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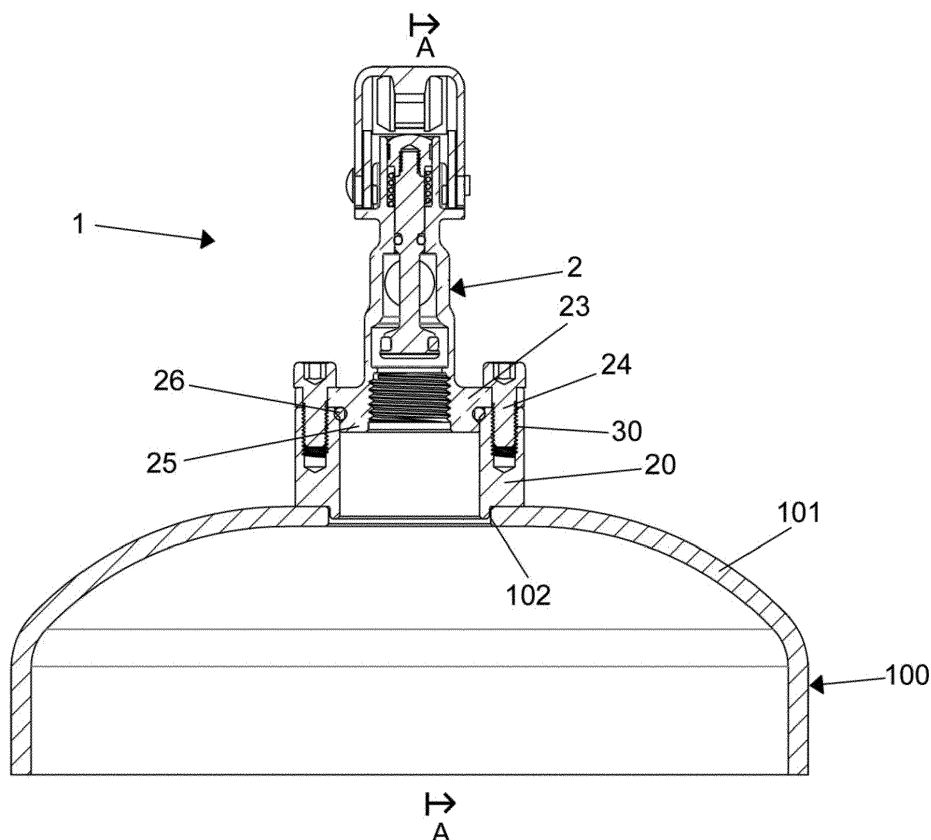
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(54) **SHUT-OFF VALVE PARTICULARLY FOR PORTABLE WATER EXTINGUISHERS**

(57) Shut-off valve, particularly for portable water fire extinguishers, or in any case containing corrosive extinguishing substances, comprising a valve-body (2) that can be fixed to a ring nut (20) welded to the mouth (102)

of an upper dome (101) of a tank (100) containing the extinguishing substance, in which said valve-body (2) has a base flange (23) that can be fixed by means of screws (24) to said ring nut (20).



Description

[0001] The subject of the present invention is a shut-off valve for fire extinguishers, in particular for pushbutton or portable fire extinguishers. More particularly, the invention is applicable to so-called water extinguishers, which use water with suitable additives, as an extinguishing agent, or other extinguishing mixtures.

[0002] Water extinguishers consist of a steel sheet tank which, due to the high corrosivity of the extinguishing agent, are coated internally with a protective layer of plastic material or are in stainless steel to prevent corrosion thereof.

[0003] The valves normally used on such extinguishers are of the screw type, i.e. they have a male thread that engages with a female thread provided at the mouth of the extinguishing agent tank, where obviously the protective layer cannot be provided.

[0004] To avoid corrosion of the valve-body, which is normally made of brass, in the threaded part, which is the most critical, galvanic protection treatments such as nickel-plating or protective treatments such as cathodolysis are used. However, when the valve is screwed to the tank, this treatment is strongly compromised if not totally eliminated, exposing the "bare" threaded part to the corrosive agent contained in the extinguishing agent.

[0005] In order to seek to overcome this disadvantage, solutions are also proposed, although less common on the market, in which the ring nut welded to the tank has a male thread, in which case the valve-body is equipped with an external turn lock.

[0006] However, this solution, as well as the one with female thread on the tank, is not economically advantageous due to the need to perform threading work. Moreover, the assembly of the valve on the tank cannot be automated, instead the screwing of the turn lock is carried out manually with the aid of a wrench.

