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KEG TAPPING STRUCTURE

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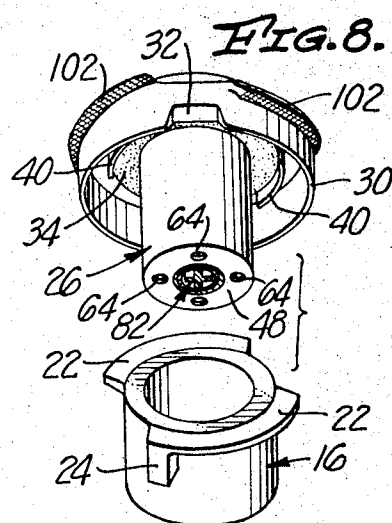
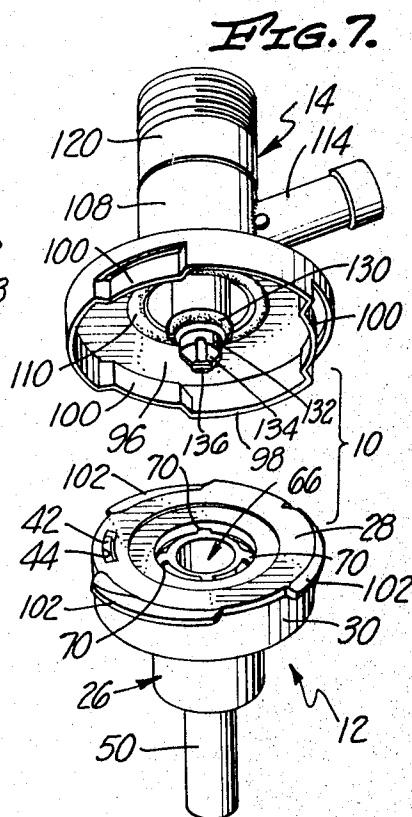
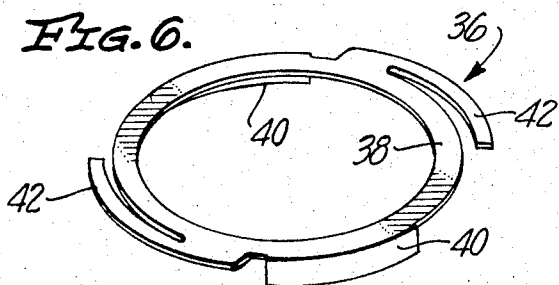
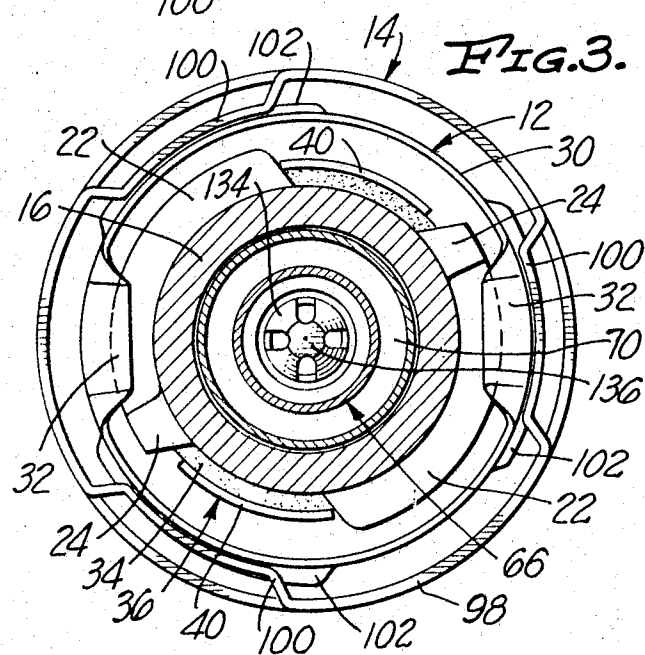
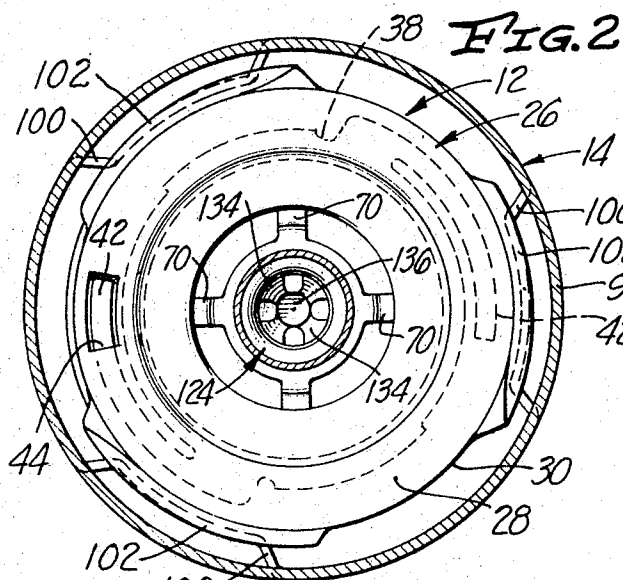
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KEG TAPPING STRUCTURE

