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(54) **FILTER MOUNT FOR A FACEMASK ALLOWING THREADED AND BAYONET TYPES OF FILTERS TO BE MOUNTED ON THE FILTER MOUNT**

(57) A quick coupling connection allows the fixing, with bayonet coupling, to an anti-NBC facemask, of a filter combined therewith, provided with specific cooperating means and, at the same time, capable of fixing all filters provided with threads, such as standard NATO

ones, by traditional screwing, to the facemask itself, so as to be compatible with all filters already available on the market. A safety system is provided, comprising the release of the quick coupling filter, using only one release button.

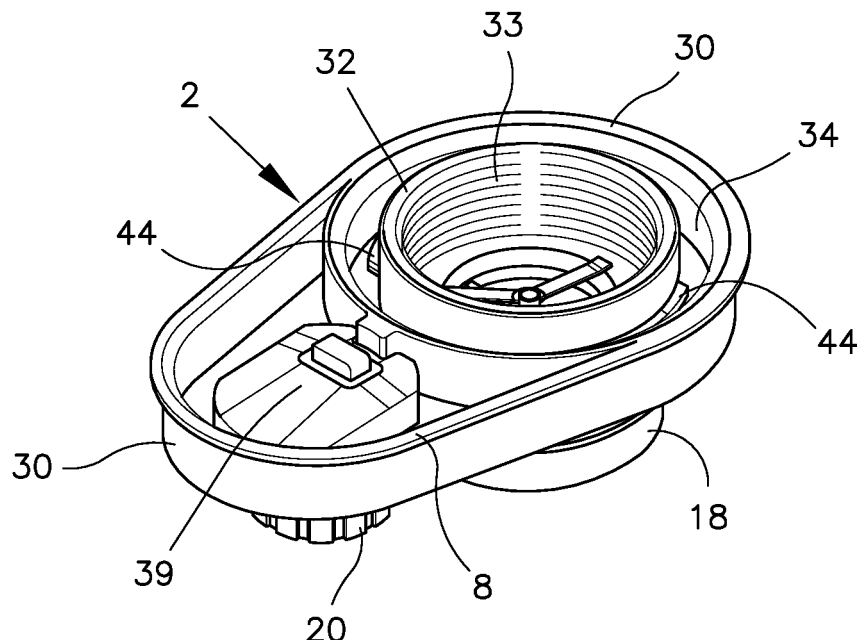


FIG. 2

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Description

Field of the invention

[0001] The present invention relates to the field of anti-NBC protection and masks used to this end, with particular reference to a facemask and anti-NBC filter provided with a connector, allowing the user to fix to the facemask itself, not only filters provided with thread, such as the standard NATO one, by traditional screwing, but also innovative filters, combined therewith, by means of a bayonet coupling and quick hooking and unhooking means, so as to reduce the intervention times and assist the related operations.

[0002] A bayonet connection is a type of round connection consisting of two or more equidistant flaps (spokes) arranged on a cylindrical piece, locked in a slot, which is also cylindrical, in which spaces of convenient dimensions are obtained. After insertion, the piece locks when it is rotated by a certain angle.

[0003] According to the present invention, a connection of this type was studied to find specific use in recent anti-NBC masks provided with filter connectors on both sides of the facemask, in other words, in two operative positions, which are mutually angularly offset, and decentralized with respect to the vertical axis of symmetry of the facemask itself, introduced to assist operation of those wearing them, as they allow the right side or left side of the facemask to be left completely free.

BACKGROUND

[0004] In most commercially available traditional masks, the filter was screwed centrally onto the body of the pipe joint of the facemask, so that the axis of the filter lays on the vertical plane of symmetry of the same facemask, so the filter formed a considerable hindrance to the user, considering its dimensions and position. Think, for example, of the moment when, after putting on the anti-NBC facemask comprising a filter, the user took up a firearm to take aim and, if necessary, shoot.

[0005] In order to overcome such a drawback, it was necessary to provide means capable of fixing a filter, with reduced dimensions, quickly and safely to a facemask, in an eccentric position with respect to the vertical plane of symmetry of the latter.

[0006] A first solution to these problems was already provided by the same Applicant in Italian patent no. 1359426, describing an innovative system for fixing an NBC filter to a pipe joint of an anti-NBC facemask, allowing said filter to be positioned in a decentralized manner with respect to the pipe joint itself. To this end, a filter was suggested, where the connection to the pipe joint is eccentric with respect to the body of the filter itself. Quick male/female coupling means were further provided on the pipe joint, capable of cooperating with quick male/female coupling means with which the filter, combined therewith, was provided.

[0007] However, such a solution has the drawback of being unusable by most existing filters and pipe joints, which are not provided with the specific features, which would allow the use thereof.

