United States Patent

[11] 3,545,475

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[54] **TAP ASSEMBLY**
3 Claims, 9 Drawing Figs.

[52] **U.S. Cl.** **137/212,** 222/400.7
[51] **Int. Cl.** **B65d 83/00;** B67d 5/54
[50] **Field of Search** 137/212, 320; 222/400.7, 400,8; 285/376, 375, 130, 361; 251/149.2

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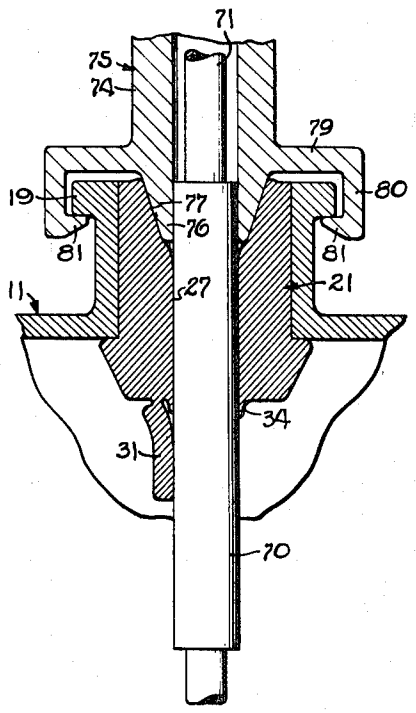
ABSTRACT: A tap for tapping an initially sealed keg of draft beer and including a draw tube, a gas tube, a tap body, and a coupling constructed as a unitary assembly, the draw tube remaining in the same position relative to the tap body before, during and after tapping of the keg. A yieldable sealing membrane in a plug in the tap hole of the keg is punctured as the draw tube is inserted into the keg, and then seals around the gas tube to establish an automatic seal between the tap and the plug. A taper at the lower end of the tap body wedges into the plug to hold the tap body and the tubes on the keg after the latter has been tapped and to establish a secondary seal between the tap and the plug.