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9 Claims

ABSTRACT OF THE DISCLOSURE

A complete tapping structure is disclosed. This tapping structure consists of a keg unit or keg valve and a tapping unit which is adapted to be coupled to the keg unit so that the contents of the keg may be exhausted. The keg unit is adapted to be held upon a conventional keg neck structure by cam means so as to be secured against undesired rotation by ratchet means. The tavern unit is adapted to be coupled to the keg unit by being located upon it and twisted. The tavern unit may be removed from the keg unit by being twisted without causing the keg unit to be uncoupled from the keg neck.

Cross-references to related applications

This application discloses subject matter which is also disclosed in the copending application entitled, "Gas Valve," filed Dec. 21, 1967, Ser. No. 692,520.

Background of the invention

Various types of liquids such as different beverages are commonly packaged and sold in pressurized containers such as common kegs or the like. For the purpose of dispensing the fluid packaged and sold in any such container it is conventional to provide on the container a keg unit which is adapted to be engaged by and coupled to a tapping unit. When such a keg unit and tapping unit are coupled in a desired manner the fluid within a container carrying such a key unit is capable of being removed from the container.

As technology has advanced, many different types of complete tapping structures including a keg unit and a tapping unit have been developed and, to varying extents, used. As this field has progressed there has been a pronounced tendency to form such key units so that they include at least one valve which is automatically opened when the tapping unit used with such a keg unit is coupled to this keg unit. The use of such a valve is considered quite advantageous in facilitating the tapping of a keg so as to avoid various complications such as possible undesired escape of the fluid within the keg. A keg unit containing such a valve is referred to herein as a keg valve.

As various types of keg valves have been developed problems have arisen as to how to satisfactorily connect such keg valves to various types of kegs. It is considered that these problems have been most significant in connection with the coupling of a keg valve to a presently common type of keg structure which is provided with a discharge neck located within a comparatively narrow recess providing only limited access to the exterior of the neck. With this type of structure the neck is cylindrical and has end flanges extending outwardly from the exposed ends of the neck and stops which extend from extremities of these flanges outwardly from the neck proper longitudinally along the neck.

In providing a structure for a keg valve to be used with this type of keg construction it is necessary to provide means whereby the keg valve can be secured internally within the neck to the end of the neck and the flanges and stops indicated in such a manner that there is substantially no danger of fluid leakage, in such a manner

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that the keg valve cannot inadvertently be twisted or turned in such a way as might cause leakage or dislodging of the valve and in such a manner that the keg valve can be easily attached or detached with a minimum of difficulty. With a structure of this type principal portions of the valve unit should be located internally of the neck on a keg so as to prevent accidental damage when a keg is handled. For the same reasons the keg valve unit should extend from the end of the neck only a comparatively limited degree.

These and various other related considerations are considered to have made it very difficult for those who have worked in this field prior to the present invention to develop keg tapping structures which can be considered satisfactory to various industries such as the beer industry. The problems of providing keg tapping structures which are acceptable in these fields are made all the more difficult because of various other related problems. A satisfactory keg tapping structure must be capable of passing a significant volume of fluid within a limited period. Such a unit must also be capable of being cleaned, and in this connection have no "traps" or other areas where bacteria are apt to accumulate, and be corrosion resistant. Such a unit must also be sufficiently strong from a mechanical standpoint so as to be capable of withstanding a significant amount of physical abuse without such abuse interfering with its operation.

