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Amrogowicz

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[54] **INLET AND OUTLET CLOSURE**

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[52] **U.S. Cl.** **220/30.5**, 220/30

[51] **Int. Cl.** **B65d 43/16**

[58] **Field of Search** 220/30.5, 30

[56] **References Cited**

UNITED STATES PATENTS

288,391	11/1883	Abbott	220/30.5
1,535,851	4/1925	O'Neill	220/30.5
1,567,399	12/1925	Stant	220/30.5
1,720,350	7/1929	Reid	220/30.5
1,806,364	5/1931	Newman	220/30.5
2,134,968	11/1938	Endicott	220/30.5
2,202,927	6/1940	Schumaker	220/30.5
2,754,027	7/1956	Schulte	220/30.5
2,821,324	1/1958	Hungerle	220/30.5

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Assistant Examiner—Steven M. Pollard
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[57] **ABSTRACT**

A tubular member, adapted to be a nozzle, is provided in the region of an open end with a closure cap which can be placed over the open end to close it and removed from the open end to expose the same. A connection is established between the closure cap and the tubular member to permit the closure cap to move to a position opening the open end of the tubular member without becoming disconnected from the same. This connection comprises one portion which is axially and rotatably displaceable relative to the tubular member, either in its interior or encircling its exterior, and another portion which is fast with the closure cap and extends from the same to the first-mentioned portion, being either rigid with the same or pivotably connected thereto.