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SHEET 1 OF 2

Fig. 1

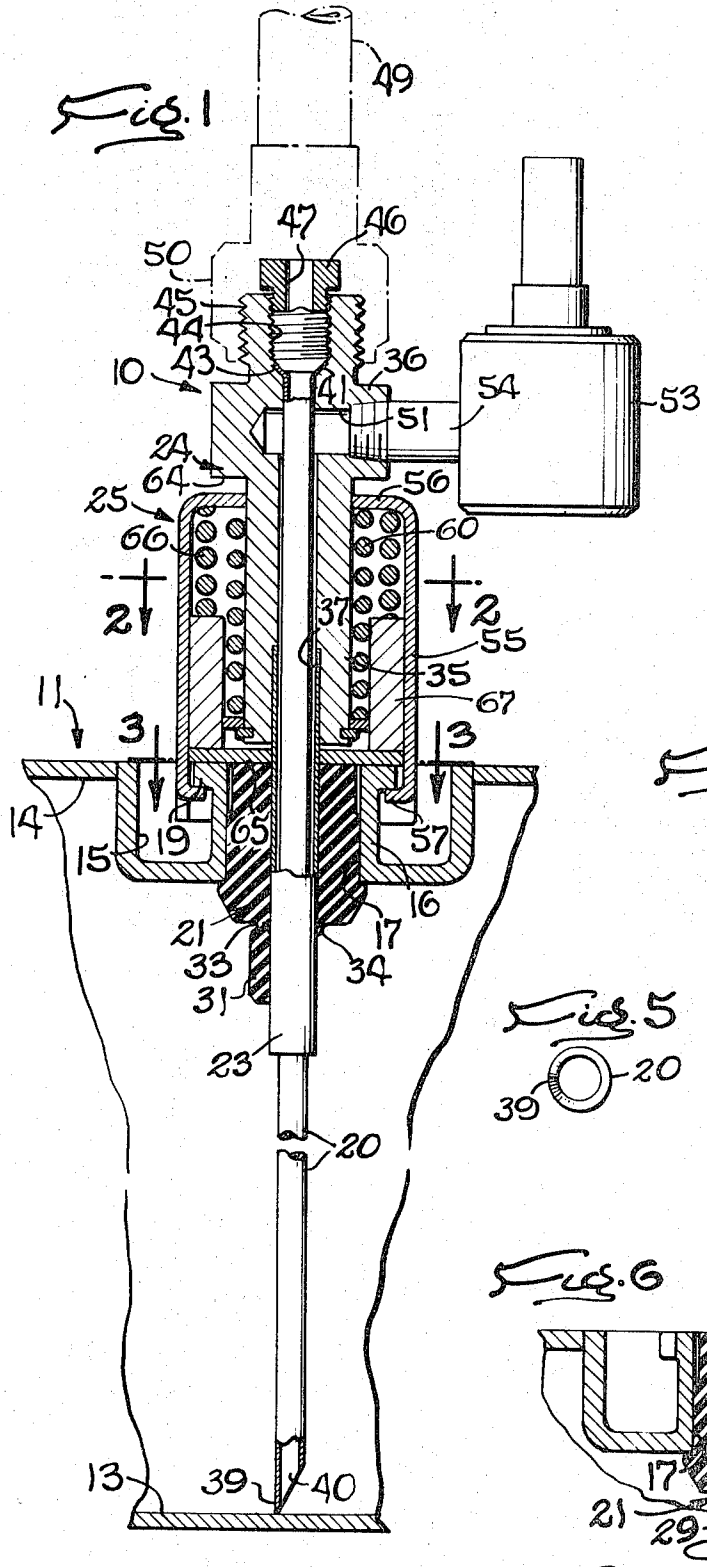

Fig. 2

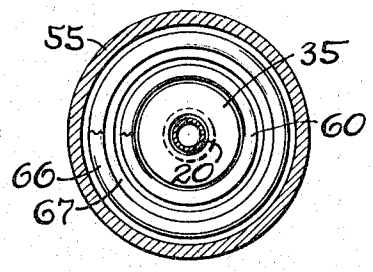

Fig. 3

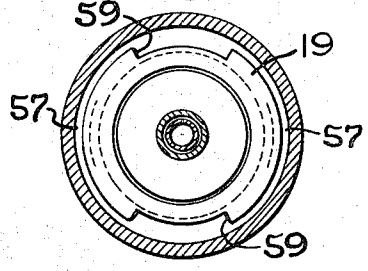

Fig. 4

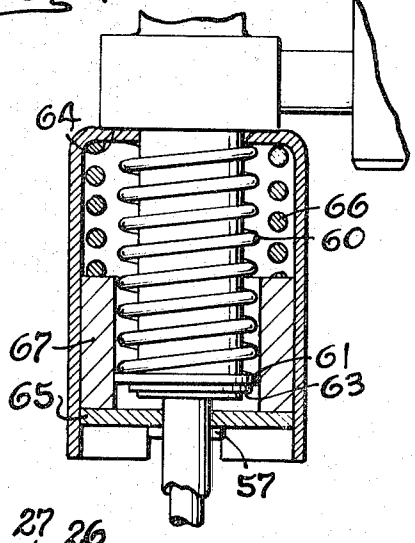