[0007] DE 3610855 A1 describes an overpressure safety valve, which automatically intervenes in the case wherein the pressure inside the container on which it is applied exceeds a limit value. The valve body is fixed to a ring nut that is mounted on the mouth of the container protruding inside it. The seal of the valve is obtained by means of a gasket that works by compression, whose correct functioning is guaranteed by not bringing the valve body to abut against said ring nut.

[0008] Such a valve would not be usable on water extinguishers, or in any case containing corrosive extinguishing substances, as it is not a manually operable shut-off valve, and the protrusion of the ring nut inside the container would not allow the continuous coating of the entire internal surface of the container in contact with the corrosive substance with a protective layer.

[0009] The object of the invention is to eliminate the disadvantages of the prior art described above.

[0010] More particularly, an object of the invention is to provide a shut-off valve for water extinguishers that prevents possible corrosion of the means of fixing the

valve to the tank due to contact with the highly corrosive extinguishing substance.

[0011] Another object of the invention is to provide such a valve that can be assembled automatically.

[0012] Another object is to allow the positioning of the valve in a univocal and repeatable way with respect to the position of the tank.

[0013] Yet another object of the invention is to provide such a shut-off valve for fire extinguishers that is simple and economical to manufacture.

[0014] These and other objects of the invention are achieved by the shut-off valve for water extinguishers according to the invention that has the features of the appended independent claim 1.

[0015] Advantageous embodiments of the invention are disclosed in the dependent claims.

[0016] Substantially, the shut-off valve, particularly for portable water fire extinguishers, or in any case containing corrosive extinguishing substances, comprises a valve-body that can be fixed to a ring nut welded to the mouth of an upper dome of a tank containing the corrosive extinguishing substance, wherein said valve-body has a base flange that can be fixed by screws to said ring nut having below a step that inserts in said mouth and has a height not higher than the thickness of the wall of the tank so as not to protrude internally to the tank.

[0017] Said flange abuts against the upper edge of the ring nut and said screws screw into threaded holes provided in the ring nut.

[0018] Said valve-body has below a cylindrical shank that inserts inside said ring nut.

[0019] Further features of the invention will be made clearer by the detailed description that follows, referred to one of its embodiments purely by way of a non-limiting example, illustrated in the accompanying drawings, in which:

Figure 1 is a side elevation view of a shut-off valve according to the invention mounted on a tank of extinguishing agents, whereof only the upper part is shown;

Figure 2 is a section taken along plane II-II of Figure 1;

Figure 2a is a blown-up section like that of Figure 2, showing a coating inside the tank;

Figure 3 is a plan view from above of the valve only;

Figure 4 is an axonometric view of the valve;

Figures 5 and 6 are views in section of the valve only, respectively in closed and open condition, taken along section plane A-A of Figure 2.

[0020] Referring to these drawings, the valve for fire extinguishers, particularly portable water extinguishers, according to the invention, is denoted by reference numeral 1 and, in Figures 1 and 2, is shown mounted on a tank 100, of which only the upper part having a dome 101 is shown.

[0021] Valve 1, which, with regard to its structure and

functioning, can be considered substantially known, comprises an internally hollow valve-body 2, in which a small piston 3 is housed that normally keeps the valve closed (Figure 5), stopping the flow of extinguishing agent from a lower entry opening 4 to a lateral opening of exit 5 from the valve-body 2.

[0022] Piston 3 has a head 6 with a conical gasket 7 that abuts, from below upwards, against a tapered seat 8 formed in the valve-body.

[0023] Piston 3 is pushed upwards by a spring 9 acting between a shoulder 10 formed inside the valve-assembly and an upper closing cover 11 of piston 3, which abuts against a lever 12, pivoted around a pin 13.

[0024] Below the mobile lever 12 a second lever 14 is placed, in a substantially fixed position, to allow gripping thereof by a user, so as to lower the lever 12 in contrast to the action of spring 9 to actuate the valve in opening, as shown in Figure 6.

[0025] When not in use, lever 12 is kept in position locked by a pin, not shown, inserted in aligned holes 15 provided in levers 12 and 14, pin that must obviously be removed when using the fire extinguisher.

[0026] On the piston 3 a gasket 16 is also provided that seals against the internal cavity of the valve-body 2 at a height higher than the exit opening 5 of the extinguisher, designed to prevent leakage of fluid upwards, both in the phase of delivery of the extinguishing agent and during filling of the tank, which occurs through the same opening 5.

