43. As shown, the keg connector body includes first and second passages 44 and 45 for connection to a liquid delivery tube 46 and the upper interior of the keg. The counterpart passages in the dispensing line connector 43 are shown at 47 and 48 connecting respectively to a line dispenser (not shown) and a source of compressed gas (not shown).

Lower and upper circular plates having registering bores 49 are disposed between the keg connector body 42 and dispensing line connector body 43 as shown, there being provided keying means similar to that described for the structure of FIG. 3 except that the arrangement is circular rather than straight. In this respect, the keying means may be released by rotating the plates and dispensing line connector body sufficiently in one direction to permit vertical separation when the keying portions are opposite cut outs 50 and 51 shown in the top view of FIG. 8.

A relief valve 52 shown in FIG. 9 may be provided in the dispensing body 43, this valve being similar to that described for the embodiment of FIG. 3.

It will be evident from an inspection of FIGS. 8 and 9 that communication may be provided between the respective first and second passages by appropriately rotating the dispensing line connector body 43 relative to the plates to cause registration of the passage 48 with the registering bores 49. The dispensing line body 43 will then continue to rotate with the plates until the registering bores 49 with the passage 48 are in axial alignment with the passage 45. The operation is in all respects similar to that described with respect to FIGS. 4, 6 and 7 except that the motion is rotary rather than rectilinear.

It should be noted with respect to both embodiments that the internal diameter of the passages and registering bores are all equal, these internal diameters preferably also being equal to the diameters of the dispensing line and delivery tube. Thus, with reference to FIG. 3 for the first embodiment, this internal diameter is indicated by the letter d for the various passages, registering bores, and delivery and dispensing tubes. Similarly, in the embodiment of FIG. 9, the passage 48, registering bores 49 and passage 45 are all of the same internal diameter. By so dimensioning the various passages there is substantially no pressure drop across the valving arrangement when the valves are in open position.

Referring now to FIG. 10, there is shown in greater detail the pin means 41 described in conjunction with FIG. 4. Essentially, the function of the pin means is to lock the lower and upper plates 28 and 29 together when these plates are assembled thereby holding the aligned bores 30 in registration with each other so that the lower and upper plates 28 and 29 move as a unit. The same pin means also functions to automatically lock the plates against sliding movement relative to the keg closure body 19 and the dispensing body 24 when the plates are physically separated as indicated by the phantom showing in FIG. 4.

An enlarged view of the pin means 41 when the plates are separated is shown in FIG. 10. It will be evident that the upper plate 29 is locked against sliding movement to the dispensing body 24 by a cup 53 partially extending into a bore 54 in the body 24 and a similar bore 55 in the plate 29, the cup being urged against the head 56 of the pin 41 by a spring 57. Similarly, a lower cup 58 extends partially in a bore 59 in the keg body 19 and a bore 60 in the lower plate 28, the same being biased to such position by a spring 61, thereby locking the lower plate 28 against sliding movement relative to the keg body 19.

It will now be appreciated that when the lower and upper plates 28 and 29 are brought together, the lower end of the pin 41 will engage the cup 58 and urge it into the bore 59 against the bias of the spring 61 until the lower end of the cup seats against the lower end of the bore 59. Further urging of the plates together will then cause the pin 41 to move upwardly thereby urging the cup 53 against the upper end of the bore 54. The keying channels 36 shown in FIG. 2 can then be slid into the corresponding key ways in the lower and upper plates to hold the plates together.

The length of each of the cups is precisely equal to the depth of the bores 54 and 59 respectively. Further, the overall length of the pin 41 measured from the top of the head to its extreme end is exactly equal to the total thickness of the lower and upper plates 28 and 29 when they are positioned together.

As a consequence of the foregoing dimensioning, it will thus be evident that when the bodies are positioned together, the plates 28 and 29 are locked against any relative movement while the keg closure body 19 and dispensing body 24 are now free to slide relative to the lower and upper surfaces of the plates.

The pin means thus constitutes a unique and novel structure for assuring that the respective plates will hold the various passages in their closed conditions when the bodies are separated and yet permit registration of the passages when the bodies are keyed together and slid relatively to the plates all as described in conjunction with FIGS. 4, 6 and 7.

A similar pin means, of course, would be used in the embodiment of FIGS. 8 and 9.

From the foregoing description, it will thus be evident that the present invention has provided a greatly improved keg closure and coupler assembly wherein problems associated with prior art devices are avoided. More particularly by eliminating the use of spring loaded check valves and the like for the main passages, a much simpler construction results which may be easily disassembled for cleaning and maintenance purposes. Moreover, both the keg is closed off and the dispensing line and compressed gas source closed off when the lower and upper plates making up the coupler are separated. There is thus avoided loss of pressure in the keg and also there is avoided dripping from the dispensing line as well as assurance that the compressed gas source is contained.