Fig. 5

Fig. 6

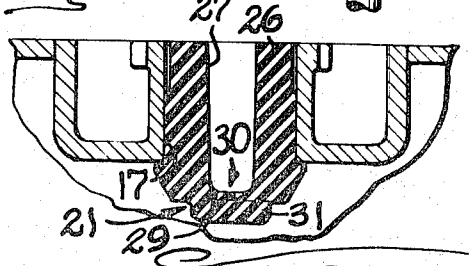

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Fig. 7

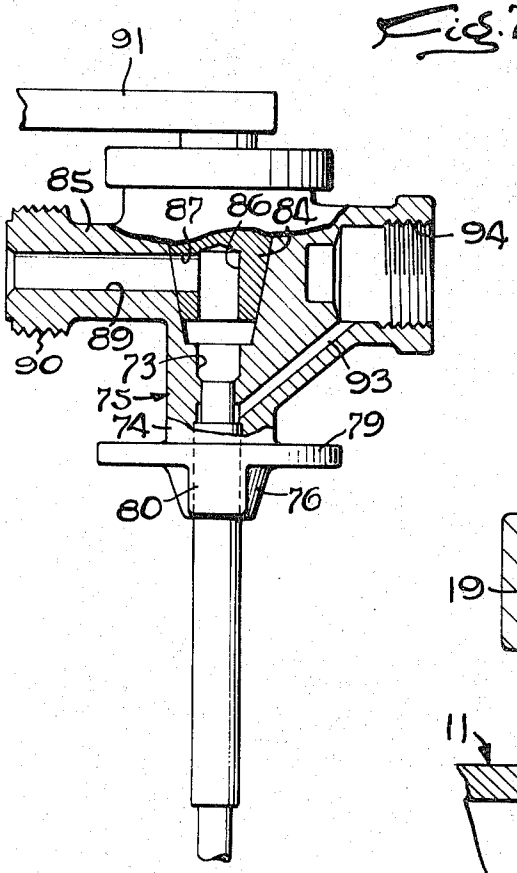


Fig. 8

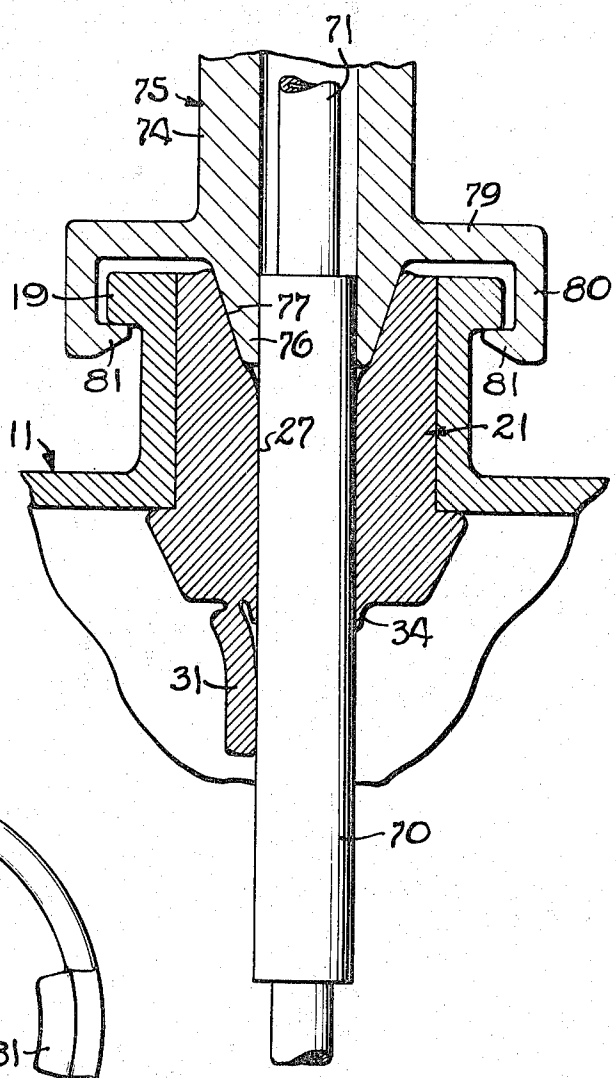
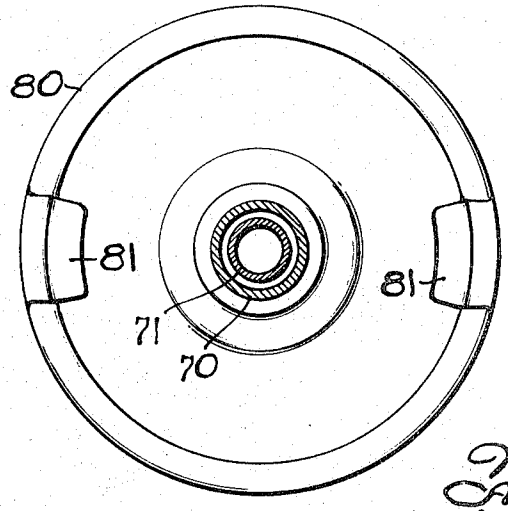