2 Claims, 6 Drawing Figures

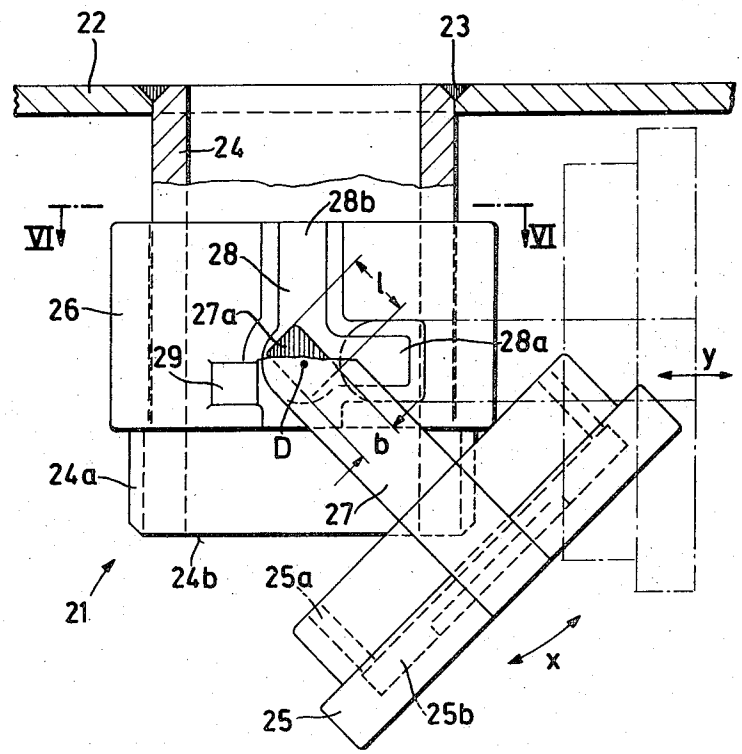

FIG. 1

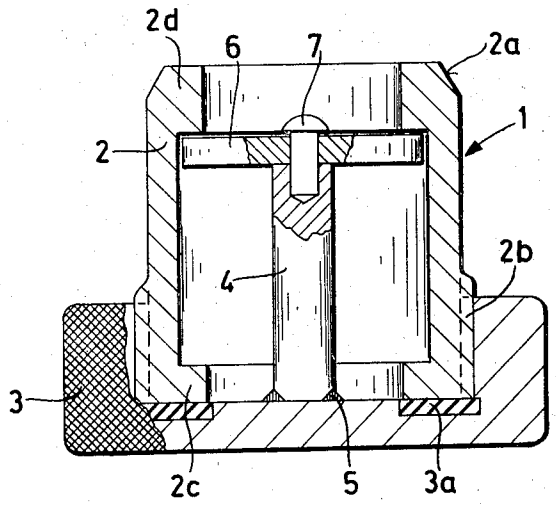

FIG. 2

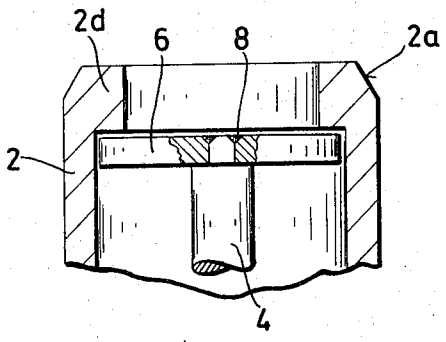

FIG. 3

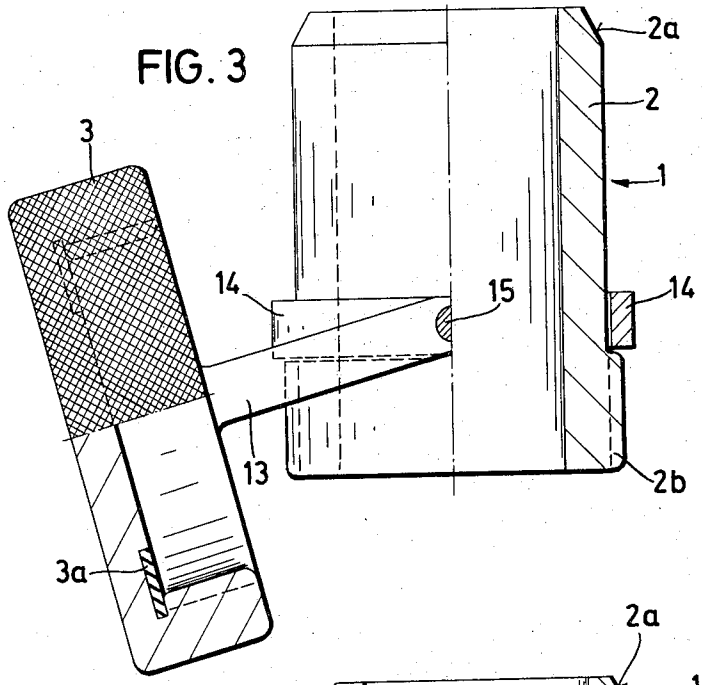

FIG. 4

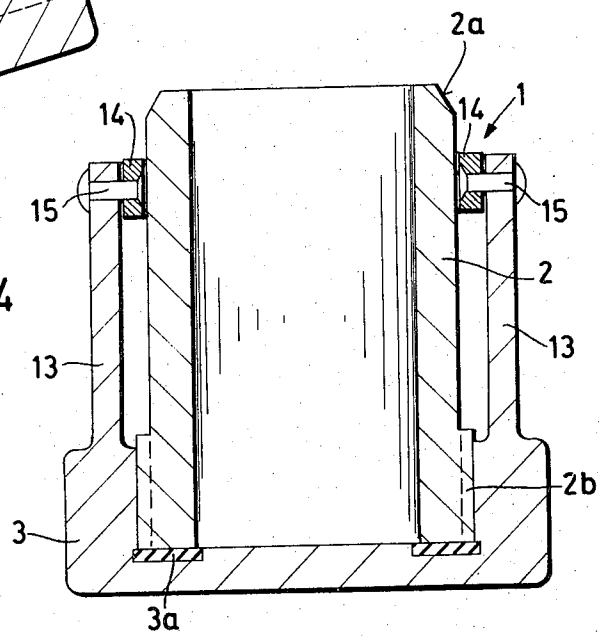

FIG.5

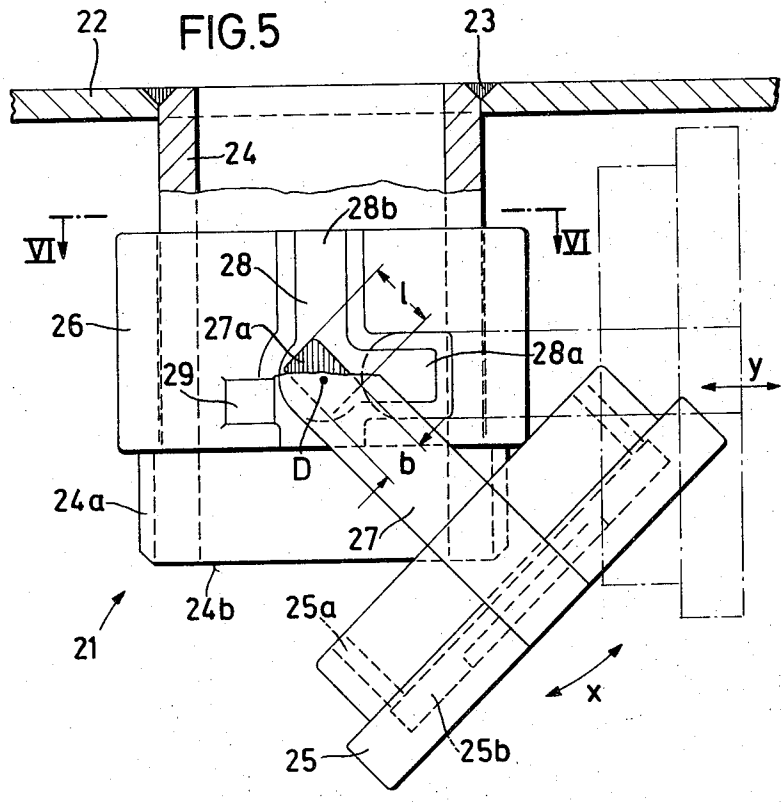
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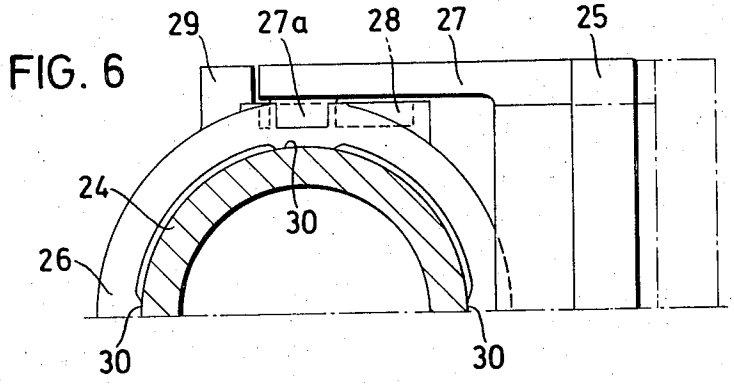
FIG. 6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INLET AND OUTLET CLOSURE