[0027] As mentioned previously, the valve structure described can be considered substantially in itself known.

[0028] The feature of the invention lies in the way in which the valve is fixed to the tank 100, or better to a ring nut 20 that is usually welded to the mouth 102 (Figures 2 and 2a) of the dome 101 of the tank 100.

[0029] For this purpose, the valve-body 2 is provided with a base flange 23 which abuts against the upper edge 29 of the ring nut 20 and is fixed thereto by means of at least two screws 24, which are screwed into threaded holes 30 provided in the ring nut.

[0030] A short cylindrical shank 25 protrudes below from the valve-body 2 and is placed inside the ring nut 20.

[0031] Between the bevelled inner edge 27 of the ring nut 20 and the intersection between flange 23 and shank 25 of the valve-body 2 a sealing gasket 26 is interposed, in particular an O-ring. The gasket 26 thus placed on the bevel 27 of the inner edge of the ring nut 20 therefore works in mechanical abutment, with the base flange 23 of the valve body that abuts against the upper edge 29 of the ring nut 20 avoiding any possibility of air entering the tank 100.

[0032] The ring nut 20 has below a step 28 which inserts in the mouth 102 of the tank 100 and has a height not higher than the thickness of the wall of the tank so as not to protrude into it.

[0033] The absence of protruding parts inside the tank 100 allows covering with continuity of its internal surface with a protective layer of plastic material 105 that also

covers the internal surface of the ring nut 20 up to its bevelled inner sealing edge 27, as shown in Fig. 2a. This is necessary in order to avoid corrosion of the tank and of the valve body, given the high corrosivity of the liquid contained.

[0034] The solution of fixing of the valve to the tank then avoids any contact of the corrosive extinguishing liquid with threaded parts; the screws 24 for fixing of the valve body to the ring nut 20 are not in contact with the interior of the tank 100.

[0035] The fixing solution according to the invention is also competitive since it reduces the cost of the threaded ring nut of the tank and that of the turn lock for the male thread solution of the ring nut. On the other hand, with the solution according to the invention, commercial steel screws can be used at a low cost.

[0036] Moreover, the threadless ring nut in the solution according to the invention allows automated positioning and tightening of the screws 24 by robot. The positioning of valve 1 on tank 100 is also easily automated. By means of a video camera the position/coordinates of the threaded holes 30 on the ring nut on which to position and tighten the screws 24 are identified and defined, without having to rotate the valve and use complex screwdrivers to screw it onto the tank, in the case of valves with male thread.

[0037] In the case of valves with turn lock the automation becomes even more complex and the screwing is normally performed manually, and the body of the tank must be kept fixed and locked/tight.

[0038] Moreover, according to the invention, it is not necessary to define the threaded ring nut, welded to the tank, nor to define the beginning of the valve thread in the case of female ring nut on the tank and male thread on the valve, all this in order to maintain the correct positioning of the whole, always referred to the longitudinal welding of the tank plating and the silk-screen printing on the stem. These advantages are maintained and further highlighted in the periodic maintenance phase required by law.

[0039] From what is disclosed above, the advantages of the invention with respect to the solutions of the prior art are clear.

[0040] Naturally the invention is not limited to the particular embodiment previously described and illustrated in the accompanying drawings, but numerous detailed changes may be made thereto within the reach of the person skilled in the art, without thereby departing from scope of the invention itself as defined in the appended claims.

Claims

1. Shut-off valve, for portable water extinguishers, or in any case containing corrosive extinguishing substances, comprising a valve-body (2) which can be fixed to a ring nut (20) welded to the mouth (102) of

an upper dome (101) of a tank (100) containing the corrosive extinguishing agent, **characterised in that** said valve-body (2) has a base flange (23) which can be fixed by means of screws (24) to said ring nut (20), and **in that** said ring nut (20) has below a step (28) which inserts in said mouth (102) and has a height not higher than the thickness of the wall of the tank (100) so as not to protrude inside the tank.