Fig. 9



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TAP ASSEMBLY

BACKGROUND OF THE INVENTION

This invention relates to a tap assembly for withdrawing a charged beverage from a container through a tap hole in the container and, more particularly, to a tap assembly having an elongated draw tube adapted, as an incident to being inserted into the container through the tap hole, to break a seal which initially closes the tap hole. Usually, the tap assembly includes a tap body for holding the assembly attached to the container and for admitting pressurized gas into the container to force the beverage to flow through the draw tube.

SUMMARY OF THE INVENTION

The general object of the present invention is to provide a tap assembly of the above character which is of unitary construction, which is simpler and less expensive than prior arrangements of the same general type and which, at the same time, may be used to tap the container in a more convenient and trouble-free manner.

A related object of the invention is to construct the draw tube and the tap body as a unitary assembly with a coupling and to do away with the need of making the usual sealing connection between the tube and the body after the container has been tapped and after the initial seal has been broken.

Another object is to provide a tap assembly in which the danger of the draw tube being forced out of the tap body and the danger of the beverage spewing out along the draw tube during tapping of the container are completely eliminated.

Still another object is to provide a unitary tap assembly in which both the tap body and the draw tube are fastened to the container at the same time, with a single coupling, and after the container has been tapped.

A further object is to insure that the draw tube will withdraw all of the beverage from containers of different depths in spite of the unitary construction of the tap assembly.

A related object is to provide a novel coupling for fastening the assembly universally to containers of various depths while maintaining the draw tube in engagement with the bottom of each container regardless of its depth.

The invention also resides in the novel construction of a coupling taper on the tap body enabling quick and yet secure attachment of the tap assembly to the container while establishing a secondary seal between the assembly and the container.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a longitudinal cross section of a tap assembly embodying the features of the present invention as installed in an exemplary container.

FIG. 2 is a cross section taken substantially along the line 2–2 of FIG. 1.

FIG. 3 is a cross section taken substantially along the line 3–3 of FiG. 1.

FIG. 4 is a fragmentary view of the tap assembly illustrated in FIG. 1 and showing the parts in moved positions.

FIG. 5 is a plan view of the lower end of the draw tube.

FIG. 6 is a fragmentary view of the container illustrated in FIG. 1 and showing the condition of the seal in the tap hole after the tap assembly has been removed from the container.

FIG. 7 is an elevational view of a modified tap assembly, parts being broken away and shown in section.

FIG. 8 is an enlarged fragmentary cross section of the tap assembly shown in FIG. 7 and illustrated as installed in a container.

FIG. 9 is a bottom view of the tap assembly shown in FIG. 8.

DETAILED DESCRIPTION

As shown in the drawings for purposes of illustration, the invention is embodied in a tap assembly **10** for tapping an initially sealed container **11** of charged beverage, such as a keg of draft beer, and for drawing the beer from the keg in response to the opening of a dispensing valve (not shown) connected to the assembly. Herein, the keg is generally cylindrical in shape and includes a bottom wall **13** and a head **14**. Projecting upwardly from a depressed well **15** in the head is a cylindrical neck **16** defining a tap hole **17** and formed with an annular flange or lip **19** to which the tap assembly is adapted to be fastened.

The tap assembly **10** includes an elongated draw tube **20** which is inserted into the keg **11** through the tap hole **17** to withdraw the beer and which, as an incident to such insertion, destroys a sealing element **21** in the tap hole, the sealing element serving to close the keg during the interval between filling and tapping of the keg. To force the beer upwardly through the draw tube, pressurized air or carbon dioxide is admitted into the keg through a gas tube **23**. Both the draw tube n and the gas tube are associated with a tap body **24** which is adapted to be coupled to the lip **19** of the keg to fasten the assembly onto the keg.