Brief summary of the invention

An objective of the present invention is to provide new and improved keg tapping structures which are advantageous in that they possess the various desirable features briefly indicated in the preceding discussion. Another objective of this invention is to provide keg tapping structures which can be manufactured out of such materials as stainless steel so as to be capable of withstanding a great deal of physical abuse so as to be capable of being easily and completely cleaned as required. It will of course be recognized that stainless steel is, under normal circumstances, resistant to corrosion.

A more specific object of this invention is to provide keg units or valves which may be easily and conveniently coupled to an existing type of conventional neck, which when so coupled can not be inadvertently moved with respect to such necks, but which can be easily and conveniently taken off of such necks when necessary for cleaning or other reasons. A still further objective of this invention is to provide tapping structures which are resistant to damage, which are capable of reliable performance and which may be easily and conveniently used.

In accordance with this invention these and other objectives of the invention are achieved by providing a keg tapping structure which is preferably formed of a metal such as stainless steel in which the keg unit is adapted to be used with a keg having a cylindrical neck provided with radially extended end flanges. A keg unit of this invention has a top adapted to be located over the end of such a keg unit and a dependent skirt extending from the top and surrounding the flanges on the keg neck. With this structure cam means are used to secure the keg unit to the keg neck and holding means including ratchet means are used so as to lock or secure the keg unit against undesired rotation with respect to the keg neck.

Brief description of the drawing

The actual details of this invention will be more fully apparent from a detailed consideration of the accompanying drawings in which:

FIG. 1 is a cross-sectional view of a presently preferred embodiment of a complete keg tapping structure of this invention in use upon the neck of a conventional keg;

FIG. 2 is a partial cross-sectional view taken at line 2-2 of FIG. 1;

FIG. 3 is a cross-sectional view taken at line 3—3 of FIG. 1;

FIG. 4 is a partial cross-sectional view taken at line 4—4 of FIG. 1;

FIG. 5 is a partial cross-sectional view taken at line 5—5 of FIG. 1;

FIG. 6 is an isometric view of a part of the keg valve shown in the preceding figure;

FIG. 7 is an exploded isometric view of the keg valve and the tapping unit illustrated in the preceding figures forming a complete tapping structure of this invention; and

FIG. 8 is an exploded isometric view of the principal portion of the tapping unit and keg neck illustrated in preceding figures of the drawings.

Description of the preferred embodiment

In the drawings there is shown a complete keg valve structure or tapping structure 10 of this invention. This structure consists of two essential parts, a keg valve or unit 12 and a tapping unit 14. The keg unit 12 is intended to be coupled to a cylindrical neck 16 formed on a conventional keg 18. In FIG. 1 of the drawing it is shown that this neck is located in a recess 20 which provides only limited space around the exterior of the neck 16. This neck 16 is provided with radially extending flanges 22 at its upper end. It is also provided with longitudinally extending stops 24, each of which extends partially along the neck 16 from an end of a flange 22. The structure of this neck 16 is conventional.

The keg unit 12 and the tapping unit 14 are except for gaskets or other appropriate sealing members preferably entirely formed of a strong corrosion proof material such as stainless steel. This keg unit 12 includes a central cylindrical body 26 which is adapted to fit closely within the interior of the neck 16. The end of the body 26 extends slightly from the outer end of the neck 16 and carries a disc-like top 28 which completely overlies the end of the neck 16 and the flanges 22. This top 28 carries at its periphery an attaching skirt 30 which extends from the top 28 generally back along the body 26. The skirt 30 is formed with a plurality of cam surfaces 32 which are inwardly directed from it towards the body 26. Preferably each of these cam surfaces 32 corresponds to one of the flanges 22.

The cam surfaces 32 are designed so that in attaching the keg unit 12, the body 26 may be slipped into the neck 16 until the top 28 is opposite and adjacent to the flanges 22. At this point the cam surfaces 32 will fit in the spaces between the flanges 22 and will be generally underneath these flanges. Then, upon twisting of the keg unit 12, as, for example, through the use of an appropriate wrench, the cam surfaces 32 can be engaged with the undersides of the flanges 22.

