

SPECIFICATION

A device for use in connection with tapping off fluid from or filling fluid into a container

The present invention relates to a device for use in connection with tapping off fluid from or filling fluid into a container through an internally threaded tapping or filling hole in the container provided with an externally threaded generally cup-shaped plug having an outwardly open cavity in which a tool may be inserted for rotating the plug. More particularly, the invention relates to such a device of the kind comprising a bell-like housing which is adapted to be removably mounted with an open end thereof over the tapping or filling hole of the container and which is provided with an opening through which fluid may be fed into or discharged from the housing, and a tool for manually operating the plug from a position outside the housing, said tool comprising a shaft which extends slidably and rotatably through a portion of the housing opposite to the open end of the housing and which is provided with handle means at its outer end, while, at its inner end, it is provided with plug holding and operating means insertable into said cavity if the plug. A device of a similar type is previously known through French patent specification No. 504.203. However, a disadvantage of said known device is that it is restricted for use with containers of a very specific type having a specially designed plug for closing the tapping or filling hole of the container.

An object of the invention is to provide an improved device of the kind above specified which is adapted to be used with drums or similar containers of the kind widely used, inter alia within the petroleum industry and the chemical industry, and having internally threaded tapping holes, or bung holes, provided with externally threaded plugs, or bungs, of well-known standardized type.

According to the invention there is proposed a device of the kind initially specified, characterized in that said plug holding and operating means include expansion means adapted to be expanded into contact under pressure with portions of the side wall of the cavity of the plug upon insertion of the plug holding and operating means into said cavity.

The use of expansion means, as proposed by the invention, makes it possible in an easy and reliable manner to hold the plug firmly in position on the tool when removing the plug from the tapping hole.

The device may be provided with separate manually operable control means for actuating the expansion means. However, it may alternatively be provided with automatically operating control means for actuating the expansion means, preferably in response to a limited rotation of the handle means of the tool with respect to the plug.

Below, the invention will be described in further detail, reference being had, by way of example, to the accompanying drawing, in which:

Figure 1 is a side elevation of a device according to one embodiment of the invention, showing the device mounted over a tapping hole of a drum-shaped container;

Figure 2 shows an exploded view of the device according to *Figure 1*;

Figure 3 is a sectional view showing a plug operating and holding tool of the device in greater detail, a portion of the shaft of the tool being cut away to facilitate easy illustration of the tool; and

Figure 4 is a partial view, partly in section, showing a modified tool.

The device shown in *Figures 1* and *2* comprises a bell-like housing 1 having an open end adapted to be mounted over a tapping and filling hole 4 in a drum 5 and to be locked in engagement with a flange 3, surrounding said hole, by means of a locking device 2. Reference numeral 6 generally designates a key, or tool, by which a plug 7 (shown in *Figure 2*) may be threaded into and removed from the tapping hole 4 and by which the plug may be held and lifted from hole 4 within housing 1 to provide free passage for fluid from the tapping hole 4 to a discharge pipe 8 terminating in an opening in the wall of housing 1. At its upper end (as shown in *Figures 1* and *2*), housing 1 is closed by a circular threaded cover 9 provided with a central bore 10 through which a shaft 11 of key 6 extends slidably and rotatably. At the upper end of the key shaft 11, there is provided a handle 13, shaped as a hand-wheel, and a screw 14. At its lower end, the shaft 11 carries a key bit formed by a cross bar 15 having slightly rounded ends 16. The bar 15 is shaped so as to fit into the upwardly open cavity of the cup-shaped plug 7. A longitudinal bore 17 extends through bar 15. Said bore 17 contains two slidable pins received in opposite ends of the bore and consisting each of an outer shaft portion 18 and an inner enlarged head 19 having a rounded end surface. A compression spring 20 is provided around shaft portion 18 of each pin to act between a shoulder on head 19 and an inner end surface of a hollow screw plug 20' inserted in an internally threaded end portion of bore 17. A bevelled lower end portion 21 of an operating rod 22 cooperates with the inner rounded end surfaces of the two pin heads 19. Said rod 22 is spring biased in an upward direction by a compression spring 24 acting between an enlarged head 25 at the upper end of rod 22 and a shoulder 26 formed by an end surface of a bore 26' of enlarged diameter provided in the upper portion of key shaft 11. A longitudinal bore 26'' of smaller diameter extends through the remaining part of shaft 11 to receive rod 22 slidably therein.