BACKGROUND OF THE INVENTION

The present invention relates generally to an inlet and outlet closure, and more particularly to a closure which is connected with an inlet or outlet in such a manner that it can be moved between positions opening and closing the inlet or outlet but cannot become disconnected from the element having the inlet or outlet when in the position opening the same.

Constructions of the general type here in question are already known, with a nozzle, usually being configured as a tubular element one end of which communicates with a receptacle and the other end of which is open and can be closed with a closure, for instance a cap. Such structures are used for instance on gasoline tanks, on oil tanks, and in many other applications. A prior-art proposal connects the closure cap with the tubular member by means of a chain. The chain is, however, usually very thin in order not to interfere with reasonably easy manipulation of the closure cap, and it has been found that even under normal circumstances these chains will frequently break. When this occurs then there is no longer any connection between the closure cap and the tubular member, and experience shows that the closure cap frequently becomes lost after only a short time.

Of course, an obvious remedy would appear to be to use a thicker and consequently stronger chain. However, such a chain is too stiff so that the connecting of the closure cap with and disconnecting from the tubular member becomes more difficult, that is the stronger chain interferes with the ready manipulation of the closure cap as already indicated above.

Besides the possibility of breakage of the chain, this known construction has the further disadvantage that when the closure cap is connected with the tubular member the chain usually hangs down along the tubular member in a relatively large loop, thereby creating the danger that it might be snagged —for instance when the arrangement is provided with a transportable container and if for example such a container is transported while depending from a crane, or under similar circumstances. Of course, when the chain is relatively weak and becomes snagged, then it becomes torn with the attendant disadvantages. On the other hand, if the chain is particularly strong and becomes snagged, then there is a danger that the tubular member, the closure cap or even other elements —for instance parts of the receptacle with which the tubular member communicates — might become damaged.

SUMMARY OF THE INVENTION

It is, accordingly, a general object of the present invention to overcome the disadvantages of the prior art.

More particularly, it is an object of the present invention to provide an improved arrangement of the character here under discussion, which is not possessed of these disadvantages.

An additional object of the invention is to provide such an arrangement which is simple in its construction and inexpensive to manufacture.

Still another object of the invention is to provide such an arrangement which, while overcoming the disadvantages of the prior art, permits ready and simple manipulation of the closure means.

With these objects in view, and others which will become apparent hereafter, one feature of the invention resides in an arrangement of the character here under discussion which, briefly stated, comprises a tubular member or a nozzle having one open end adapted to communicate with a receptacle, and an other open end. Closure means is provided in the region of the other open end and is displaceable relative to the latter between a first and a second position in which it respectively closes and exposes the other open end. Connecting means connects the closure means with the tubular member against separation therefrom when the closure means is in its second position; this connecting means comprises a first portion connected with and displaceable axially with the tubular member intermediate the open ends thereof, being rotatable about the longitudinal axis of the tubular member. The connecting means further comprises at least one rigid second portion fast with the first portion and with the closure means.

The second portion is either in form of a rod-like or a bolt-like member, or it may be in form of a single or two transversely spaced arms. Such a construction has the advantage that contrary to the conventional used chains a breaking of this second portion has become virtually impossible. This means that under all circumstances the closure means will remain connected with the tubular member and a loss of the closure means is reliably avoided. On the other hand, the possibility of axially and rotationally displacing the first portion relative to the tubular member assures that there is no interference with the manipulation of the closure means, that is the securing thereof or removal thereof on the open end of the tubular member, including a construction in which the closure means is to be connected with the tubular member by a threaded connection. The use of a threaded connection of course is advantageous because it permits particularly tight and sealing engagement of the closure means with the open end of the tubular member, so that the open end is reliably and sealingly closed even if the medium which is to be prevented from passing through the open end is particularly thin or even of gaseous character, and even if it is under high pressure.