So as to form a seal between the neck 16 and the keg unit 12, this keg unit includes a cylindrical elastomeric washer 34 which is located around the body 26 next to the top 28. When the cam surfaces 32 are attached as described, this washer is normally brought under compression by the engaging of these cam surfaces 32 so as to form the requisite seal between the top 28 and the end of the neck 16. This structure of the keg unit 12 described in this manner is normally adequate to hold the keg unit with respect to the keg 18, particularly because of the fact that friction with respect to the surfaces 32 tends to prevent undesired rotation of the cam surfaces 32 with respect to the undersides of the flanges 22.

However, with the structure described to this point it is possible for the keg unit 12 to be rotated so as to be detached from the neck 16. Obviously such detachment is normally not desired except when the complete tapping structure 10 is to be deliberately removed. In order to prevent such undesired dislodging of the keg unit 12 this unit carries what may be referred to as a holding means 36 as shown in FIG. 6 of the drawing. This hold-

ing means 36 in the preferred embodiment illustrated includes a central ring 38 of a size adapted to fit within the skirt 30 against the under surface of the top 28. This ring 38 carries flanges 40 which depend from it and which are adapted to fit around the neck 16 in the spaces between the flanges 22. This ring 38 also carries elongated resilient fingers 42. At least one of these fingers 42 is designed so as to be opposite to an opening 44 in the top 28 when the keg unit 12 is installed.

This structure of the holding means 36 is designed so that it may be located around the body 26 against the top 28 in contact with the washer 34. When in this position the flanges 40 extend parallel to the skirt 30 within the interior of the skirt. When the holding means 36 is so located, and the keg unit 12 is located upon the neck 16 and turned as previously described so as to tighten the cam surfaces 32 upon the flanges 22, the holding means 36 is prevented from rotating along with the rest of the keg unit 12 because of the flanges 40 engaging the flanges 22.

As the keg unit 12 is rotated with the holding means 36 being held in this manner, the keg unit 12 will gradually be turned to a location in which at least one finger 42 by virtue of its resiliency pops up into an opening 44. Such engagement of the finger 42 through the opening 44 will prevent further rotation of the keg unit 12 since the holding means 36 is prevented from rotating. The entire keg unit 12 is preferably constructed to that at this point the washer 34 is sufficiently compressed to form a seal.

Because of the action of the holding means 36 with respect to at least one opening 44 in the top 28 the keg unit 12 cannot be backed off of the flanges 22 inadvertently. However, the keg unit 12 may be removed by applying an appropriate tool such as a pointed instrument against the end of any finger 42 engaged within an opening 44 and holding such a finger down while the keg unit 12 is turned so as to release the cam surfaces 32 from the flanges 22. Because of this type of action a finger 42 and an opening 44 as described may be considered "a ratchet means." If desired a small bent tab 46 may be provided on the top 28 in connection with any such opening 44 in order to achieve an efficient ratchet-like action. The opening 44 may be relocated upon any accessible part of the keg unit 12 and any finger 42 may be appropriately relocated.

The end of the body 26 within the interior of the keg 18 is provided with a completely flat bottom wall 48 of a washer-like shape. From the center of this wall 48 the body 26 is provided with an integrally formed tube 50. Another tube 52 is secured on the end of the tube 50 so as to extend from it to the bottom of the keg 18 by means of a small band or ferrule 54 which clamps the tube 52 firmly in position.

A coil spring 56 is located against the end of the tube 52 and the band 54 so as to extend around the tube 50 into contact with a metal washer 58. The center of this washer 58 carries a tubular flange 60 capable of fitting upon and sliding upon the tube 50. Normally the spring 56 is held under compression at all times. Because of such compression the spring 56 will normally bias a completely flat elastomeric washer 62 into contact with the wall 48 so that this washer 62 contacts this wall 48 completely around each of a series of openings 64 located within it.

This structure involving the wall 48, the opening 64, the washer 58, the washer 62, and the spring 56 is as described in more detail in the copending application entitled, "Gas Valve," filed Dec. 21, 1967, Ser. No. 692,520. The entire disclosure of this copending action is incorporated herein by reference in the interest of brevity so as to alleviate the necessity of describing it in greater detail herein.