In accordance with the primary aspect of the present invention, the draw tube **20**, the gas tube **23**, and the tap body **24** are constructed as a simplified unitary assembly adapted to coact in a novel manner with each other and with the sealing element **21** in the tap hole **17** to establish a seal between the tap assembly and the keg automatically as an incident to tapping of the keg. Moreover, the body and the two tubes are adapted to be fastened to the keg as a unit after the keg has been tapped simply by connecting a single coupling **25** to the keg.

To achieve these ends, the draw tube **20**, the gas tube **23** and the tap body **24** are manufactured and assembled in such a manner that the draw tube is sealed within and remains in the same position relative to the tap body before, during and after tapping of the keg **11**. In tapping the keg, the assembly is moved in unison toward the keg, and the draw tube punctures the sealing element **21** as an incident to being inserted into the tap hole **17**. The punctured sealing element thereafter seals around the tubes automatically to prevent the beer from spewing out of the keg along the tubes. After the tubes have been inserted into the keg, the coupling **25** is simply connected to the lip **19** to fasten the assembly to the keg and to complete the tapping operation. With this arrangement, the tap assembly is of extremely simple and inexpensive construction and yet taps the keg in a more convenient and trouble-free manner than has been possible with prior arrangements of the same general type.

In the present instance, the sealing element **21** is of the type disclosed in Johnson et al. U.S. Pat. No. 3,410,456 and includes a substantially cylindrical plug **26** made of resiliently yieldable rubber and telescoped snugly the tap hole **17** to seal the latter. As shown most clearly in FIG. **6**, the plug is formed with a longitudinal bore **27** which is about the same diameter as the gas tube **23** and which initially is closed at its lower end by a thin, unbroken rubber member membrane **29** molded integrally with the plug and extending across the lower end of the bore. The membrane thus establishes a seal between the bore and the inside of the keg **11** to seal the beer within the keg from the time the keg is filled until the time the keg is tapped.

When the keg **11** is tapped. the draw tube **20** is telescoped downwardly into the bore **27** and punctures the membrane **29** indicated at **30** in FIG. **6**. At the same time, a flapper **31** molded integrally with the plug **26** is swung downwardly about a hinge **33** (See FIG. **1**) formed by a short segment of rubber connecting the flapper to the lower end of the plug. With continued downward telescoping of the draw tube, the torn edges of the membrane fold downwardly around the draw tube and form a sealing lip **34** (FIG. **1**) resiliently gripping the tube and automatically establishing a seal between the tube and the plug to prevent the charged beer from spewing out through the bore. As the draw tube approaches the bottom **13** of the keg, the gas tube **23** moves downwardly through the bore and is embraced by the sealing lip **34** so that the seal between the keg and the tap assembly is maintained. As a result of such au-

tomatic sealing, there is no need to make an additional sealing connection between the draw tube and the tap body as is the case with prior tap assemblies that have found commercial acceptance.

After the keg **11** has been emptied and after the draw tube **20** has been pulled out of the plug **26**, the flapper **31** is forced upwardly about the hinge **33** and into face-to-face engagement with the lower end of the plug (See FIG. **6**) by the pressure remaining in the keg. The flapper thus closes off the puncture **30** in the membrane **29** and maintains the keg in a sealed condition during its return to the brewery. At the brewery, the plug is knocked out of the tap hole **17** and is replaced by a new plug with an unbroken membrane **29** before the keg is refilled.

Herein, the tap body **24** is a generally T-shaped member made of aluminum and is formed with a cylindrical stem **35** depending from a cross head **36**. The draw tube **20** projects downwardly from the lower end of the stem and is telescoped into a longitudinal bore **37** formed through the body. Preferably, the lower end **39** of the draw tube is cut on an angle to form a point (See FIG. **1**) to facilitate puncturing of the membrane **29**. Beer is admitted into the draw tube through an inlet hole **40** in the lower end of the tube.