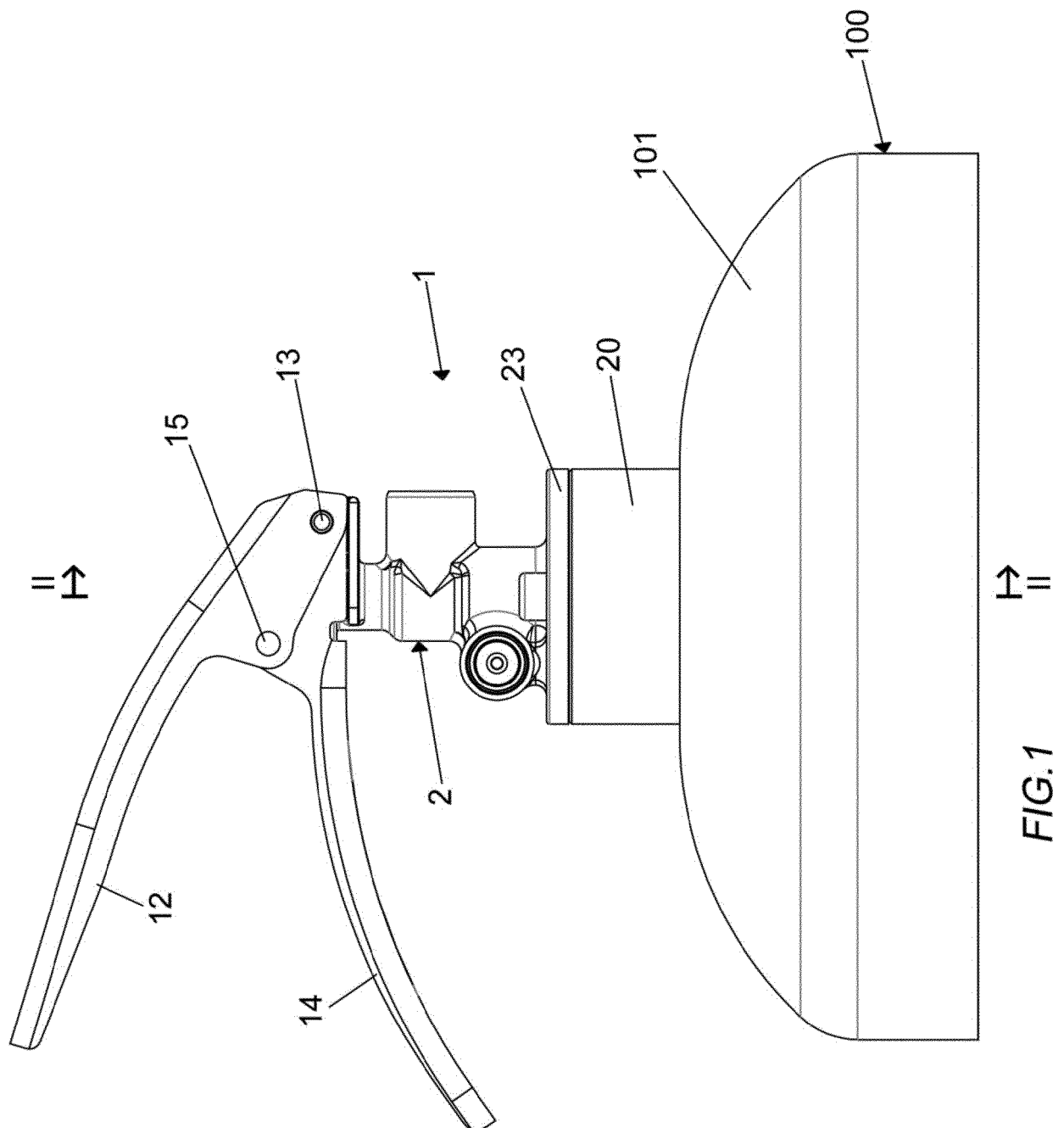
2. Valve according to claim 1, wherein said flange (23) abuts against the upper edge (29) of the ring nut (20) and said screws (24) are screwed in threaded holes (30) provided in said ring nut (20).
3. Valve according to claim 1 or 2, wherein said valve-body (2) has below a cylindrical shank (25), which inserts inside said ring nut (20), and a sealing gasket (26) is interposed between a bevelled inside edge (28) of said ring nut (20) and the intersection between said flange (23) and said cylindrical shank (25) of the valve body.
4. Valve according to any one of the preceding claims, **characterised in that** said tank (100) is covered internally with a protective layer of plastic material (105) which covers also the inner surface of the ring nut (20) as far as its bevelled inner sealing edge (27).
5. Valve according to any one of the preceding claims, wherein said valve-body (2) is internally hollow and houses a small piston (3), normally closing of the valve, which can be actuated by means of a push-button lever (12) to allow the passage of the extinguishing fluid from a lower entry opening to a lateral exit opening provided in said valve-body (2).