While the invention has been described with respect to a beer keg, it should be understood that the closure and coupler assembly can be used as a closure means in any other situation wherein a keg or tank is to hold a liquid under pressure.

What is claimed is:

1. A keg closure and coupler assembly for connecting the interior of a keg with a liquid dispensing line and

source of compressed gas, comprising, in combination:

- a. a keg connector body having first and second passages;
- b. a dispensing line connector body having first and second passages; and,
- c. lower and upper separable plates having registering bores disposed between said keg connector body and dispensing line body, relative movement between the plates and the bodies in one direction positioning one of said registering bores in communication with each of said first passages and also positioning the other of said registering bores in communication with each of said second passages, relative movement in an opposite direction positioning the registering bores respectively out of registration with each of the first and second passages to close off communication therebetween.

2. The subject matter of claim 1, in which said relative motion is in a back and forth rectilinear direction.

3. The subject matter of claim 1, in which said relative motion is in a clockwise and counterclockwise rotational direction.

4. A keg closure and coupler assembly for connecting the interior of a keg with a liquid dispensing line and a source of compressed gas, comprising, in combination:

- a. a keg connector body having means for securing it in a keg opening and including first and second passages terminating at their upper ends in a top flat surface and communicating at their lower ends with a liquid delivery tube extending to the bottom interior portion of the keg and with the upper interior portion of said keg, respectively;
- b. a dispensing line connector body including first and second passages terminating at their lower ends in a bottom flat surface and communicating at their upper ends with said dispensing line and with said source of compressed gas, respectively; and
- c. a plate assembly comprised of lower and upper separable plates having first and second registering bores, said plate assembly being disposed between said top and bottom flat surfaces, relative movement of said lower plate closing off said first and second passages in said keg connector body by moving the registering bores in the lower plate out of registration with said first and second passages, and relative movement of the upper plate closing off said first and second passages in said dispensing line connector body by moving the registering bores in the upper plate out of registration with said first and second passages, whereby said lower and upper plates can be separated, the keg delivery tube and upper interior portion being closed and the dispensing line and source of compressed gas being closed.

5. The subject matter of claim 4, including lower and upper stop means limiting to given distances respectively the relative movement between said lower plate and said top flat surface and relative movement between said bottom flat surface and said upper plate in one direction such that when the stop means are en-

gaged in said one direction, the first and second passages in the keg connector body and dispensing line connector body are in registration with said registering bores and when the stop means are disengaged by relative motion away from the stop means in an opposite direction, the first and second passages in the keg connector body and dispensing line connector body are out of registration with said registering bores.

6. The subject matter of claim 5, in which said lower and upper plates are keyed respectively to said keg connector body and dispensing line connector body and to each other to prevent separation when relative movement therebetween takes place over said given distances, the keying of the plates to each other being removable whereby the assembly is readily separated for easy cleaning.

7. The subject matter of claim 6, including O-ring biased plastic seals surrounding the openings of said passages at their registration points with the bores to provide sealing during relative movement between the plates and said top and bottom flat surfaces.

8. The subject matter of claim 7, in which said keg closure and coupler assembly includes an adjustable and manually operable relief valve, so that if the gas pressure exceeds a given value, it can escape through said relief valve.

9. The subject matter of claim 8, in which said first and second passages in said keg connector body and in said dispensing line connector body and said registering bores are all of the same internal diameter to thereby minimize pressure drops across the passages and bores when in registration with each other.

10. The subject matter of claim 9, in which relative movement between the plates and top and bottom flat surfaces is in a back and forth rectilinear direction.

11. The subject matter of claim 9, in which relative movement between the plates and top and bottom flat surfaces is in a clockwise and counterclockwise rotational direction.

12. The subject matter of claim 4, including pin means for locking said lower and upper plates together when the bodies are assembled, said pin means being responsive to separation of said lower and upper plates to effect a locking of the lower and upper plates respectively to the keg connector body and dispensing line connector body respectively to retain the closed condition of the keg delivery tube and upper interior portion and the dispensing line and source of compressed gas.

13. The subject matter of claim 12, wherein said pin means includes an elongated pin and cooperating upper and lower cups respectively partially extending into opposed bores in the plates and bodies respectively to effect said locking when the plates are separated, assembly of the plates together causing the opposite ends of the pin to urge the cups completely into the bores in the bodies so that the plates are locked together and yet relative sliding movement between the bodies and exterior surfaces of the plates can taken place.

* * * * *