[0008] It is the task of the present invention to provide a facemask and an anti-NBC filter couplable together by a quick coupling connection, which, instead, due to its innovative features, allows the fixing, to the anti-NBC facemask itself, by bayonet coupling, of a filter combined therewith, provided with specific cooperating means and, at the same time, capable of fixing, by traditional screwing, to the facemask itself, all filters provided with threads, like the standard NATO ones, so as to be compatible with all filters already available on the market.

[0009] This was achieved according to the present invention by providing a rigid connection, to be airtightly assembled onto an NBC facemask, and an innovative filter associated therewith, characterized in that it has, in conjunction:

first quick male coupling means, capable of protruding externally from the through hole of the facemask intended for the connection with the filter, which first means are able to cooperate with respective means, protruding centrally from one of the faces of said innovative filter with associated quick coupling, replacing the pipe joint with standard NATO thread, allowing the quick snap fastening thereof;

second female type means, coaxial to said first means, capable of cooperating with the pipe joint of a common filter provided with thread, such as the standard NATO one, allowing the fixing thereof by screwing;

third means, designed to protrude, through the same through hole, into said facemask, allowing the airtight assembly of said connection onto the facemask itself; and

fourth means, allowing the release on command, by using a single release button, of said filter associated with said connector, from its operative position on said facemask, reducing the times of a possible replacement, and where

said connection is further provided with means, which allow the user to replace the NBC filter safely, preventing the contaminated outside air from entering the facemask when said filter is removed from said connection.

[0010] In particular, in a preferred embodiment of the invention, said first means consist of two or more equidistant flaps (spokes), arranged on the outer surface of a cylindrical sleeve, which protrudes from the surface of the quick coupling connection, facing outwards, and

which, on insertion into the hole intended for the insertion of the connection on an anti-NBC facemask, is locked inside a cooperating mouth, protruding from a face of the filter with associated quick coupling, which is to be assembled: for this purpose, grooves with arc of a circle are made on the inner face of said mouth, where said flaps are guided and locked, when the filter is rotated by a certain angle, after insertion.

[0011] Said second means are represented by a thread, like the standard NATO one, made in the inner surface of said cylindrical sleeve, allowing the screwing of the mouth of a traditional filter commercially available at present, and a stop ring, inside the cylindrical piece itself, which represents the screwing limit stop of the mouth itself.

[0012] Said third means consist of a cylindrical sleeve on which a thread is obtained for the ferrule for fixing to the facemask, which protrudes from the surface facing the interior of the facemask.

[0013] Said fourth means consist of a pair of grooves with arc of a circle, each terminating in a receiving space, obtained on the face of the associated quick coupling filter from which the mouth protrudes, and a tooth capable of sliding in said groove and penetrating said spaces, activated by a spring with a contrasting release button, which, arranged in the part of the connection adjacent to said cylindrical sleeve, allows said tooth to be lowered, releasing it from the slot in which it slides, thus disengaging the filter with just one movement.

[0014] Further features and advantages of the invention will become apparent from the following detailed description, made with reference to the accompanying drawings, which show a non-limiting example of a preferred embodiment. In the drawings:

fig. 1 is a raised frontal view of an anti-NBC facemask provided with two filter connectors according to the invention, on both sides, decentralized with respect to the vertical axis of symmetry of the facemask itself, where a partial removal of material highlights the methods for fixing one of said connectors to the facemask;

fig. 2 shows a perspective view from above of one of the connectors in fig. 1;

fig. 3 is a plan view from above of the same connection in fig. 2:

fig. 4 is a raised frontal view of the same connection in the previous figure;

fig. 5 is a plan view from below of the same connection in fig. 4;

fig. 6 is a sectional view of the same connection according to the outline plan Y-Y in fig. 3;

fig. 7 is a sectional view of the same connection according to the outline plan A-A in fig. 3.

fig. 8 is a sectional view, again according to the outline plan A-A in fig. 3, of the connection with the filter assembled;

fig. 9 is a perspective view of the filter assembled onto the connection with the detail of the release button.

Advantages of the invention

[0015] A first advantage achieved by the present invention is a quicker and more efficient system of coupling an NBC filter to a facemask.

[0016] A second advantage is that said innovative coupling system nonetheless allows all of the commercially available traditional filters to be assembled by screwing, such as those with standard NATO thread.

[0017] A third advantage is that the accidental detachment of the filter provided with quick coupling is prevented by the presence of a manually controlled safety system, which can be deactivated by only one release button.

[0018] A fourth advantage is that said connector for connecting to the filter is capable of containing a movable unit therein, which does not form the subject of the invention, which allows the anti-NBC filter to be replaced safely, preventing the outside air from entering the facemask when the filter is removed from the mouth of the facemask.

[0019] These and further advantages will be better understood by those skilled in the art with the aid of the accompanying drawings and the following description.

Detailed description

[0020] With reference to the accompanying drawings, where some parts may have been removed for a better representation, a device according to the invention is described, comprising a quick coupling connector 2 between an NBC mask 4 and a filter associated therewith 6, conveniently provided with cooperating means.