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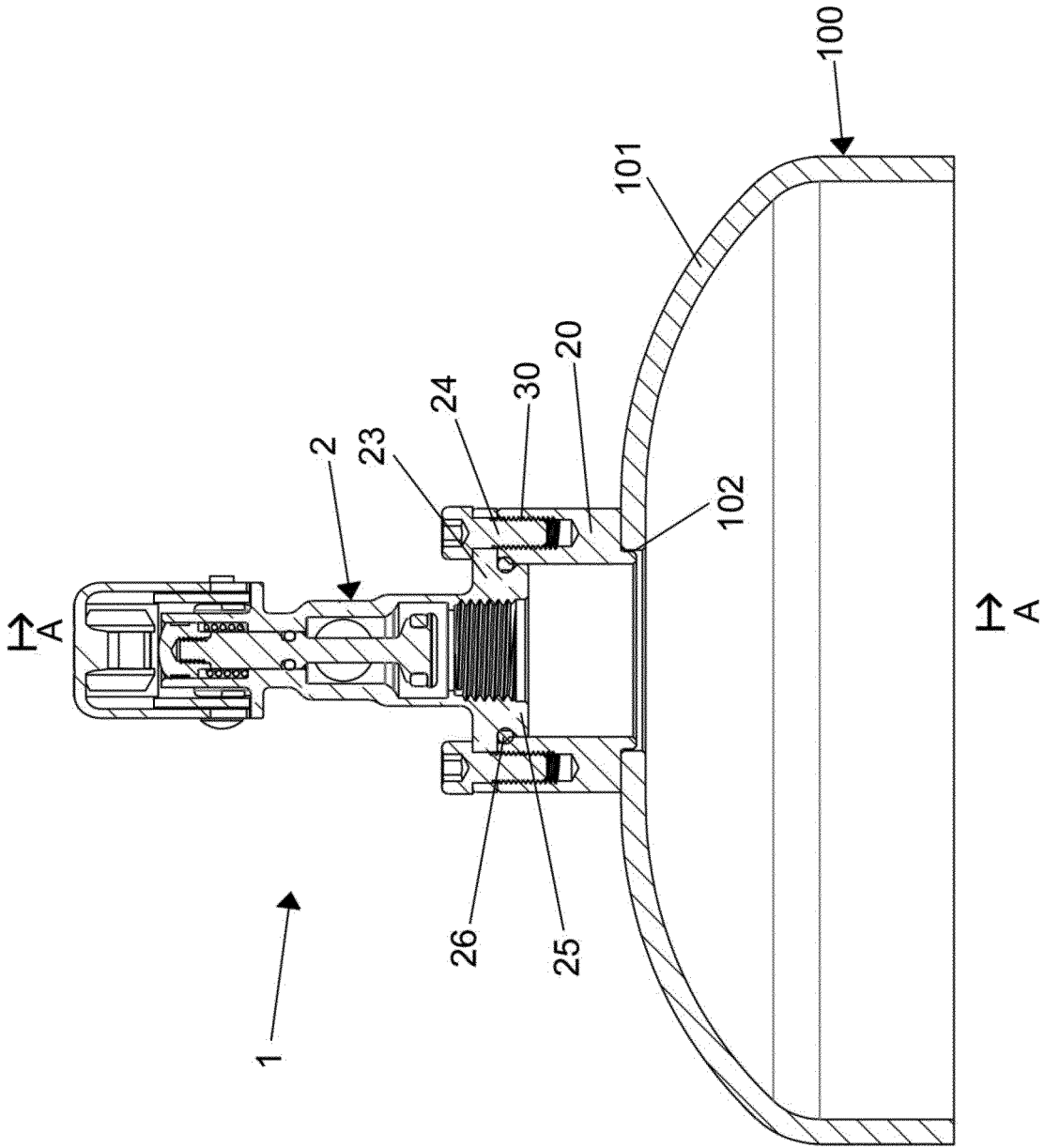


