June 6, 1950 W. A. FRASER ET AL 2,510,393

MANUALLY OPERABLE FLUID VALVE

Filed March 14, 1946 2 Sheets-Sheet 1

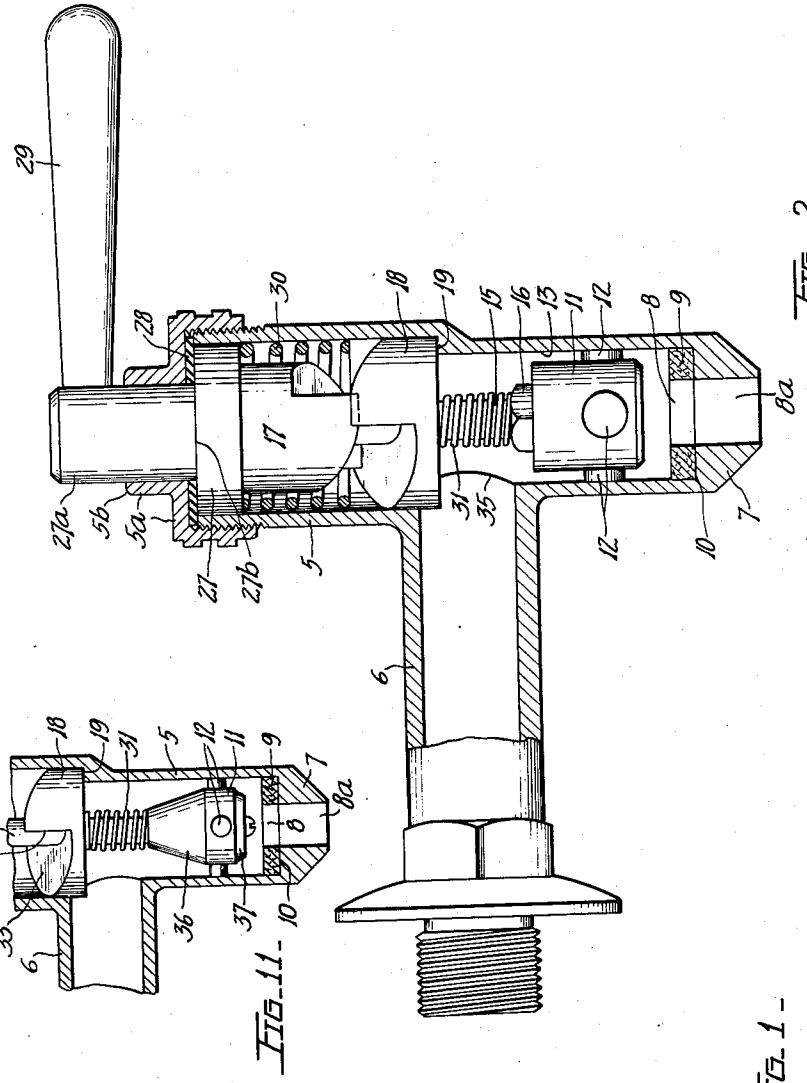



FIG. 2.




FIG. 11.