At its upper end the wider bore 26' is internally threaded (at 27) to receive the threaded shank 28 of screw 14 therein. By a manually rotating screw 14 the operating rod 22 may be forced downwardly to move the two pins 18, 19 in opposite outward directions into engagement with the side wall of the cavity provided in plug 7.

At its upper end, shaft 11 has a squared end portion 29 on which handwheel 13 may be mounted by means of a correspondingly shaped central opening and fixed in position in any suitable manner.

The locking device 2 comprises two jaws 31 and 32 of generally semi-circular arcuate configuration which are provided with inwardly extending teeth 34 and which are pivotally connected to each other

and to housing 1 by means of a pivot pin 33 extending through aligned bores in adjacent end portions of the two jaws and secured to an external projection 42 on housing 1, near the lower end thereof. At

5 their opposite ends with respect to pivot pin 33, the two jaws 31 and 32 are movably connected to each other by a tightener 35 comprising a lever 36, at its one end pivotally connected to jaw 32 by means of a pivot pin 37, while its other end forms a manually
10 operable handle. A link 38 has its one end connected to jaw 31 by means of a pivot pin 39, while its other end is pivotally coupled to lever 36 by means of a pivot pin 40 located at some distance from pivot pin 27 towards the handle end of the
15 lever.

Near the lower end of the housing 1 a number of slot-like openings 41 are provided to receive the teeth 34 of jaws 31 and 32 displaceably therein and to permit the teeth to be brought into engagement
20 under the edge flange 3 surrounding tapping hole 4 and out of such engagement by manual operation of lever 36.

A sealing ring may be provided in the internal groove at the lower end of the housing to facilitate a
25 sealed connection between the housing 1 and the tapping hole 4. Suitable sealing means may also be provided between the cover 9 and the remaining part of the housing 1 as well as between cover 9 and key shaft 11.

30 When the device above described is to be used for instance for tapping of fluid from the container 5, housing 1 is mounted with its open end over tapping hole 4 and locked to flange 3 by means of tightener 3. Key 6 is then pushed towards plug 7
35 until key bit 15 reaches the bottom of the open cavity in the plug. By means of handwheel 13 the key is rotated in a counterclockwise direction until the key bit has been brought into contact with shoulders formed by projections 44 extending into said cavity
40 from the surrounding side wall. Screw 14 is then manually rotated so as to press rod 22 downwardly until pins 18, 19, which form an expansion holder for plug 7, have been brought into firm contact with the side walls of the cavity in plug 7.

45 Handwheel 13 may then be further rotated in counterclockwise direction to screw plug 7 out from hole 4, whereupon the plug may be axially withdrawn from said hole by means of key 6 to establish free communication between tapping hole 4 and
50 discharge pipe 8. When plug 7 is to be reinserted in hole 4 it is pushed into contact with the upper edge of said hole by means of handwheel 13 which may then be rotated in clockwise direction to thread plug 7 into hole 4. The expandable pins 18, 19 serving to
55 hold the plug on the key may be retracted by means of screw 14 to release the plug as soon as the plug has been threaded partially into hole 4. In any case, it may be advisable to retract said pins from their engagement with the plug before finally tightening the plug.
60