FIG.2

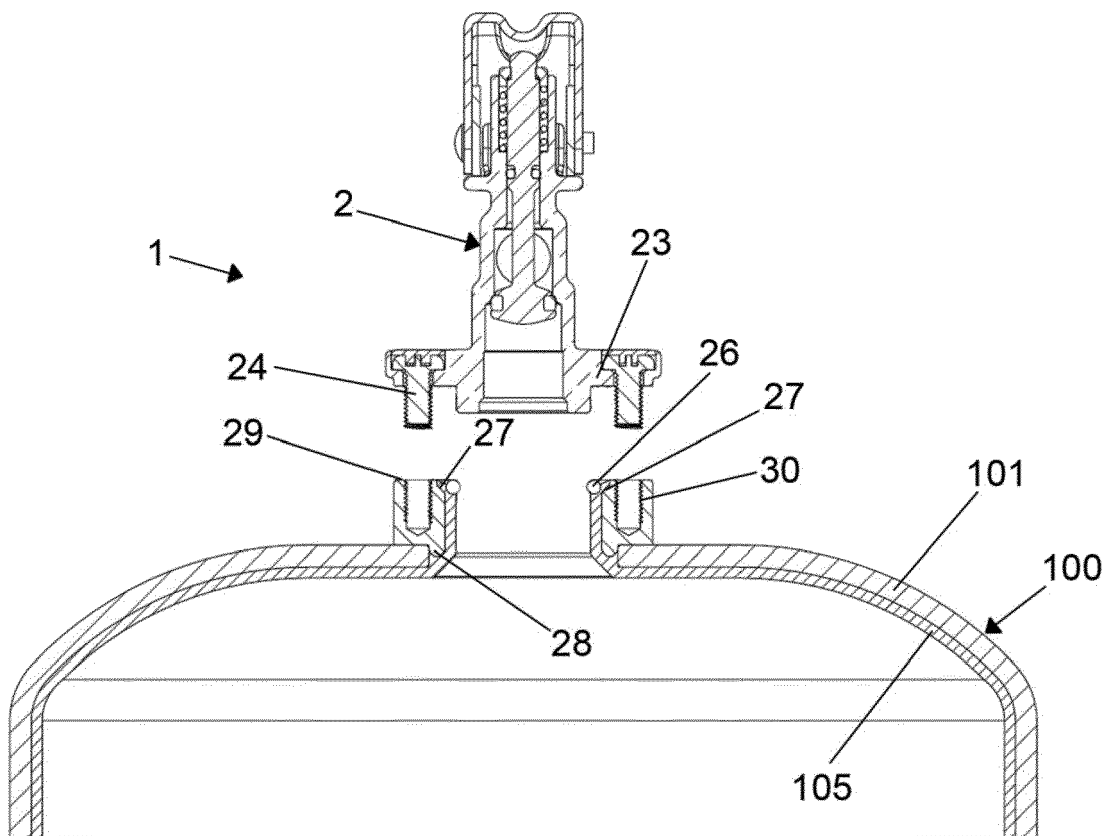


FIG.2a

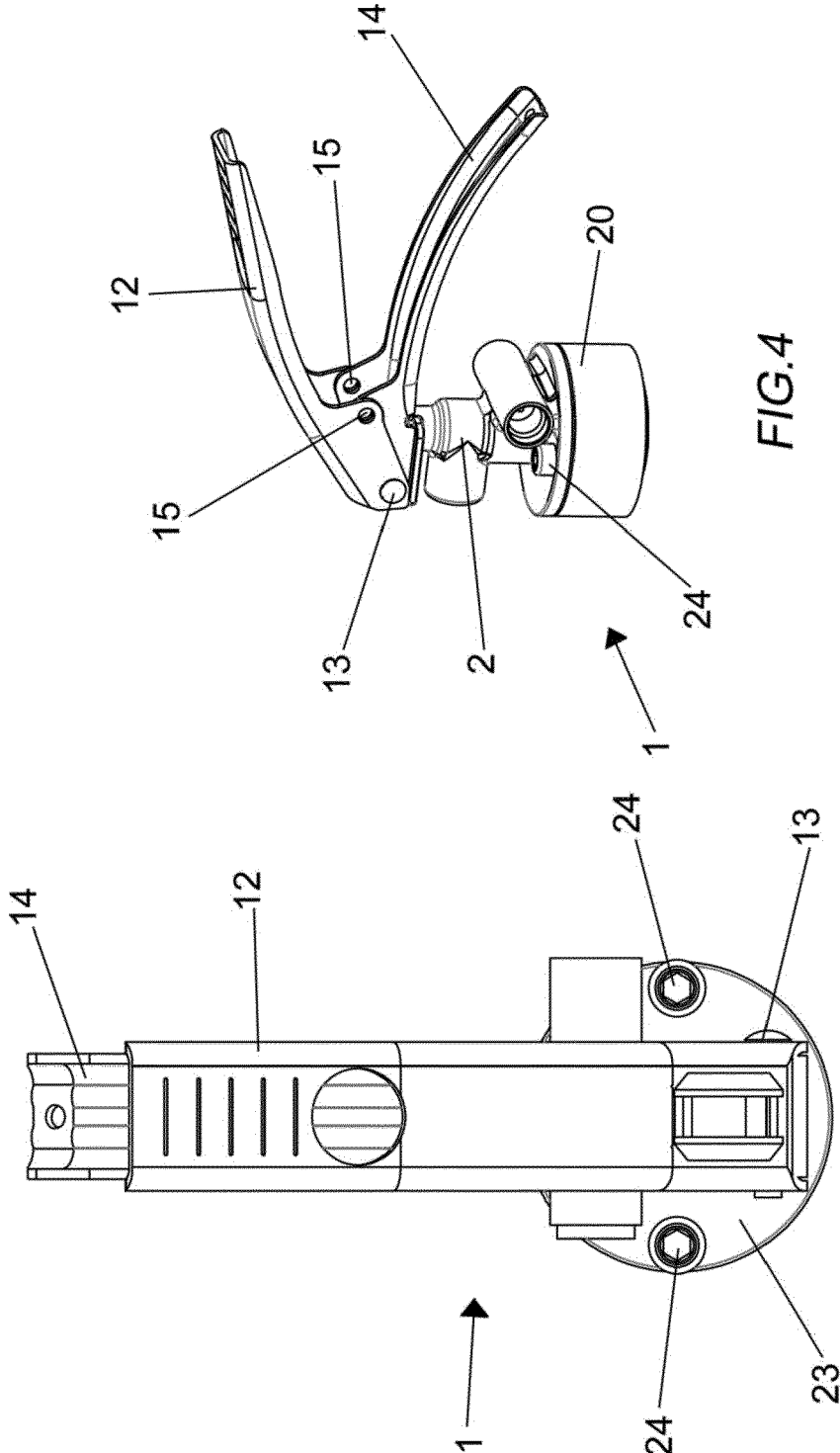


FIG.3

FIG.4

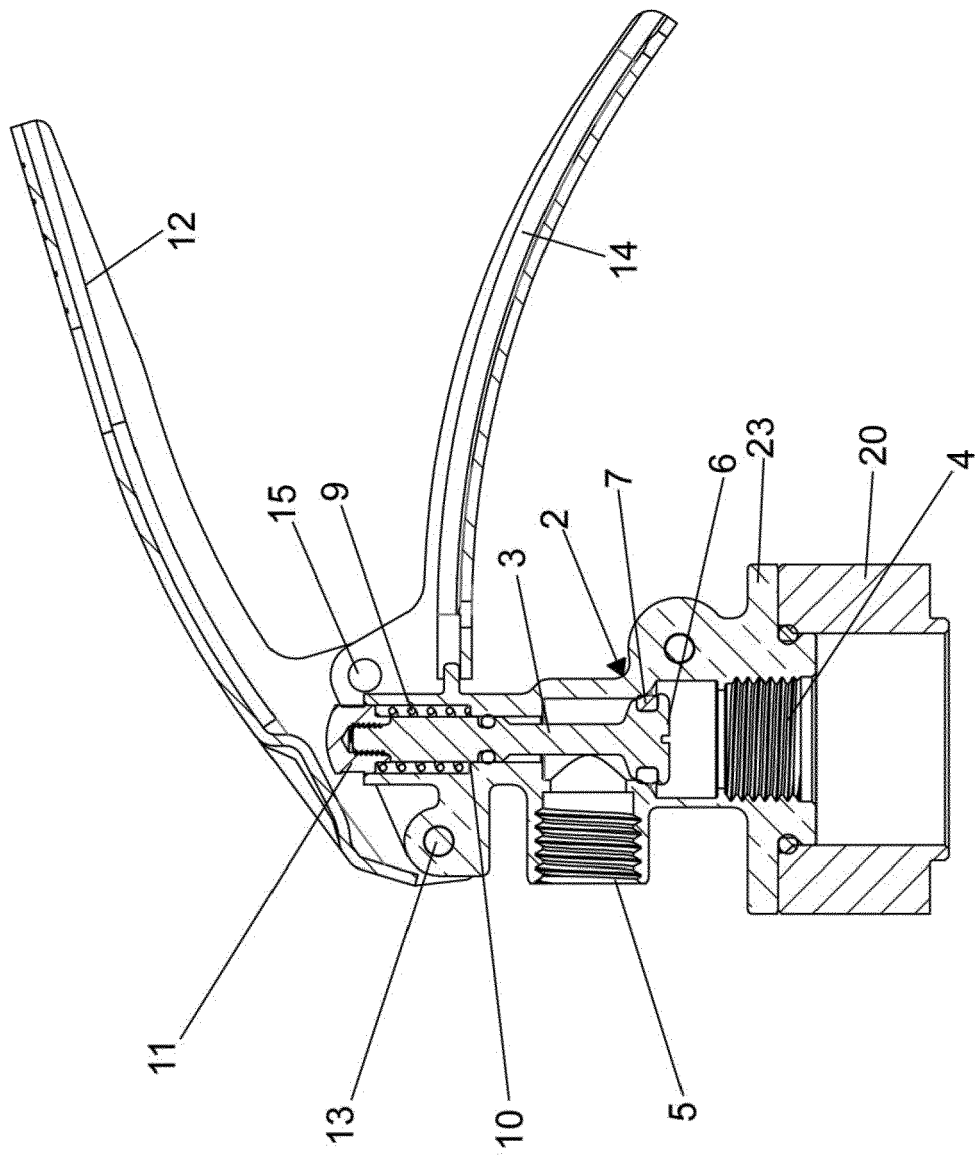
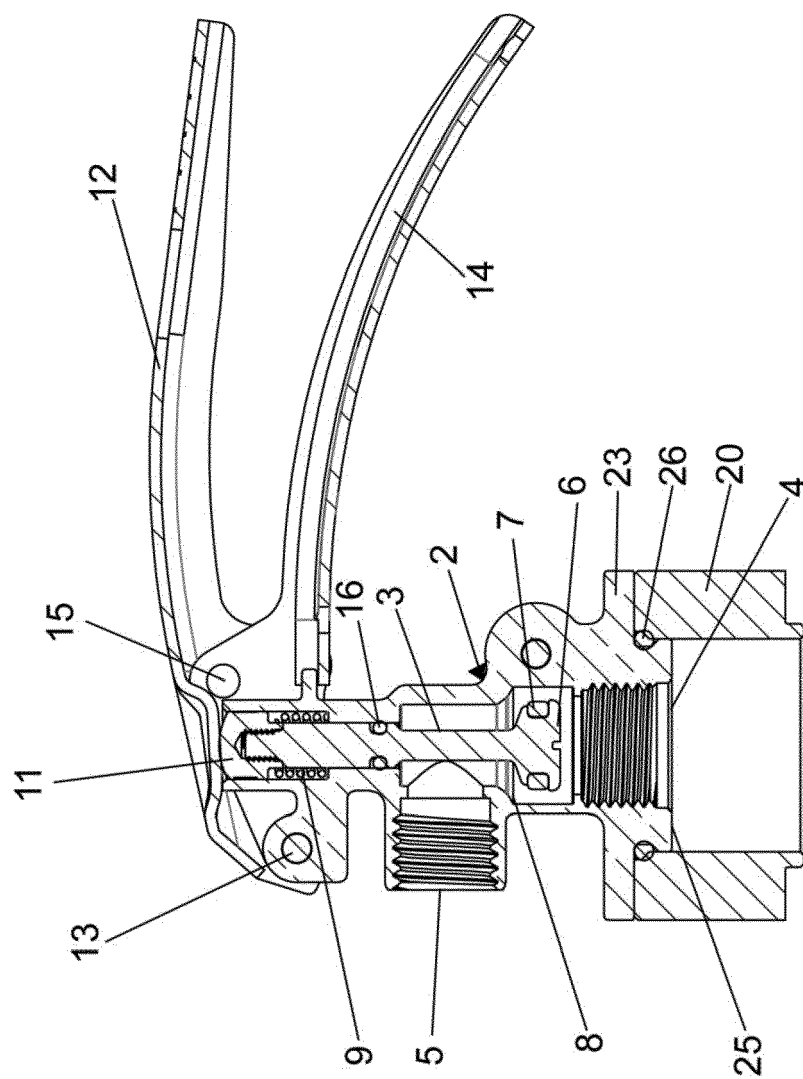


FIG.5





EUROPEAN SEARCH REPORT

Application Number
EP 19 21 0790

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 36 10 855 A1 (GOK GMBH & CO KG [DE]) 8 October 1987 (1987-10-08) * the whole document *	1-5	INV. F17C13/04 A62C13/64 A62C13/76
A	JP S63 133253 U (NO transliteration of PATENTEE FOUND [JP]) 31 August 1988 (1988-08-31) * figure 1 *	1-5	ADD. F16K1/30
			TECHNICAL FIELDS SEARCHED (IPC)
			A62C F16K F17C
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 3 April 2020	Examiner Nehrdich, Martin
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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03-04-2020

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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