[0021] Said quick coupling connection is in the form of a molded base 8 made of rigid material designed for fixing to the interior of the mask consisting of a facemask, covering the user's face, made of resilient, rubbery material, associated with means for putting it on the user's head. Such a facemask 4 has three openings, of which a central one 10 designed for letting out air, and the other two 12 and 14 for letting in air, symmetrically arranged with respect to the first, below a clear eye surface 16 made of rigid material.

[0022] As can be seen in figures 2-5, the base 8 has rounded corners and a width, decreasing progressively from one end, in which a cylindrical sleeve 18 with outer thread 19 protrudes from the face facing inward I, to the other end, in which, instead, a hollow cylindrical body 20

with a notably smaller diameter, protrudes, again from the face facing the interior of the facemask.

[0023] In contrast, on the surface facing outwards, said rigid molded base 8 has a raised edge 30 along the whole perimeter thereof, a cylindrical sleeve 32 protruding from the interior thereof and bearing at least two flaps 44 for a bayonet coupling, and a button 39, which commands the release of a ratchet 38 by overcoming the bias of a contrasting spring 45, thus preventing accidental disengagements.

[0024] On assembly, the sleeve 18 is inserted, to measure, inside one of the holes 12 and 14 of the facemask 4 and airtightly sealed along the edges of the same holes with the aid of a metal washer and hermetic seals (not shown) by a ferrule, which is screwed onto its outer thread 26. The body 20 is received instead by a recess 28 of the facemask 4 obtained by molding, without the need for further holes in the material.

[0025] The face facing outwards E has a small edge 30, which protrudes along the entire perimeter of the base 8, and connects to a portion of inner round wall, coaxially surrounding a short sleeve 32, at the widest end of the same base 8, provided with an inner thread 33, for example, a thread according to the NATO standard, defining an annular slot 34, on which the mouth 36 of the associated filter 6 is inserted.

[0026] The mouth 36 is provided (fig.8) with a thread 40 on its outer face, while on its inner face, it has a pair of spaces, or slots 42, with an arc of a circle.

[0027] As can be seen in figures 6 and 7, on the outer surface, the sleeve 32 of the base 8 contains a pair of diametrically opposite flaps with an arc of a circle, which, after introducing the mouth 36 of the filter 6 into the annular slot 34, are inserted into said slots 42, when the filter is rotated by a certain angle.

[0028] According to a feature of the invention, a pair of grooves with an arc of a circle are obtained on the face of the associated quick coupling filter 6, from which the mouth 36 protrudes 36, each terminating in a receiving space, inside which a tooth 38, activated by a spring 35, arranged in a space 33 inside the cylindrical body 20, in the part of the connection 2 adjacent to said cylindrical sleeve 32, is able to slide and penetrate said spaces. With the tooth inserted in its receiving space, it is not possible to disengage the filter. The tooth 38 is lowered, overcoming the resistance of the spring 35, only by pressing a release button 39, arranged on the outer face of the quick coupling connection 2, and reachable by the user, also with the filter assembled.

[0029] According to a further feature of the invention, in the quick coupling connection 2, the interior of the sleeve 18 and the sleeve 32 form a housing for a movable unit, comprising known means, which do not form the subject of the invention, capable of airtightly sealing the inlet of the air in the facemask when the filter is removed from the connection itself, blocking the inhalation valve 48.

Claims

1. A filter connection to an anti NBC facemask, which allows the screwing of filters provided with thread, and the quick insertion of associated filters with bayonet coupling, **characterized in that** said connection (2) is in the form of a molded base (8) made of rigid material and comprises:

first quick male coupling means comprising a cylindrical sleeve (32) provided with two or more equidistant flaps (44) arranged on the outer surface, inside an annular slot (34), which sleeve (32) protrudes from the inner surface of the connection (2) and, on insertion into the hole (12,14) intended for the insertion of the connection (2) on said facemask (4), is locked inside a mouth (36), protruding centrally from one of the faces of an associated quick coupling filter (6); grooves and spaces of convenient dimensions being obtained on the inner face of said mouth (36), where said flaps (44) are guided and locked, when the piece is rotated by a certain angle, after introduction, allowing a quick snap fastening thereof;

second female type means, coaxial to said first means, represented by a thread (33) obtained in the inner surface of said cylindrical sleeve (32), which allows the screwing of the mouth of a common filter available on the market, with a stop inside the cylindrical piece itself, which represents the screwing limit stop of the mouth itself;

third means capable of protruding through the through-hole itself into the facemask, to assemble said connection, air tight, onto the facemask itself, comprising a sleeve (18) provided with an outer thread (26) for a fastening ring (24); and

fourth means for releasing, on command, said quick coupling filter associated with said connection, from its operative position on said facemask, reducing the times of a possible replacement thereof, comprising a pair of grooves with arc of a circle, each terminating in a receiving space, obtained on the face of the associated filter (6) from which the mouth (36) protrudes, and a tooth (38), capable of sliding in said grooves and penetrating said spaces, activated by a spring, whose bias is overcome by a contrasting button (39) arranged in the part of the connection (2) adjacent to said cylindrical sleeve (32), allowing the tooth (38) to be lowered, releasing it from its slot (41) and releasing the disengagement, simply by pressure.