In the embodiment above described screw 14 forms a separate manual control means for actuating the expandable plug holding means formed by pins 18, 19. In Figure 4 there is shown a modified
65 embodiment wherein the expandable plug holding

means may be operated automatically in response to a relative rotation of handwheel 13 with respect to plug 7. In said embodiment the operating rod 22 has an extension 22' projecting at the upper end of
70 key shaft 11 which is provided with a left-hand threaded upper end portion 50 on which handwheel 13 is mounted by means of a correspondingly threaded central opening 51. A set screw 52 is threaded partially into opening 51 from the upper
75 end of said opening. The lower end surface of the threaded shank 53 of screw 52 is adapted to cooperate with the end surface of extension 22' of rod 22. At its lower side handwheel 13 is provided with a projecting circular flange 55 in which a split locking
80 washer 54 is mounted to engage in a circumferentially extending groove 56 on key shaft 11. The manner of operation of the key is as follows. When, upon insertion of the key bit 15 into the cavity in plug 7, the handwheel 13 is rotated in counterclockwise direction, it will be threaded in a downward direction on shaft portion 50, whereby screw
85 52 is brought into contact with extension 22' of rod 22 to press said rod downwardly in order to expand the plug holding pins 18, 19 into contact under

90 pressure with the side wall of the cavity formed in the plug. Upon a limited rotation of the handwheel, washer 54 will contact the lower wall surface of groove 56 and prevent further relative rotation of the handwheel 13 with respect to the key shaft 11.
95 Accordingly, when the handwheel is further rotated, key shaft 11 will rotate in unison therewith and, hence, plug 7 will be threaded out from hole 4. The desired contact pressure between pins 18, 19 and the plug may easily be set to a suitable value by means of screw 52.

100 The invention is not restricted to the embodiments above described. Thus, many modifications are possible within the scope of the invention. Especially, it should be noted that the expansion means need not consist of means adapted to move in a rectilinear manner, as is the case in respect of pins 18, 19. Instead, said means may be arranged for pivotal movement or any other suitable movement.
105

110 CLAIMS

1. A device for use in connection with tapping off fluid from or filling fluid into a container through
115 an internally threaded tapping or filling hole in the container provided with an externally threaded generally cup-shaped plug having an outwardly open cavity in which a tool may be inserted for rotating the plug, said device comprising a bell-like housing which is adapted to be removably mounted
120 with an open end thereof over the tapping or filling hole of the container and which is provided with an opening through which fluid may be fed into or discharged from the housing, and a tool for manually operating the plug from a position outside the housing, said tool comprising a shaft which extends
125 slidably and rotatably through a portion of the housing opposite to the open end of the housing and which is provided with handle means at its outer end, while, at its inner end, it is provided with plug
130



and to housing 1 by means of a pivot pin 33 extending through aligned bores in adjacent end portions of the two jaws and secured to an external projection 42 on housing 1, near the lower end thereof. At their opposite ends with respect to pivot pin 33, the two jaws 31 and 32 are movably connected to each other by a tightener 35 comprising a lever 36, at its one end pivotally connected to jaw 32 by means of a pivot pin 37, while its other end forms a manually operable handle. A link 38 has its one end connected to jaw 31 by means of a pivot pin 39, while its other end is pivotally coupled to lever 36 by means of a pivot pin 40 located at some distance from pivot pin 27 towards the handle end of the lever.

Near the lower end of the housing 1 a number of slot-like openings 41 are provided to receive the teeth 34 of jaws 31 and 32 displaceably therein and to permit the teeth to be brought into engagement under the edge flange 3 surrounding tapping hole 4 and out of such engagement by manual operation of lever 36.

A sealing ring may be provided in the internal groove at the lower end of the housing to facilitate a sealed connection between the housing 1 and the tapping hole 4. Suitable sealing means may also be provided between the cover 9 and the remaining part of the housing 1 as well as between cover 9 and key shaft 11.

When the device above described is to be used for instance for tapping of fluid from the container 5, housing 1 is mounted with its open end over tapping hole 4 and locked to flange 3 by means of tightener 3. Key 6 is then pushed towards plug 7 until key bit 15 reaches the bottom of the open cavity in the plug. By means of handwheel 13 the key is rotated in a counterclockwise direction until the key bit has been brought into contact with shoulders formed by projections 44 extending into said cavity from the surrounding side wall. Screw 14 is then manually rotated so as to press rod 22 downwardly until pins 18, 19, which form an expansion holder for plug 7, have been brought into firm contact with the side walls of the cavity in plug 7.