A further advantage of the construction according to the present invention is the fact that the tubular member may be relatively short in its axial extension, so that it projects only by a small distance beyond the receptacle with which it communicates, and is no longer a hindrance as is frequently the case in the prior art. This is especially true if the closure means is to be connected with the tubular member by means of a screw connection or threaded connection, and a further advantage of such a connection is the fact that it can be secured or released not only manually but also by the aid of mechanical means or by suitable powered equipment.

Of course, it must not be overlooked that it is an additional advantage of the present invention that when the closure means is in its closed condition, that is when it is connected with the tubular member in a sense closing the open end thereof, no part whatsoever of the connecting means is exposed exteriorly and the possibility of snagging is thus completely avoided.

The novel features which are considered as characteristic for the invention are set forth in particular in

the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a view, partly in axial section, of a first embodiment of the invention;

FIG. 2 is a fragmentary view similar to FIG. 1, but illustrating a somewhat different embodiment;

FIG. 3 is a somewhat diagrammatic view, partly in longitudinal section, of a further embodiment of the invention;

FIG. 4 is a view of the embodiment in FIG. 3 in axial section;

FIG. 5 is a partially sectioned side view illustrating another embodiment of the present invention; and

FIG. 6 is a section taken on line VI—VI of FIG. 5.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. 1 shows an advantageous embodiment of the present invention. Here, the second portion of the connecting means is in form of a rod-shaped or bolt-shaped member which when the closure means is connected with the tubular member, extends substantially coaxially with the tubular member and with the closure means. One section of the rod-shaped member is connected with the inner side of the closure means and the other with the first portion which is in this embodiment accommodated in the interior of the tubular member, extending transversely to the longitudinal axis of the latter and engaging behind a suitable abutment which prevents at least undesirable, but preferably also intentional removal of the first portion through the open end of the tubular member. There are no components of the connecting means located at the exterior of the tubular member in this embodiment, so that snagging is completely avoided and the possibility of interference of such components with the securing or removal of the closure means on the tubular member is impossible. All portions of the connecting means are located in the interior of the tubular member when the latter is closed by the closure means and are thus also protected against damage. This construction in particular can be such that the tubular member is very short, an advantage which very often has been found desirable.

It is advantageous, generally speaking, if the abutment means is in form of a radially inwardly extending circumferential bead located in the region of that open end of the tubular member which is to be closed, and with which the first portion of the connecting means engages. The outer diameter of this first portion and the radial width of the opening bounded by the bead should be so correlated with one another that a removal of the first portion from the interior of the tubular member is impossible even if the first portion is tilted by requisite manipulation of the rod-like second portion. The manner in which the tubular members in question are conventionally manufacture permits the provision of such a bead without any difficulty and without any significant additional expense.

With these comments in mind it will be seen that in FIG. 1 reference numeral 1 identifies the tubular member in toto, which tubular member has a tubular portion 2 an open end of which is to be closed with a closure cap 3. A relatively wide bevel 2*a* is provided on that end of the tubular member remote from the closure cap 3, so that the tubular member can be readily welded or otherwise connected with a receptacle with which it is to communicate, for instance a tank, a conduit, a pipe or the like. In the region of the open end which is to be closed by the closure cap 3, the tubular member 2 is provided with outer threads 2*b* with which internal threads of the closure cap 3 can mesh so that the cap 3 can be threadedly connected with the tubular member 2. The interior of the closure cap 3 is provided with a sealing ring 3*a* of a soft or elastically compressible material, for instance rubber or an elastomeric plastic and which, when the closure member or closure cap 3 is in place on the tubular member 2 as shown in FIG. 1, will sealingly engage both the closure cap 3 and the tubular member 2. Knurling is advantageously provided on the exterior of the closure cap 3 so that the latter can be more readily equipped for rotation.

Located in the interior of the tubular member 2, coaxial therewith when the cap 3 is in the position shown in FIG. 1, is a rod-shaped or bolt-shaped member 4 constituting the first portion of the connecting means. The member 4 is in the illustrated embodiment welded by a welded seam 5 with one of its end portions on the inner side of the closure cap 3. Its opposite end portion is connected with a yoke-like portion of the connecting means, identified with reference numeral 6 and accommodated in the interior of the tubular member 2. The connection between the member 6 and the member 4 is here established by means of a rivet 7.

In the region of the opening which is to be closed by the closure cap 3, the tubular member 2 is provided with an inwardly extending circumferential annular bead 2*c* with which the member 6 —which is slidable axially of the tubular member 2 as well as being turnable within the same— abuts when it approaches the open end so that it cannot be withdrawn through the latter. For this purpose the outer dimensions of the member 6 and the inner dimensions of the opening surrounded by the bead 2*c* are so correlated that even if the member 6 is tilted —with the closure cap 3 disengaged from the tubular member 2— it cannot be withdrawn.