2. A filter connection to an anti NBC facemask, as in claim 1, **characterized in that** known means are

also present in said connection, allowing the user to replace the NBC filter safely, preventing the contaminated outside air from entering the facemask when said standard NATO filter, or said quick coupling filter, is removed from said connection. A known movable unit is also present in said connection, inside the sleeve (32) and the mouth (18), combined with a membrane and a seal valve, which allows the user to replace the NBC filter safely, preventing the contaminated outside air from entering the facemask, when said standard NATO filter, or said quick coupling filter, is removed from said connection.

3. A connection as in claim 1 **characterized in that** a known movable unit is also present in said connection, inside the sleeve (32) and the mouth (18), combined with a membrane and a seal valve, which allows the user to replace the NBC filter safely, preventing the contaminated outside air from entering the facemask, when said standard NATO filter, or said quick coupling filter, is removed from said connection.
4. An anti NBC filter with bayonet coupling, configured to connect to a filter connection, to an anti NBC facemask, which allows the screwing of filters provided with thread, and the quick insertion of associated filters with bayonet coupling, as in claim 1, **characterized in that** it is provided with an externally threaded mouth (36), (40), on whose inner face is a pair of spaces, or slots, with arc of a circle, capable of receiving the pair of diametrically opposite flaps with arc of a circle (44) on the outer surface of the sleeve (32) of the connection (2), when said filter (6) is rotated by a certain angle in the annular slot (34) of said connection (2), a receiving space being provided at the end of said slots with arc of a circle, penetrated by a tooth (38), activated by a spring (35), arranged inside the cylindrical body (20) of the connection (2), allowing the disengagement of the filter simply by pressing a release button (39) arranged on the connection itself (2).
5. A facemask for an anti NBC filter configured to connect to a filter connection, to an anti NBC facemask as in claim 1, **characterized in that** it is provided with two holes (12,14) for inserting the sleeve (18) of said connection (2), to measure, and at least one recess (28), obtained by molding, to receive the hollow cylindrical body (20) of the connection itself (2)).

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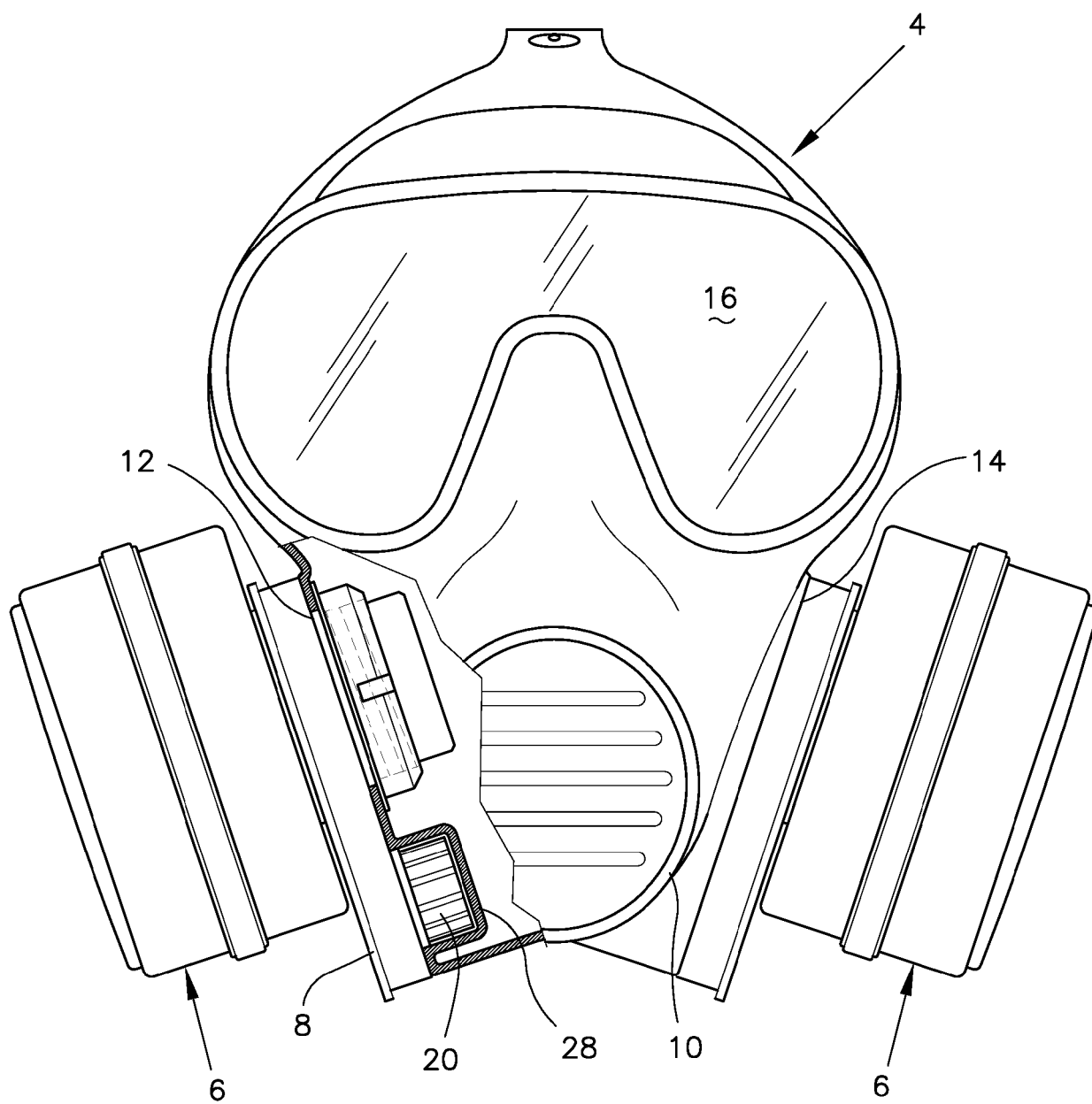