Within the interior of the body 26 there is located what is referred to here as a valve housing 66. This housing 66 is held in place by a lower cylindrical tube 68 which

is in press fit engagement with the interior of the tube 50 so that it cannot be moved and that no fluid can move between these two tubes. The housing 66 is also held in place by means of small arms 70 extending from its upper cylindrical end 72 into a small groove 74 in the body 26 where these arms are secured by physical engagement. Immediately beneath the cylindrical end 72 the housing 66 is provided with an internal necked-down band portion 76 which extends completely around the body 66. Sloping walls 78 lead to both sides of the necked-down portion 76. A generally somewhat cylindrical section 80 connects the tube 68 with the one of the walls 78 immediately adjacent to the necked-down band 76.

Within the section 80 and the tube 68 there is located a valve member 82. This member 82 has a cross or X-shaped stem 84 which projects from the section 80 into the tube 68 and which fits closely within the tube 68 so as to be guided by contact with it in such a manner as to only be capable of being moved in a linear direction or path. This stem 84 carries a head 86 having a peripheral groove 88 and a flat top surface 90. Located within this groove 88 so as to be held thereby is another elastomeric sealing washer 92 which extends outwardly from the head 86 to fit against and form a seal with the lower of the sloping walls 78 when the tapping unit 14 is in a closed position. Normally the valve member 82 is biased so that such a seal is formed by means of a coil spring 94 held under compression between the head 86 and the portion of the housing 66 generally between the tube 68 and the section 80.

The tapping unit 14 includes a top 96 adapted to overlay the top 28 and a dependent skirt 98 which carries a plurality of inwardly extending cam surfaces 100 which are adapted to engage similar projecting cam surfaces 102 located on the skirt 30 as shown in FIG. 8. The lower surfaces of the cam surfaces 102 may be "coined" or similarly roughened so as to prevent slippage of the cam surfaces 102 with respect to one another when the tapping unit 14 is located in place upon the keg unit 12 as shown in FIG. 1 of the drawings.

The top 96 is provided with a centrally located opening 104 which in turn is surrounded by a partial groove 106. This opening 104 is in communication with and in effect forms an extension of a top cylinder 108. A small elastomeric sealing ring 110 adapted to form a seal with the upper surface of the top 28 is held in this groove 106 by means of retainer 112 of a band-like shape fitting within the cylinder 108. This ring 110 extends from the top 96 a sufficient extent so as to be compressed against the top 28 so as to form a seal therewith when the cams 100 and 102 are in use.

A gas inlet pipe 114 is secured to and carried by the cylinder 108 so as to lead into its interior. This cylinder 108 also has a top washer-like wall 116 which carries an upwardly extending tube 118. If desired this tube may be surrounded by a closely fitting threaded ferrule 120 for use in connecting a line to convey fluid.

A cylindrical base 122 of a generally cylindrical probe 124 is in press fit, sealed engagement with the interior of the tube 118 so as to extend therefrom through the center of the cylinder 108 and through the skirt 98. This probe 124 may include a flange 126 fitting against the wall 116 so as to facilitate it being held in position to insure the proper positioning of the entire probe 124. This probe 124 includes, adjacent to its end, remote from the wall 116, a groove 128 which holds another elastomeric sealing ring 130 so that this sealing ring projects generally outward from the probe 124. This same end of the probe 124 includes what may be referred to as a "pagoda" consisting of a continuous wall 132 carrying arms 134 which are connected by means of a terminal wall 136 of a flat configuration extending perpendicular to the axis of the probe 124.

The entire tapping structure 10 is designated so that the keg unit or valve 12 may be attached to the neck 16 of

the keg 18 in the manner previously described. When so attached the valve 82 is normally held by the spring 94 so that the sealing member or washer 92 forms a seal with one of the sloping walls 78. When it is desired to tap the keg 18 the tapping unit 14 may be located generally above the keg unit 12 and may be moved downwardly until the probe 124 fits within the cylindrical end 72. At this point the sealing ring 130 will engage the interior of the cylindrical end 72 so as to be compressed and form a seal.