The tubular member 3 is additionally provided with a further inwardly extending circumferential bead 2*d* at its opposite axial end from the bead 2*c*, serving the same purpose as the latter; however, because the member 6 cannot be withdrawn at the end where the bead 2*d* is located because of the presence of the closure cap 3, this additional bead 2*d* is not absolutely essential and serves actually more to increase the thickness of the wall of the tubular member 2, a consideration which is important for connecting —for instance by welding— of the tubular member 2 with a receptacle.

The embodiment in FIG. 2 is rather like that of FIG. 1, except that in this fragmentary illustration it will be seen that the member 6 is connected with the member 4 not by means of a rivet 7, but by being welded thereto via a welded seam 8. Of course, it is also possible to use a screw connection or to connect the members 4 and 6 pivotally, for instance by means of a suitable ball-and-socket joint or the like.

A particularly advantageous embodiment of the invention can utilize a pair of arms which are connected on the outer periphery of the closure cap 3 and extend

in substantial parallelism with one another transversely spaced; these arms extend in substantial parallelism with the longitudinal axis of the tubular member 2 along the exterior of the latter. In this case the member 6 is replaced with an annular member which exteriorly encircles the tubular member 2 being turnable relative thereto as well as being axially displaceable with reference to the tubular member 2, with the free end portions of the arms being connected to this annular member. Although in such an embodiment the various components of the connecting means are located at the exterior side of the tubular member 2, contrary to the embodiments of FIGS. 1 and 2, they are spaced from the outer surface of the tubular member by such a small distance that it is in effect impossible for such components to become snagged. Danger of damage to the arms is therefore not to be expected.

The particular advantage of this embodiment is the fact that the cross-section of the inlet or outlet opening in the tubular member 2 is entirely unobstructed, making it impossible for any solids or liquid residues to adhere to the components of the connecting means and to either contaminate or partially or completely close (for instance over a period of time) the cross-section of the inflow or outflow opening in the tubular member. An additional advantage of this embodiment is the fact that it is of course very simple in such a construction to effect a threaded connection of the opening of the tubular member 2 —after the cap member 3 has been removed— with hose couplings or the like. It is advantageous for the tubular member 2 to be provided with an abutment, projection, radial flange or the like extending outwardly in the region of the open end so as to prevent withdrawal of the annular member. In fact, an annular flange so constructed can serve as the carrier for threads by means of which the closure cap 3 can be threadedly connected to the tubular member 2, and/or by means of which a hose coupling can be secured to it. This means that in such a construction it is not necessary to provide a separate flange or abutment for retaining the annular member because the single flange can perform both functions.

In this embodiment it is also advantageous for the arms to be releasably connected with the annular member, for instance by means of a pin-and-socket connection or the like. Such a construction has the advantage that in the event of cleaning or repair work to be carried out, the closure cap can be readily removed without danger of damage to either the cap member or the connecting means. In addition, it is advantageous but not necessary for either the member 4 of the embodiments of FIGS. 1 and 2, or equivalent members of the embodiments still to be discussed, to be made integrally —either of one piece or permanently united with as by welding— with the closure cap, because this reduces in an advantageous manner the number of individual components required, whereby the reliability and protection against loss of the closure cap is even further improved.

Just as the member 4 can be pivotably connected with the member 6 in FIGS. 1 and 2, in the other embodiments also the same pivotable connection can be established between the arms and the annular members surrounding the tubular member 2. This has the advantage that the closure cap can be moved away from the opening laterally of the tubular member 2 to such an extent that the opening is freely accessible and entry of exit of matter from it is entirely unhindered.

In order to make it possible to displace the closure cap laterally of the tubular member 2 to such an extent that the opening is completely exposed —which is of course not possible in the embodiments of FIGS. 1 and 2— the axis of the pivots connecting the arms and the annular member must be coaxial with one another. It has been found particularly advantageous in such an arrangement to provide means for arresting the closure cap after it has moved pivotably and laterally of the tubular member to a certain extent, and preferably after it has moved to a position which is offset through approximately 90° to the longitudinal axis of the tubular member. This has the advantage that the opening for inlet or outlet of the tubular member is completely accessible and unobstructed, so that hose couplings or the like can be threadedly connected with the tubular member at this opening, and on the other hand inflow or outflow of liquids or other flowable matter is totally unhindered. Also, in such a manner it is of course easier to clean the interior of the tubular member than if the closure cap were only axially spaced from the opening of the tubular member or were laterally offset with reference to this opening to a lesser extent in which it would still partly overlap the opening.