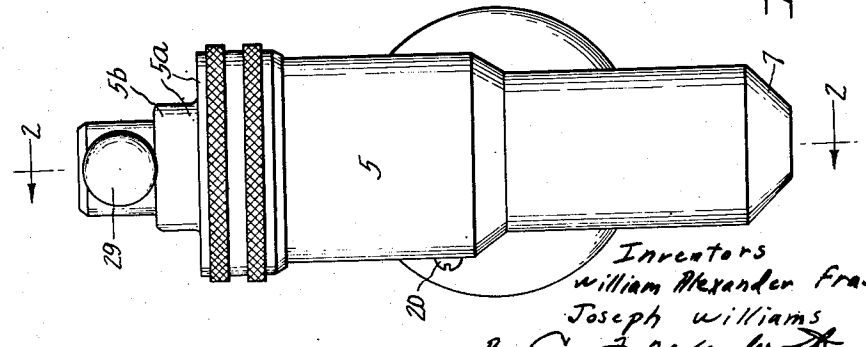


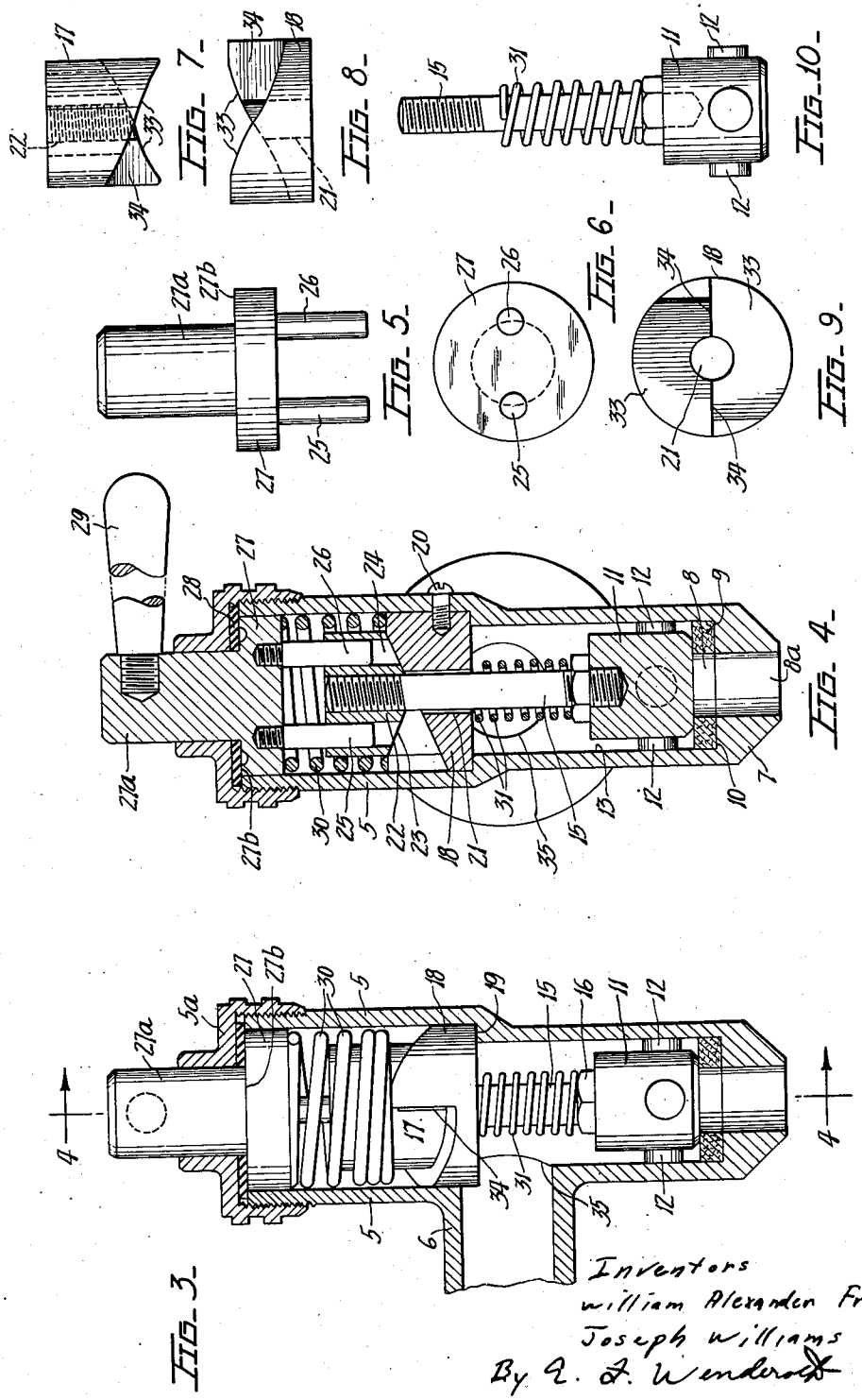

FIG. 1.