At its upper end, the draw tube **20** is formed with a flare **41** which fits against a complementary tapered seat **43** formed by the lower end of an internally threaded bore **44** extending axially through a nipple **45** on the upper end of the cross head **36**. The draw tube is sealed within the tap body **24** by a bushing **46** threaded into the bore **44** and formed with a tapered lower end mating with the flare and forcing the latter downwardly against the seat **43**. With this arrangement, the draw tube is sealed within the tap body and yet can be removed and replaced with a tube of different length simply by unthreading the plug and pulling the tube endwise out of the body. The tap assembly thus can be adapted for use with kegs of different capacity.

Advantage is taken of the fact that the draw tube **20** remains in a fixed position within the tap body **24** to use the body itself as the dispensing outlet for the tap assembly. For this purpose, the bushing **46** is formed with a longitudinal passage **47** communicating with the draw tube and adapted to communicate with a conduit **49** (FIG. **1**) leading to a dispensing faucet (not shown). A fitting **50** on the end of the conduit may be threaded onto the nipple **45** to connect the conduit to the tap body. The outlet or dispensing conduit thus may be connected directly to the tap body instead of being connected to the draw tube as in prior arrangements of the same general character.

In this instance, the gas tube **23** is telescoped into the bore **37** and over the draw tube **20** and projects downwardly from the lower end of the stem **35** sufficiently far that the lower outlet end of the gas tube passes by the membrane **29** and into the keg **11** when the latter is tapped. The upper or inlet end of the draw tube communicates with a radially extending inlet passage **51** (FIG. **1**) formed in the cross head **36**. Air under pressure is admitted through the bore **37** and into the gas tube from a pump or a pressurized tank (not shown) communicating with a pressure relief valve **53** connected to the passage **51** by a conduit **54** threaded into the passage.

Kegs of equal capacity made by different manufacturers may vary in depth as much as seven-eighths of an inch. That is, the distance between the bottom **13** and the head **14** is not the same for all kegs of the same capacity. It is, of course, desirable for the lower end **39** of the draw tube **20** to be in direct engagement with the bottom of each keg regardless of its depth in order that all of the beer may be withdrawn from the keg. In accordance with another of its aspects, the present invention contemplates a novel coupling **25** which permits the tap assembly to be fastened quickly and securely to kegs of various depths with the draw tube disposed at the very bottom of each keg in spite of the nonadjustable relationship of the draw tube and the tap body **24**.

As shown in FIGS. **1** and **4**, the coupling **25** cup a clamp in the form of an open end cup **55** which surrounds the stem **35** of the tap body **24** and which is mounted both for rotation and for up and down sliding on the stem. A closed end **56** of the cup is disposed adjacent the upper end of the stem and is formed with a hole which receives the stem. From the closed end, the cup extends downwardly beyond the lower end of the stem and is formed with a pair of diametrically opposed fingers **57** struck from the walls of the cup and projecting radially inwardly toward the center of the cup, the distance between the free edges of th the fingers being less than the diameter of the lip **19** on the keg **11**.

When the cup **55** is turned about the axis of the stem **35**, the fingers **57** may be alined with a pair of notches **59** (FIG. **3**) formed in the lip **19** of the keg **11** so that the fingers will pass through the notches when the cup is slid downwardly on the stem. The tap assembly **10** then may be locked onto the keg by turning the cup about the stem to a position in which the fingers are misalined with the notches and hook around and engage the underside of the lip.

With this arrangement, the effective length of the draw tube **20**, that is, the distance between the lower end of the draw tube and the lower end of the stem **35**, may be made sufficiently great that the draw tube will engage the bottom of each keg of equal capacity before the lower end of the stem engages the lip **19** of the keg. Thus, the stem will never stop against the lip before the draw tube has reached the bottom of the keg even though the depths of different kegs may vary considerably. After the draw tube has engaged the bottom of the keg, the tap assembly may be fastened to the keg simply by sliding the adjustable cup **55** downwardly on the stem **35** and then by turning the cup to hook the fingers **57** beneath the lip **19**.