The embodiment just discussed is illustrated in FIGS. 3 and 4, where it will be seen that the closure cap 3 is of one piece with the two parallel transversely spaced arms 13 which extend alongside the tubular member 2 at the outer surface thereof. Of course, the arms 13 need not be of one piece with the closure cap 3, but could be separate elements welded thereto or otherwise connected to it. An annular member 14 surrounds the tubular member 2, being turnable about the same as well as being axially slidable relative to the tubular member 2. The free ends of the arms 13 are connected with the annular member 14. Axial movement of the annular member 14 is limited on the one hand by the welded seam in the region of the bevel 2*a* (the seam is not illustrated) by means of which the tubular member 2 is to be connected to a receptacle, a container, a conduit or the like, whereas in the opposite direction the axial displacement is limited by an abutment which is provided and in which the outer thread 2*b* for the closure cap 3 is formed.

Pivots 15 connect the arms 13 with the annular member 14 so that, when the closure cap 3 has been unthreaded from the tubular member 2, it can be pivoted laterally out of the region of the opening of the tubular member 2, as illustrated in FIG. 3, whereas in FIG. 4 the closure cap 3 is shown connected with the tubular member 2.

According to another embodiment of the invention it is also advantageous if each releasable connection between the annular member or ring and the respective arms is established by a radially inwardly extending projection, or a trunnion, on the end portion of the respective arm, received in a corresponding groove-like depression in the outer circumferential surface of the ring. Such an embodiment, which is illustrated and will be discussed with reference to FIGS. 5 and 6 has the advantage that the entire construction only utilizes three components, namely the tubular member or nozzle, the closure cap and the arms cooperating with the ring. It is highly advantageous in such a construction that the nozzle, the closure cap and the arms (if the

same are of one piece with the closure cap) as well as the ring can be made by molding techniques, for instance by casting or injection molding and can be connected without requiring any significant amount of material-removing processing after manufacture. In fact, it is possible to manufacture the constituent components in such a manner without ever having to subject them to material-removal treatment, thereby making their manufacture very inexpensive. In particular, the riveting or screw threaded connection of individual components is avoided, and of course also the necessary material removal which is required for such connection. The depressions or recesses as well as the projections or trunnions on the arms can be produced as the ring and the arms are being molded, so that it is subsequently only necessary to establish a connection between them in simple inexpensive manner. In addition, such a construction is particularly strong so that even under the influence of substantial forces the closure cap cannot be torn off.

Aluminum and aluminum alloys, steel, as well as synthetic plastics which can be molded —for instance injection molded— can be utilized for producing the nozzle, the closure cap, and the ring. If synthetic plastics are utilized, they should preferably be resistant to or uneffected by acids, bases and fats, and they should have as low as possible a swelling index on contact with moisture. Such plastics should also have relatively high resistance to temperature fluctuation, and by way of example I wish to mention the polyamides, polyethylenes and polyolefins.

Advantageously this latter embodiment will have groove-like depressions in the outer circumferential surface of the ring which extend from the pivot point of the respective pivotal connections to that axial end of the ring which faces away from the closure cap. This has certain advantages, particularly in terms of assembly of the various components, because in order to connect the arms with the ring it is not even necessary to deflect them outwardly away from one another in order to insert their inwardly extending projections, or trunnions, into the grooves. Rather, they simply enter from the axial end at which the grooves are open. Furthermore, such an insertion can of course be carried out much more simply and much more rapidly than if the arms would have to be deflected outwardly, even if that were only by a small amount before the trunnions could snap into the associated recesses.

It is particularly advantageous if each of the grooves or recesses is angled, with the groove having two portions which intersect one another and with the point of intersection constituting the pivot point for the respective pivotal connection. The longer arm or portion of the angular groove should then extend to that axial end of the ring which faces away from the closure cap, and the shorter other arm should extend approximately tangentially with reference to the circumference of the ring. In such an embodiment the assembly of the components is as simple as just outlined above, but in addition it is possible after unthreading the closure cap from the tubular member, or nozzles, to move it laterally out of the region of the opening of the nozzle without requiring a complete disconnecting of the closure cap from the nozzle. In other words, in such an embodiment the cross-section of the opening can be made completely unobstructed by removing the closure cap entirely to one side of the nozzle. It is advantageous if the cross-sectional dimensions of the trunnion of at least one but preferably both of the arms be greater in longitudinal direction of the arm, and smaller in transverse direction of the arm, than the width of the associated groove-like recess, and that the recess has only in the region where the pivot point of the connection is, a width which is slightly greater than the maximum cross-sectional dimension of the associated trunnion. In this case it is possible, with the closure cap unthreaded from the nozzle, to pivot it entirely out of the region of the opening and at the same time to arrest the closure cap in the position of maximum lateral displacement in such a manner that it cannot fall back unintentionally to cover partly or completely the opening. This arresting is achieved by the just-mentioned dimensions because the trunnion can be inserted in such a case only into a shorter tangential portion of the associated groove if the cap and the arms thereof have been pivoted through approximately 90° about the pivot point. If thereafter the cap is exerted to a pull in radial direction, that is normal to the longitudinal axis of the tube of the tubular member, then the trunnions of the arms will enter into the tangential portions or arms of the grooves where they cannot turn because their cross-sectional dimensions do not permit this. Consequently the closure cap and the arms will be reliably retained in this laterally pivoted position. When the cap is to be threadedly connected again with the nozzle, then it need only be displaced radially until its trunnions again reach the point of intersection of the two arms of the respective grooves, whereupon they can again turn about their axis which intersects the longitudinal axis of the nozzle, and the closure cap can be placed over the opening. Thus, this construction not only avoids a separation of the closure cap from the nozzle, but at the same time it affords a simple and reliable arresting of the closure cap in a position in which it completely frees the opening of the nozzle and is retained against undesired movement back to a position in which it would partially or completely close this opening.