Handwheel 13 may then be further rotated in counterclockwise direction to screw plug 7 out from hole 4, whereupon the plug may be axially withdrawn from said hole by means of key 6 to establish free communication between tapping hole 4 and discharge pipe 8. When plug 7 is to be reinserted in hole 4 it is pushed into contact with the upper edge of said hole by means of handwheel 13 which may then be rotated in clockwise direction to thread plug 7 into hole 4. The expandable pins 18, 19 serving to hold the plug on the key may be retracted by means of screw 14 to release the plug as soon as the plug has been threaded partially into hole 4. In any case, it may be advisable to retract said pins from their engagement with the plug before finally tightening the plug.

In the embodiment above described screw 14 forms a separate manual control means for actuating the expandable plug holding means formed by pins 18, 19. In Figure 4 there is shown a modified embodiment wherein the expandable plug holding

means may be operated automatically in response to a relative rotation of handwheel 13 with respect to plug 7. In said embodiment the operating rod 22 has an extension 22' projecting at the upper end of key shaft 11 which is provided with a left-hand threaded upper end portion 50 on which handwheel 13 is mounted by means of a correspondingly threaded central opening 51. A set screw 52 is threaded partially into opening 51 from the upper end of said opening. The lower end surface of the threaded shank 53 of screw 52 is adapted to cooperate with the end surface of extension 22' of rod 22. At its lower side handwheel 13 is provided with a projecting circular flange 55 in which a split locking washer 54 is mounted to engage in a circumferentially extending groove 56 on key shaft 11. The manner of operation of the key is as follows. When, upon insertion of the key bit 15 into the cavity in plug 7, the handwheel 13 is rotated in counterclockwise direction, it will be threaded in a downward direction on shaft portion 50, whereby screw 52 is brought into contact with extension 22' of rod 22 to press said rod downwardly in order to expand the plug holding pins 18, 19 into contact under pressure with the side wall of the cavity formed in the plug. Upon a limited rotation of the handwheel, washer 54 will contact the lower wall surface of groove 56 and prevent further relative rotation of the handwheel 13 with respect to the key shaft 11. Accordingly, when the handwheel is further rotated, key shaft 11 will rotate in unison therewith and, hence, plug 7 will be threaded out from hole 4. The desired contact pressure between pins 18, 19 and the plug may easily be set to a suitable value by means of screw 52.

The invention is not restricted to the embodiments above described. Thus, many modifications are possible within the scope of the invention. Especially, it should be noted that the expansion means need not consist of means adapted to move in a rectilinear manner, as is the case in respect of pins 18, 19. Instead, said means may be arranged for pivotal movement or any other suitable movement.

110 CLAIMS

1. A device for use in connection with tapping off fluid from or filling fluid into a container through an internally threaded tapping or filling hole in the container provided with an externally threaded generally cup-shaped plug having an outwardly open cavity in which a tool may be inserted for rotating the plug, said device comprising a bell-like housing which is adapted to be removably mounted with an open end thereof over the tapping or filling hole of the container and which is provided with an opening through which fluid may be fed into or discharged from the housing, and a tool for manually operating the plug from a position outside the housing, said tool comprising a shaft which extends slidably and rotatably through a portion of the housing opposite to the open end of the housing and which is provided with handle means at its outer end, while, at its inner end, it is provided with plug



- 3
- holding and operating means insertable into said cavity in the plug, characterized in that said plug holding and operating means include expansion means adapted to be expanded into contact under
- 5 pressure with portions of the side wall of the cavity of the plug upon insertion of the plug holding and operating means into said cavity.
2. A device according to claim 1, characterized by separate manually operable control means for
- 10 actuating the expansion means.
3. A device according to claim 1, characterized by automatically operating control means for actuating the expansion means.
4. A device according to claim 3, characterized
- 15 in that said automatically operating control means are arranged to actuate the expansion means in response to a limited relative rotation of the handle means of the tool with respect to the plug.
5. A device constructed and arranged substan-
- 20 tially as herein described and as shown in the Figures of the accompanying drawings.