FIG. 1

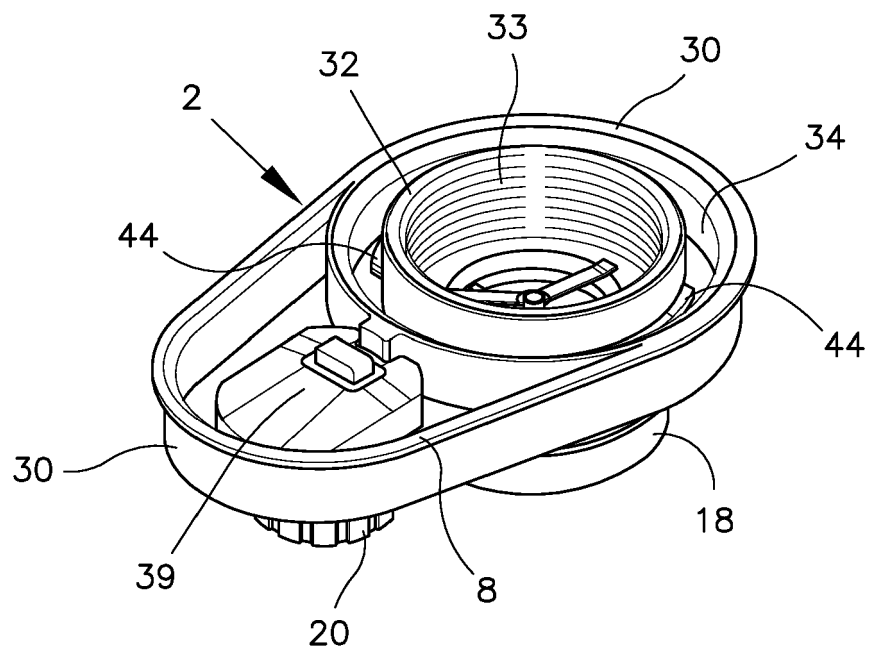


FIG. 2

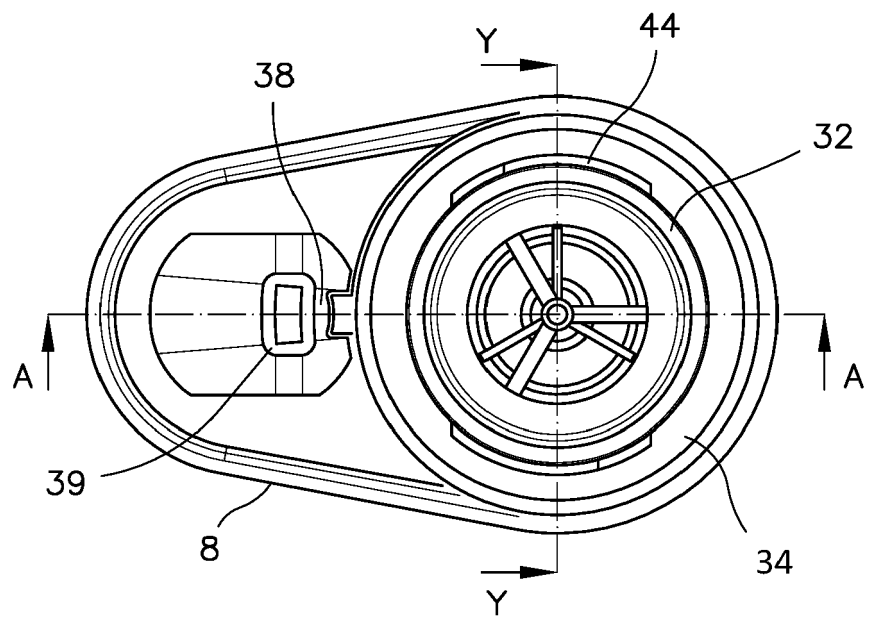


FIG. 3

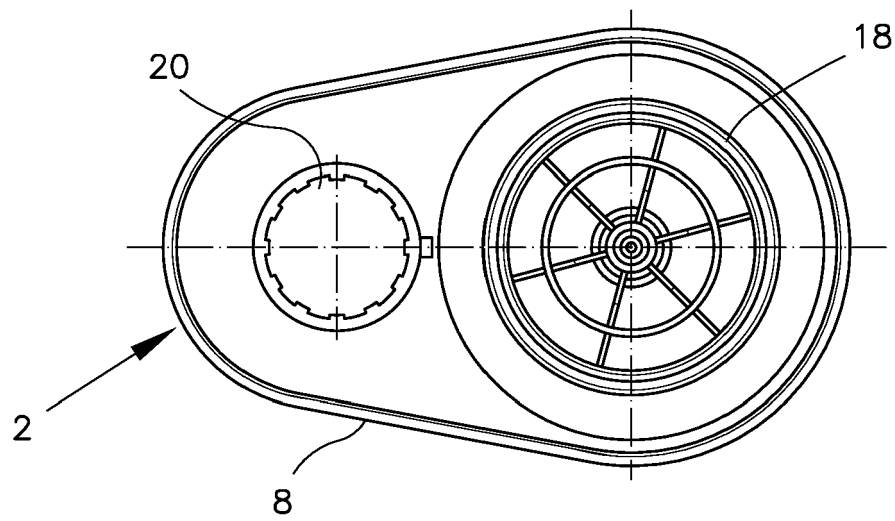
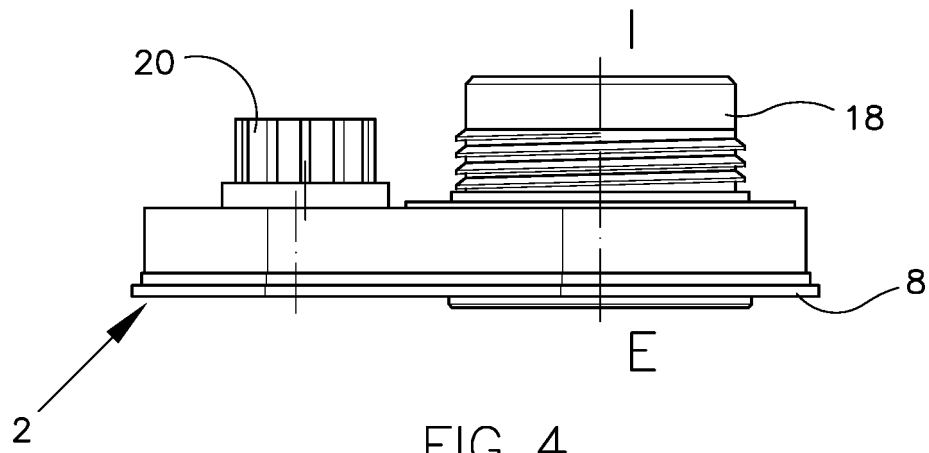