Inventors
William Alexander Fraser
Joseph Williams
By E. F. Wenderoth
Attorney

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MANUALLY OPERABLE FLUID VALVE

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Inventors
William Alexander Fraser
Joseph Williams
By R. A. Wenderoth
Attorney

Patented June 6, 1950 2,510,393

# UNITED STATES PATENT OFFICE

2,510,393

## MANUALLY OPERABLE FLUID VALVE

William Alexander Fraser and Joseph Williams, Saint Kilda, Victoria, Australia, assignors, by direct and mesne assignments, of one-fourth to said William Alexander Fraser, one-fourth to Herbert John Fraser, both of Bendigo, Victoria, Australia, and one-half to Joseph John Casey, Saint Kilda, Victoria, Australia

Application March 14, 1946, Serial No. 654,370
In Australia April 5, 1945

5 Claims. (Cl. 251—132)

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This invention relates to a fluid control valve or tap and is particularly, though not specifically, directed to a tap for the drawing or dispensing of beverages such as wine or beer.

Taps for the drawing of beer have been singularly ineffective due to several inherent disadvantages, amongst which may be recited the failure to cut off the flow of beer immediately the tap is turned off whereby there is a discharge of residual beer in the form of drips.

A dripping beer tap is wasteful and uneconomical; dripping is primarily caused by the faulty cut-off of the valve on its seating, and the remote location of the valve and seating relative to the mouth of the tap which, irrespective of the skill of the barmen, permits the above-mentioned subsequent discharge of the residual beer after the filled glass has been removed.

Incidentally the slow cut-off of fluids and gases in other valves is due in many instances to the relatively slow return of the valve element to its seating.

Now this invention as its primary objective comprehends the provision of an inexpensive and effective valve or tap capable of mass production and operating to provide a practically instant cut-off of the fluid or liquid, e. g. beer, and resultantly a non-drip construction.

A further specific objective of the invention is to produce a beer tap in which the valvular and internal construction and moving parts are effectively tinned or plated to offset the effect of the acid content of the beer upon, and resultant deterioration of these parts under friction between the working surfaces, whereby the tap will conform with legislation governing the manufacture and use of the same.

A further object of the invention is to provide an effectively sealed beer tap in which the parts can be readily dismantled for cleaning purposes and reassembled by unskilled labour and without the use of mechanical tools, thereby ensuring continuity of use of the tap.

With the above stated principal object in view, there is provided according to this invention a valve or tap comprising a casing having an inlet port to communicate with a supply of fluid and a discharge port located in or adjacent to the delivery end of said casing, a valve element located between said ports and normally closing the discharge port, a spring arranged to resist the opening movement of said valve element, and means operatively connected to said valve element and operable from without the casing to rotate and axially move said valve element and thereby open

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or lift the latter from engagement with the discharge port against the resistance of said spring.

The valve or tap in the form of a beer or like tap, is characterized by a low lift or opening movement, and quick return of the valve element, to thereby effect a positive cut-off in the flow of fluid from the valve, the valve element can be opened slowly or quickly but upon termination of the opening movement it normally closes quickly.

The quick return of the valve from the low lift, combined with the location of the valve in the delivery and of the casing, contributes mainly to the positive cut-off of the flow from said tap.

The accompanying drawings depict a practical arrangement of the invention applied to a beer tap.

In the drawings:

Fig. 1 is an elevation of the beer tap.

Fig. 2 is a view in section taken on line 2—2 of Fig. 1 showing the valve element in the open or raised position.

Fig. 3 is a section taken on the same line 2—2 with the valve element closed.

Fig. 4 is a section taken on line 4—4 of Fig. 3.

Figs. 5 and 6 are views in elevation and plan respectively of the sealing member which also connects the control handle of the tap.

Figs. 7 and 8 are views in elevation of the co-acting cams.

Fig. 9 is a plan view of the cam illustrated in Fig. 8.

Fig. 10 is a detail view of the valve element and spindle.

Fig. 11 is a fragmentary sectional view of the tap showing a modified valve element.

Referring to Figs. 1 to 4 the barrel 5 of the tap comprises a tubular casing substantially T-shaped, the leg of the T being horizontal forming a tubular extension 6 adapted for direct connection to a cask or supply pipe.