Furthermore, it is advantageous in this embodiment to provide on the outer circumferential surface of the ring, in the region of the pivot points, at least one but preferably two abutments each associated with one of the pivots and located on that side which faces away from the tangentially extending portion of the respective groove, at some distance from the pivot point. Such an abutment will then be engaged by the respective arms to limit the pivoting thereof. It assures that the closure cap can be pivoted only to the proper side of the nozzle, that is to that side at which it can be arrested against undesired return movement. Pivoting to the other side is prevented by the abutment or abutments.

The features discussed above are embodied in the embodiment of FIGS. **5** and **6**, where the tubular member or nozzle, is identified with reference numeral **21** and is for instance welded by means of a welded seam **23** into the bottom wall **22** of a receptacle. However, such receptacle is shown of course by way of example only and not to be considered limiting.

The member **21** has a tubular portion **24**, the closure cap **25** and an outer annular member or ring **26** encirculing the tubular portion **24**. In the embodiment of FIGS. **5** and **6** the closure cap **25** is provided with internal threads **25***a* by means of which it can be threadedly connected with the external threads **24***a* of the tubular

portion 24. A sealing gasket 25*b* is provided which in the connected position is pressed by the closure cap 25 against the sealing surface 24*b* of the tubular member 24, thereby establishing a reliable seal of the opening thereof.

The connecting means is here in form of two transversely spaced arms 27 of which only one is visible in FIG. 5 because the other one is concealed by the tubular portion 24, the cap 25 and the visible arm 27. However, it is to be understood that the other arm 27 is connected and arranged in the same manner as that which is visible.

Both of the arms 27 are fixedly connected with the cap 25, for instance by being of one piece therewith. Their free end portions are connected with the ring 26 by means of trunnions 27*a* which in longitudinal direction of the respective arms 27 have a greater length *l* than in direction transversely thereto in which they have a width *b*. The trunnions 27*a* extend into angular grooves 28 formed in the outer circumferential surface of the ring 26, and the point of intersection of the two portions of each angular groove constitutes at the same time the pivot point D about which the respective trunnion 27*a* can pivot. At this point of intersection the grooves are of circular cross-section so that the trunnion 27*a* can be readily turned about the pivot point D; the greatest cross-sectional dimenion of each trunnion 27*a*, that is in this embodiment the diagonal of the cross-sectional surface of the trunnion 27*a*, is smaller than the diameter of this circular-cross sectional portion of the respective groove 28. The length of the arms 26 is so configurated that the cap 25 can be pivoted in the direction of the arrow *x* out of the region of the open end of the nozzle 24.

When so pivoted, the cap 25 moves to a position laterally of nozzle 24 in which the arms 27 extend approximately normal to the longitudinal axis of the nozzle 24 and in which the trunnions 27*a* of each arm 27 can be drawn into the portion 28*a* of the respective groove 28, which extends tangentially in the ring 26 because the width *b* of the trunnions 27*a* is slightly smaller than the width of the portion 28*a* of the groove 28. When a radially outwardly directed force is exerted on the cap 25 in the direction of the arrow *y*, the trunnions 27*a* are drawn into the arms 28*a* so that the cap 25 assumes the position shown in broken lines in FIG. 5 in which it is arrested because the cross-sectional dimension *l* of the trunnions 27*a* is greater than the length of the groove 28 in the region of its portion 28*a* so that a turning of projection 28*a* about its longitudinal axis is impossible. When it is so arrested, cap 25 cannot unintentionally return into its initial position or near its initial position, and only when it has been moved oppositely to the direction of the arrow *y*, and the trunnions 27*a* move back into the region D, the cap 25 can be pivoted counter to the direction of the arrow *x* and be threadedly connected again with the threads 24*a* of the nozzle 24.

Of course, in order to establish such a threaded connection or in order to terminate it, it is necessary for the cap 25 to be capable of being turned about the longitudinal axis of the nozzle 24. Because this is prevented by the projections 27*a* of the arms 27 and the associated grooves 28 with respect to the ring 26, the ring 26 must be capable of turning together with the cap 25 about the longitudinal axis of the nozzle 24, and must be capable of moving axially of the nozzle 24 even if only to a limited extent. This is self-evident.