FIG. 5

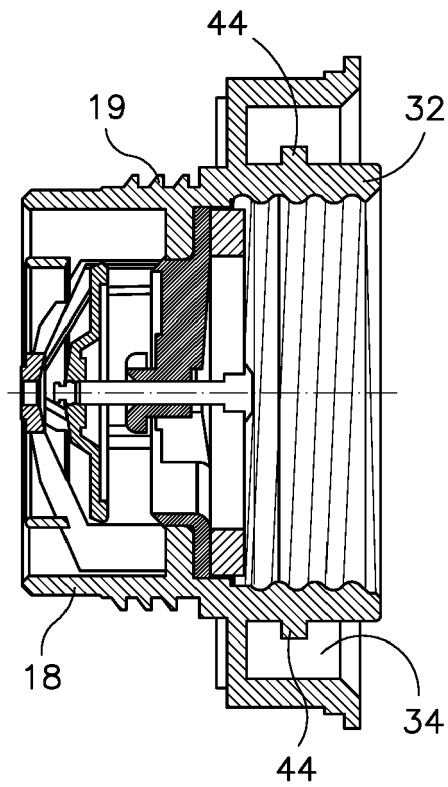


FIG. 6

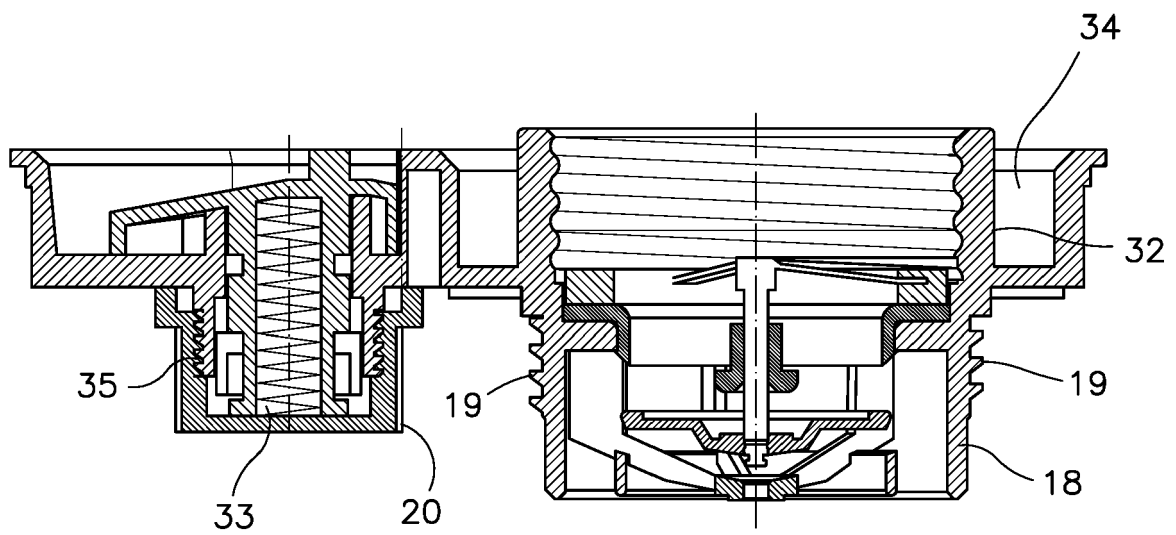
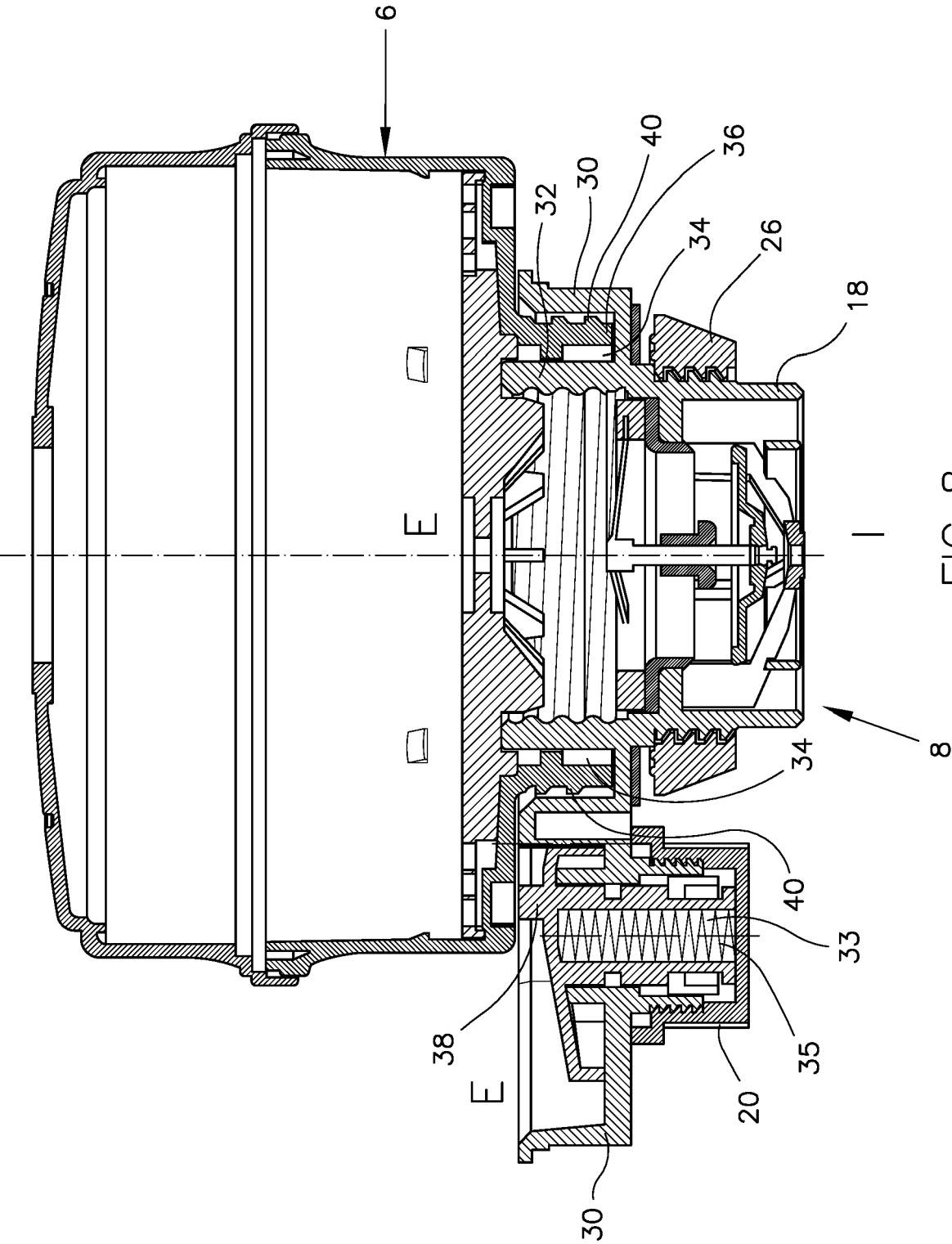