The vertical tubular body of the barrel houses the valvular mechanism and the lower end is formed with a short nozzle 7 for the delivery of the beer. The bore of the nozzle is approximately ½" in length and is of equivalent diameter to and aligns with the outlet port 8 in the valve seat 9 constituting a washer of leather or other material, located on the annular base 10 of the barrel. The valve element 11 is a solid metal cylinder having circumferentially spaced guide blocks 12 integral with or attached thereto at right angles to the axis of the cylinder, to engage the internal wall 13 of the barrel 5 so as to centre the valve element at all times upon the valve seat 9. Valve

element 11 is carried upon a vertical spindle 15 threaded into said element and secured thereto by the nut 16, the upper end of said spindle being secured to a movable cam 17 located in the barrel in operative relation to a fixed cam 18 seating upon the annular shoulder 19 of the barrel and retained fixed by the grub screw 20.

Fixed cam 18 is centrally bored as at 21 to permit the free passage of the valve spindle 15 therethrough to connect the movable cam 17. The spindle 15 is threaded into the tapped central hole 22 of the movable cam after the movable cam has dropped into position upon said spindle.

The movable cam 17 is provided with a pair of diametrically opposite apertures 23—24 parallel to its axis and in which is disposed a pair of guide pins 25—26 attached to and threaded into the cylindrical sealing element 27 located in spring pressed sealing relation to a washer 28 located in the upper end of the barrel 5.

A threaded cap 5*a* is fitted to the upper end of the barrel for the closure of the latter. An integral stem 27*a* of the sealing element projects through the boss 5*b* of the cap 5*a* and is externally fitted with a handle 29 for operating the valvular mechanism.

Handle 29 is threaded into and arranged at right angles to the stem 27*a* of the sealing element 27. As the handle is turned the sealing element 27 is partially rotated whereby through the medium of the pins 25—26, the movable cam 17 is also partially rotated or turned about its axis. A take-up spring 30 is freely disposed about the movable cam 17 to engage at respective ends, the fixed cam 18 and the inner face 27*b* of the sealing element 27 which is supported by the spring 30. This spring operates to automatically maintain the outer annular sealing face 27*b* of the washer 27 in constant engagement with the washer 28, and also to take up any wear upon the washer 28 to maintain the sealed closure of the barrel. The arrangement eliminates the necessity for a stuffing box or gland and consequent manual adjustment in the event of wear.

The valve spindle 15 between the valve element 11 and underside of the fixed cam 18 has disposed thereon a control spring 31 which is compressed during the opening or lifting movement of the valve element 11 to thereby assist the return movement of the latter. The movable cam 17 and fixed cam 18 comprise cylindrical blocks having complementary cam surfaces formed on the oppositely disposed and engaging ends.

The cam surfaces 33 of each cam consist of partly convex partly concave or helical surfaces which terminate in vertical diametrically opposite shoulder 34.

Each helical surface 33 extends from the periphery of the cylinder to the vertical shoulder 34 and occupies substantially one half of the cylinder, and as viewed in Figs. 6 to 8 the cam surfaces are correspondingly shaped and project in opposite directions towards the vertical shoulders 34.

As viewed in Figs. 3 and 4 the cams in the normal position i. e. with the valve element 11 engaging the seat 9, the cams 17—18 are disposed with the cam surfaces 33 seating flush with each other and the vertical shoulders 34 on the movable cam 17 engaging the vertical shoulders of the fixed cam 18.

In operation upon the turning of the control handle 29 through approximately 90° i. e. from the position illustrated in Fig. 1 to that in Fig. 2, the sealing element 27 is correspondingly partially rotated with the movable cam 17, which being



fixed to the valve spindle 15 similarly turns the latter and valve element 11.

The partial rotation of the movable cam 17 upon and relatively to the fixed cam 18 effects an axial movement of the movable cam 17 in response to the traversing of its cam surface 33 upon the cam surface 33 of the fixed cam 18.

The movement of the movable cam 17 guided by the pins 25—26 also raises the valve spindle 15 connected thereto whereby the valve element 11 is raised from engagement with the valve seat 9 against the compression of the spring 31. Communication is thereby set up between the outlet port 8 in the valve seat 9 and the inlet port 35 at the inner end of the tubular extension 6 whereby liquid flows through the last mentioned port 33 to the barrel, around the valve element to pass through the outlet port 8 into the delivery nozzle 7.