Preferably, the fingers **57** are urged upwardly into tight clamping engagement with the lower side of the lip **19** by a coiled spring **60** surrounding the stem **35** and telescoped into the cup **55**. The spring is compressed between the closed end **56** of the cup and a washer **61** which is held on the stem by a snap ring **63** fastened to the stem. With the tap assembly **10** detached from the keg **11** (See FIG. **4**), the spring urges the cup upwardly on the stem and presses the closed end of the cup into engagement with a shoulder **64** formed by the lower side of the cross head **36**. The spring is compressed as the cup is slid downwardly along the stem, and thus urges the fingers upwardly against the underside of the lip after the cup has been turned and released. Once the fingers are hooked beneath the lip, the compressed spring also acts to hold the draw tube **20** downwardly against the bottom **13** of the keg and to restrict upward movement of the stem and the draw tube relative to the clamped cup. Accordingly, the draw tube will not be forced upwardly by the pressure within the keg.

To insure a tight connection between the cup **55** and the lip **19**, a sleeve or washer **65** is mounted to slide on the gas tube **23** and within the cup **55**. When the tap assembly **10** is detached from the keg **11** (See FIG. **4**), the washer **65** is urged downwardly against the fingers **57** by a second coiled spring **66** telescoped into the cup and over the spring **60** and compressed between the closed end **56** of the cup and a sleeve in the form of a collar **67**. The latter is telescoped slidably into the cup and over the stem **35** and is disposed immediately above the washer **65**.

As the cup **55** is slid downwardly along the stem **35**, the spring **66**, the collar **67** and the washer **65** move in unison with the cup until the fingers **57** pass into the notches **59** of the lip **19**. At this time, the lower side of the washer **65** engages the upper side of the lip and is stopped and pressed downwardly against the lip as the spring **66** is compressed upon continued downward movement of the cup. Thus, with the fingers locked beneath the lip, the spring-urged washer **65** forms a clamping surface bearing tightly against the upper side of the lip and coacting with the fingers **57** and the spring **60** to prevent the tap assembly from tilting about an axis perpendicular to the longitudinal axis of the draw tube **20**. The washer **66** also forms a bearing around the gas tube **23** to guide the lower end of the cup as the cup is slid up and down on the stem.

From the foregoing, it will be apparent that the keg **11** may be tapped with the new and improved tap assembly **10** of the present invention simply by moving the assembly in unison toward the keg to insert the end of the draw tube **20** into the bore **27** in the sealing plug **26**. With continued movement of the assembly, the draw tube punctures the membrane **29**, and the latter seals around the draw tube to establish an immediate seal between the tap assembly and the keg. Thus, there is no danger that the beer will spew out of the keg along the draw tube and, with the draw tube held rigidly within the tap body **24**, there is no danger that the pressure within the keg will cause the draw tube to fly upwardly out of the tap body. Thereafter, the entire assembly is fastened securely to the keg simply by sliding the coupling **25** downwardly on the stem **35** and locking the coupling to the lip **19**. The tapping operation with the present assembly is so uncomplicated that even persons without previous experience in the tapping of kegs are able to use the assembly without detailed instructions as to the proper procedure to follow.

Illustrated in FIGS. **7** to **9** is a modified tap assembly which, while incorporating most of the advantageous features of the assembly of the first embodiment, is much simpler in construction and is less expensive to manufacture. In this instance, a gas tube **70** and a draw tube **71** are telescoped into a longitudinal bore **73** formed in a stem **74** of a tap body **75**. A coupling for fastening the tap assembly to the keg **11** is advantageously formed by a downwardly diminishing taper **76** integral with and projecting downwardly from the lower end of the stem and encircling the gas tube **70**. With this arrangement, the tap assembly may be fastened to the keg simply by telescoping the taper downwardly into the bore or passage **27** in the sealing plug **21** until the taper becomes tightly wedged within the plug as shown in FIG. **8**. Preferably, the diameter of the lower end of the taper is slightly less than the diameter of the upper end of the bore **27** to facilitate insertion of the taper into the bore. The diameter of taper above the lower end is greater than the diameter of the bore and thus the rubber of the plug becomes compressed as an incident to downward insertion of the taper into the bore. The compressed rubber resiliently grips the taper and holds the tap assembly securely on the keg. In addition, a secondary seal is established between the taper and the plug as indicated at **77** in FIG. **8** to insure that no beer will escape from the keg even if the seal formed by the sealing lip **34** should be less than perfect.