The portion 28*b* of the grooves 28 extends from the pivot point D towards that axial end of the ring 26 which faces away from the cap 25. When the components are assembled, the projections 27*a* are simply inserted at this aforementioned axial end into the portions 28*b* until they reach the pivot points D, at which time they together with the arms and the cap 25 can be pivoted about the pivot point until the cap 25 assumes approximately the broken-line position after which the nozzle 24 can be pushed from below into the ring 26 because the nozzle 24 of course at this time is not yet connected to a receptacle or the like. This, then, establishes a rapid connection in a very simple and time-saving manner and subsequently the nozzle 24 can be connected to a receptacle or the like.

To prevent the cap 25 from being pivoted towards the left instead of toward the right as shown in FIG. 4, an abutment 29 is provided against which the cooperating arm 27 will abut. The abutment 29 is more clearly shown in FIG. 6 and it will be seen that the associated arm 27 cannot be moved past this abutment. Also, FIG. 6 shows that the annular member 26 is in contact not over its entire circumference of the tubular member 24, but only at four locations 30 in order to facilitate turning and longitudinal movement relative to the tubular member 24. However, this is of course not necessary.

It will be appreciated that it is also possible to provide an embodiment in which the cap member can be pivoted to the opposite sides of the tubular member, and arrested in either one of the positions thus achieved. However, the grooves 28 would then have to be of substantially T-shaped configuration, that is the portion 28*a* would have to be complemented by an additional portion extending in the same orientation but to the opposite side of the portion 28*b*. However, this is not normally necessary for the purposes of the present invention and for an appropriate use.

Instead of welding the tubular member 24 to a receptacle or the like, its end remote from that to which the cap member is to be connected can also be provided with internal or external threads, for engagement with for instance a threaded ring which in turn can then be welded to a container or the like. This has the advantage that only the relatively small threaded ring —especially if it is threaded into the interior of the tubular member— need be made of a material which can be welded, whereas the choice of material for all other components is entirely free. This means that a container which for instance is made of stainless steel or the like, can be provided with a tubular member, a cap and connecting means of synthetic plastic. Also, the use of a threaded ring has the advantage that the ring can be provided with appropriately long internal threads whereas a container or the like usually has a wall thickness which is too small to provide a properly long internal thread so that it is preferred to establish a welded connection with such a relatively thin wall.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of constructions differing from the types described above.

While the invention has been illustrated and described as embodied in an inlet and outlet closure, it is not intended to be limited to the details shown, since

various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be protected by Letters Patent is set forth in the appended claims:

1. In a non-removable closure which completely stops or opens a flowpath to or from a vessel along a substantially vertical axis and comprises a nozzle defining said flow-path and having an upper end portion adapted to be permanently attached to said vessel, a smooth tubular portion constituting a major part of said nozzle along the vertical axis, and a lower portion of enlarged outer diameter provided with an external thread, a ring having an outer surface and coaxially enveloping the smooth tubular portion, while capable of force-free revolving and sliding thereon, and a one-piece rigid cap supplied with a gasket, said cap including a cover portion, a cylinder portion having an internal thread adapted to engage the external thread of said nozzle and thus to effect a tight closing, two arm portions serving to pivotally connect said cap and said ring and extending from the cover portion at diametrically opposite locations outside and along the cylinder portion, an improvement comprising two thickened diametrically opposite areas each being a mirror image of the other end provided on the outer surface of said ring; a pair of mirror-symmetrical channel-shaped recesses in the outer surface of said ring and extending partially into said thickened areas, each of said recesses forming a substantially right-angled L-shape and including a horizontal linear recess portion extending substantially tangent to said ring, and a substantially vertical linear recess portion extending along the axis of said ring, the linear recess portions of each of said recesses being of a constant width and merging to form a circular recess portion, the vertical recess portion being slightly longer than the horizontal recess portion and extending up from the circular recess portion along the entire outer surface of said ring; a pair of trunnions provided on the arm portions of said cap, each of said trunnions being rectangular and having a longer dimension which parallels the arm portions and approximates the length of the horizontal recess portions and having a shorter dimension which corresponds substantially to the width of the linear recess portions and also having a diagonal dimension which corresponds substantially to the circular recess portions, said trunnions being insertable into the respective vertical recess portions during assembly or said closure without need to bend the arm portions of said cap, and said cap being pivotable when unscrewed from said nozzle into a horizontal position in which it does not obstruct said flowpath, in response to said trunnions entering into the respective circular recess portions, and being adapted to be secured in said horizontal position in response to said trunnions entering into the respective linear recess portions.

2. An arrangement as defined in claim 1; further comprising at least one abutment portion provided on the outer surface of said ring and operative for abutment with a respective arm for limiting pivotal displacement of the same relative to said ring and said nozzle.

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