As the control handle is returned to the normal position, reverse rotation of the movable cam 17 returns the latter to the normal position and the valve spindle 15 is retracted to close the valve element 11 upon the valve seat 9 and this movement is assisted and accelerated by the spring 31.

Accordingly there is a quick return of the valve element 11 to the closed position upon the valve seat 9 from the open or raised position illustrated in Fig. 2.

As the valve element in the beer tap has an opening movement restricted to approximately ⅛ to ¼ of an inch, and a quick return under the influence of spring 31 there is a positive cut off of the flow of beer, while the relatively short length of the bore 8*a* of the nozzle 7 contributes to the non-dripping of the tap. The low lift is possible in view of the internal diameter of the barrel relatively to the diameter of the valve element 11 and bore 8, which permits the free flow of beer immediately the valve element is raised.

The tap hereinbefore described with reference to the drawings has a limited number of component parts capable of economical mass production and the means employed to connect the attached parts readily facilitate the dismantling for cleaning and maintenance operations without the necessity for the employment of special tools or skilled labour.

In the application of the above tap for the drawing or dispensing of wine, the tubular extension 6 of the barrel 5 is of external tapering construction for driving into the cask in the conventional manner, a diametrically opposite head or abutment being formed on the barrel for that purpose.

The component parts of the tap can be metal plated or tinned, and having only two main parts in frictional engagement, i. e. the cam surface 33, and valve guides 12 with wall of the barrel, little or no deterioration under the influence of the acid content of the beer will be set up because of the normal absence of wear between these plated parts due to the small amount of movement which occurs during the opening and closing movements of the valve element.

We claim:

1. A valve or tap comprising a casing having an inlet port and an outlet port, a valve element normally closing the discharge port, a spring arranged to resist the opening movement of the valve element, a spindle connected to the valve element, a movable cam secured to said spindle, a spring pressed rotatable element disposed in sealing relation to one end of the casing with an extension projecting through the latter, means upon said extension for rotating the rotatable

element, a pair of pins projecting from said rotatable element and extending into complementary slots in the movable cam to rotate the latter in unison with said rotatable element and permit relative axial movement of said cam responsive to its coaction with the relatively fixed cam.

2. In a valve or tap according to preceding claim 1, a spring interposed between the relatively fixed cam and the rotatable element.

3. In a valve or tap according to claim 1 and wherein the spring is disposed upon the spindle and interposed between the valve element and fixed cam.

4. In a valve or tap, a tubular casing having a short nozzle at one end for the delivery of fluid and including a discharge port, a tubular extension intermediate the ends of said casing to communicate with a supply of fluid, a valve seat concentric with the discharge port, a solid cylindrical valve element normally closing said port, guide means on said element engaging the wall of the casing to centre said valve element upon said valve seat, a spindle connected to said valve element, a spring arranged on said spindle to resist the opening movement of said valve element, a pair of complementary cams coaxially mounted upon said spindle, one of said cams fixed and the other movable, a rotatable element disposed in sealing relation to the other end of said casing with an extension projecting through the casing, a spring interposed between the fixed cam and the rotatable element, spaced pins projecting from said rotatable element to freely engage diametrically opposite slots in the movable cam, and means upon the extension of said rotatable element to rotate the latter.

5. A valve or tap comprising a tubular casing, a lateral inlet port in the tubular casing, an outlet port at one end of the tubular casing, a detachable cover on the opposite end of said casing, a valve element normally closing the outlet port, an annular cam fixed to and coaxial with the tubular casing, a rotatable complementary annular cam engaging the fixed annular cam, a spindle extending axially through the fixed annular cam and connecting the valve element with the complementary annular cam, a spring encircling the spindle and positioned between the valve element and the fixed annular cam to oppose movement of said valve element, a manually rotatable stem extending through the detachable cover, drive means carried by the manually rotatable member engaged with the rotatable complementary annular cam to rotate and permit axial movement of said complementary cam in response to rotation in contact with the fixed annular cam, an annular enlargement of the stem at the inner side of the detachable cover, a sealing ring interposed between the annular enlargement and the inner side of said cover, and a spring interposed between the fixed cam and the annular enlargement.



WILLIAM ALEXANDER FRASER.
JOSEPH WILLIAMS.


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