As the tapping unit 14 is moved further towards the keg unit 12 the wall 136 will contact the head 86 of the valve member 82 compressing the spring 94 and moving the head to a position as shown in FIG. 1 in which it is spaced from the interior of the housing 66. Substantially simultaneously the ring 110 will be compressed so as to form a seal against the top 28. As such a seal is formed the tapping unit 14 may be turned so that the cams 100 and 102 move with respect to one another to cause further compression the ring 110 so as to more firmly hold the tapping unit 14 in place on the keg unit 12. By virtue of the fact that the wall 136 and the surface 90 are flat such rotation can take place.

At this time the entire tapping structure 10 is ready for use. During such use carbon dioxide gas is normally introduced into the tube 118 from an appropriate connecting structure (not shown) and passes into the interior of the cylinder 108, then past the arms 70 into the interior of the body 26 around the outside of the housing 66. When sufficient gas pressure is applied in this manner it will move through the opening 64 in the wall 48 against the washer 58, causing the spring 56 to be compressed. As the washer 62 is moved in this manner this gas will of course go into the interior of the keg 18. Simultaneously normally any fluid from within the interior of the keg will move through the tube 52 into the tube 50 and around the stem 84 up past the head 86 between the arms 70 into the interior of the probe 124. From there it will pass out through the tube 118 to an appropriate connecting tube.

I claim:

1. A structure for use in connecting a tapping unit with a keg, said keg having a cylindrical neck, said neck having end flanges, said flanges extending radially outward from the end of said neck remote from said keg, wherein the improvement comprises:

a keg unit having a body fitting within said neck, a top extending radially outward from an end of said body, said top being adapted to overlay said flanges, an attaching skirt carried by said top and extending from said top generally parallel to said body, said attaching skirt having a cam surface located thereon corresponding to each of said flanges, sealing means located around said body and against said top,

said sealing means being adapted to be held under compression between said top and the end of said neck when said cam surfaces are located on the sides of said flanges remote from said top and are engaged with said flanges,

a holding means located within said skirt in contact with said top, said holding means including means engaging the end of said neck remote from said keg so as to be held against rotation,

ratchet means for preventing rotation of said keg unit when said cam surfaces are engaged with said flanges, a first part of said ratchet means being located on said holding means and a second part of said ratchet means adapted to coact on the said first part being located on said keg unit.

2. A structure as claimed in claim 1 wherein:

said first part of said ratchet means located on said holding means comprises at least one resilient finger extending from said holding means,

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said second part of said ratchet means located on said keg unit comprises an opening within said keg unit, said finger fitting within said opening when said keg unit is connected to said keg so as to prevent rotation of said keg unit with respect to said neck of said keg.

3. A structure as claimed in claim 1 wherein:

said means on said holding means comprises flange means which fit around the exterior of said neck and engage said flanges so as to prevent rotation of said holding means.

4. A structure as claimed in claim 1 including:

means for attaching a tapping unit located on said attaching skirt.

5. A structure as claimed in claim 4 wherein:

said means for attaching a tapping unit comprise cam means formed on said skirt so as to extend outwardly therefrom.

6. A structure as claimed in claim 1 including:

tapping unit means coupled to said keg valve unit.

7. A structure as claimed in claim 1 including:

liquid valve means and gas valve means located on said body of said keg unit,

said gas valve means being capable of being opened in response to gas pressure applied thereto,

said liquid valve means being capable of being opened by pressure being applied to a surface of said liquid valve means.

8. A structure as claimed in claim 1 wherein:

said first part of said ratchet means located on said holding means comprises at least one resilient finger extending from said holding means,

said second part of said ratchet means located on said keg unit comprises an opening within said keg unit,

said finger fitting within said opening when said keg

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unit is connected to said keg so as to prevent rotation of said keg unit with respect to the neck of said keg,

said means on said holding means comprises flange means which fit around the exterior said neck and engage said flanges on said neck so as to prevent rotation of said holding means.

9. A structure as claimed in claim 8 including:

means for attaching a tapping unit located on said attaching skirt,

tapping unit means coupled to said means for attaching a tapping unit so as to be sealed with respect to said body by contact with said top,

liquid valve means located on said body of said keg unit,

said liquid valve means being capable of being opened by pressure being applied to a surface thereof,

probe means on said tapping unit contacting said liquid valve means so as to apply pressure to open said liquid valve means when said tapping unit is coupled to said keg unit.

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