FIG. 7



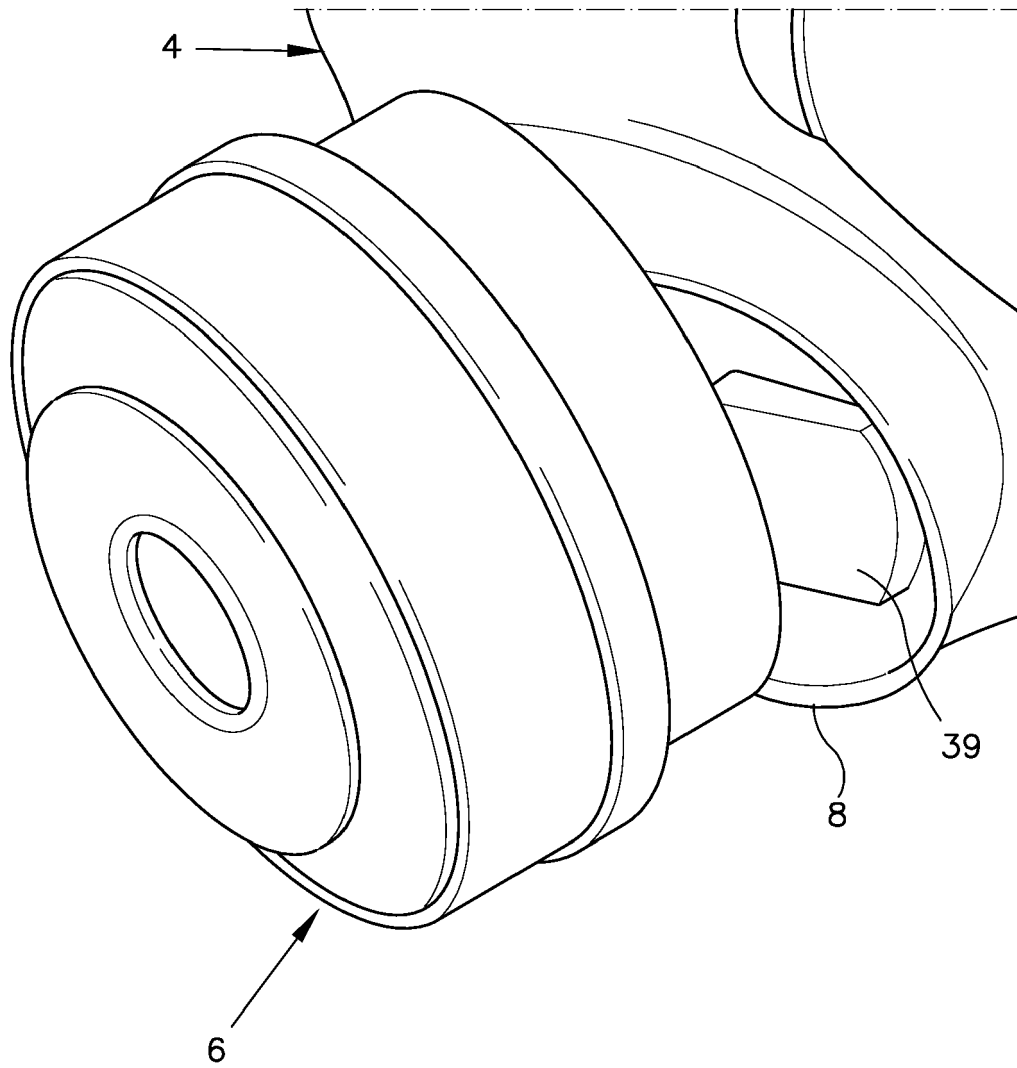


FIG. 9



EUROPEAN SEARCH REPORT

Application Number
EP 18 15 6012

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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