While in most instances the rubber plug **21** will grip the taper **76** sufficiently tight to hold the tap assembly on the keg **11**, it is desirable to provide an additional coupling between the assembly and the keg to insure that the assembly will remain locked in place when, for example, a hand pump (not shown) is used to inject pressurized air into the keg. Herein, the additional coupling is quite simple and includes an annular flange **79** formed integrally with the lower end of the stem **74**. Depending from the flange are a pair of lugs **80** diametrically spaced from each other and formed with inwardly projecting fingers **81**. To attach the assembly to the keg, the tap body **75** is turned to a position in which the fingers are alined with the notches **59** in the lip **19** on the neck **16** of the keg. The fingers thus will pass downwardly through the notches as the taper is wedged into the plug. After the taper has been seated, the tap body is turned to move the fingers out of alinement with the notches and into engagement with the underside of the lip **19**. When thus positioned, the fingers will hold the tap assembly securely on the keg even though jerked upwardly rather abruptly during operation of the hand pump.

Advantage is taken of the unitary assembly of the gas tube **70** and the draw tube **71** with the tap body **75** to provide a shutoff valve **84** within the body itself for controlling the flow of beer from the keg **11**. In this instance, the valve is a downwardly tapered member mounted rotatably in a cross head **85** formed at the upper end of the stem **74**. The valve is formed with a vertical passage **86** communicating with the bore **73** and the upper or outlet end of the draw tube **71**. Extending horizontally through the valve and communicating with the passage **86** is a passage **87** which, when the valve is open, is adapted to aline with and permit flow through an outlet passage **89** formed in the cross head **85**. The latter preferably is threaded as indicated at **90** for connection to a dispensing conduit or faucet. An operating handle **91** is journaled in the cross head and is connected to the valve for turning the latter between open and closed positions. Pressurized air or carbon dioxide is conducted to the gas tube **70** through an inclined passage **93** extending upwardly from the bore **73** to an internally threaded hole **94** to which a hand pump or pressurized tank (not shown) may be connected.

With the valve **84** mounted in the tap body **75** itself, beer may be dispensed directly from the tap assembly through the outlet passage **89** without the necessity of fastening a valve dispensing conduit or faucet to the threaded fitting **90** on the cross head **85**. This is particularly advantageous in those instances in which the tap assembly is used for home or picnic purposes since the total amount of equipment required for a complete operable assembly is considerably reduced. When the assembly is used in commercial enterprises, it is possible to tap the keg with the valve closed and without having first to connect to the cross head the conduits for dispensing the beer and supplying the pressurized gas. Moreover, the conduits may be disconnected with beer still in the keg and may be used in conjunction with a tap assembly on another keg.

We claim:

1. The combination of, a walled container holding beverage and having a tap hole in a wall thereof, a tap assembly comprising a body member formed with a longitudinal bore, a gas tube projecting downwardly from the lower end of said body member and into said container through said tap hole to deliver pressurized gas to the inside of the container, an elongated draw tube fastened to said body member and telescoped into said gas tube with at least one of said tubes being telescoped into said bore, said draw tube projecting downwardly from the lower end of said body member and into said container to withdraw the beverage from the container, a plug made of resiliently yieldable material disposed within said tap hole and formed with a longitudinal passage receiving said tubes, said plug including a resiliently yieldable sealing lip near its lower end encircling said passage and yieldably embracing said gas tube to establish a fluidtight seal between the gas tube and the container, and means at the lower end of said body member wedged downwardly into the upper end of said passage of said plug and held releasably therein by virtue of the resiliency of the plug.

2. A tap assembly as defined in claim **1** in which said means includes a downwardly diminishing taper disposed at the lower end of said body member and encircling said gas tube, the major diameter of said taper being greater than the diameter of said passage when the material of said plug is in a relaxed condition.

3. A tap assembly as defined in claim **2** in which said taper is wedged sufficiently tight in said passage to establish an additional fluidtight seal between said tap assembly and said container.