(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 415 936 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
08.02.2012 Bulletin 2012/06

(51) Int Cl.:
E03C 1/04 *(2006.01)*

(21) Application number: **11176485.8**

(22) Date of filing: **03.08.2011**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(30) Priority: **03.08.2010 IT MI20101475**

(71) Applicant: **Cerutti, Silvano**
28887 Omegna (Verbania) (IT)

(72) Inventor: **Cerutti, Silvano**
28887 Omegna (Verbania) (IT)

(74) Representative: **Ponzellini, Gianmarco**
Ponzellini, Gioia e Associati S.r.l.
Via Mascheroni, 31
20145 Milano (IT)

(54) **A spacer element for hydraulic apparatus**

(57) A spacer for mixers (A) comprises a body (2) having a prevalent development axis (X). The body (2) exhibits: a first end portion (3) externally provided with a thread for removable engagement of the spacer (1) to a first body (C1) of the mixer (A); a second end portion (5) externally provided with a second thread for engaging the spacer (1) to a second body (C2) of the mixer (A); an intermediate portion (7) interposed and joined in a single piece to the first (3) and to the second end portion (5); a first, a second and a third through-channel (8, 9, 10) which extend from respective mouths (8a, 9a, 10a) arranged at the first end portion (3) to respective mouths (8b, 9b, 10b) arranged at the second end portion (5) to enable transit of respective fluids; a lateral narrowing (11) suitable for defining an access opening towards the intermediate portion (7). The body (2) is made of a reinforced plastic material.

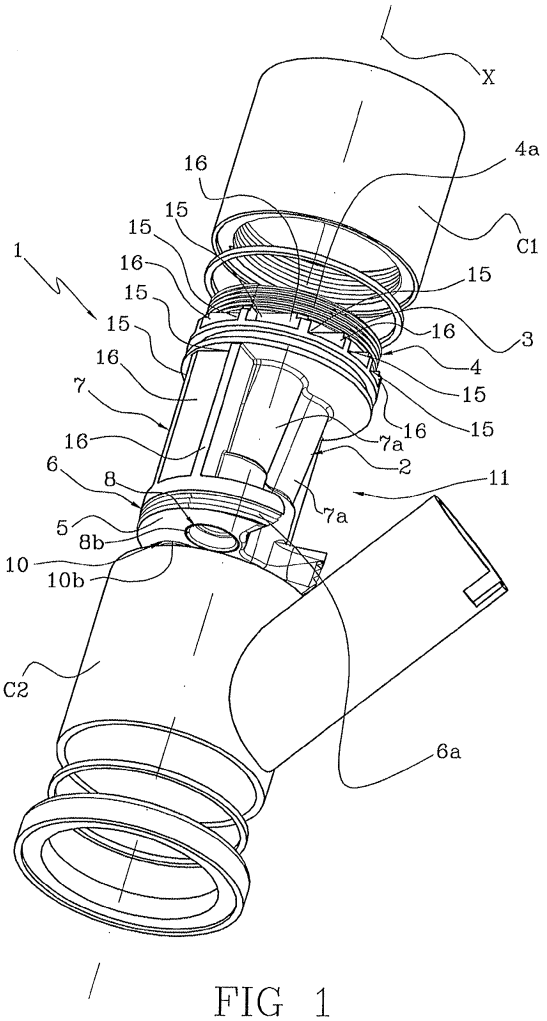


FIG 1

EP 2 415 936 A2

Description

BACKGROUND OF THE INVENTION.

[0001] The present invention concerns a spacer element for hydraulic apparatus, in particular taps, mixers and/or the like.

[0002] Also object of the present invention is a hydraulic apparatus, in particular, a tap, a mixer or a like liquid dispensing device.

[0003] The object of the present invention is applicable in the hydraulic sector, and in particular is suitable for application to taps.

[0004] As is known, taps and/or mixers for water dispensing can be provided with respective spacer elements which have the task of enabling mechanical and hydraulic engagement to the respective water source and, at the same time maintaining them at a desired distance from the water source such as to adapt them according to the application they are destined for.

[0005] Generally, spacer elements which are supplied together with the taps and/or the mixers at present on the market comprise a body having a substantially cylindrical conformation exhibiting a prevalent development axis.

[0006] The body of these spacer elements normally exhibits a first end portion externally provided with a first thread for engagement thereof to a first body of the tap and/or mixer to which it is associated. Further, the body of the spacer elements exhibits a second end portion, opposite the first, externally provided with a second thread for engagement thereof to a second body of the tap and/or mixer to which it is associated.

[0007] The above-mentioned spacer elements comprise also a first, a second and a third through-channel which extend from respective mouths realised at the first end portion to respective mouths realised at the second end portion. Each through-channel passes through the intermediate portion to enable the transit of a respective fluid from one side to another of the body of the respective spacer element.

[0008] The spacer body is completely made of brass and is obtained by removal of material from a solid body. Alternatively a known method is to forge spacer elements starting from a brass rod that has been suitably heated and worked. The through-channels are realised by means of respective boring operations, while the external shape of the spacer elements is made by milling and/or other similar operations, all aimed at removing material.

[0009] Although the known spacer elements are very widely used, the applicant has found that they are however not lacking in some drawbacks and are improvable in various aspects, mainly in relation to the overall weight thereof, the speed of manufacturing thereof, the practicalness of realising the various bodies, as well as the overall production costs, logistical management and/or marketing.

[0010] In particular, the applicant has found that the brass spacer elements are particularly heavy and require significant realisation times as the formation thereof requires a series of mechanical work operations actuable by removal of material; costs for the material and the waste are also inhibitive.

[0011] Also to be considered is that the manufacturing of the spacer elements requires, on the one hand, the predisposing of suitable machine tools suitable for realising the required work operations, and on the other hand, specialised operatives able to perform those operations.

[0012] A final point is that the above-mentioned spacer elements are particularly expensive and have a considerable effect on the overall costs of the taps and/or the mixers to which they are associated.

[0013] The high costs of the spacer elements depend both on the high costs of the materials they are made of, and on the complex and laborious mechanical operations for removing the material necessary for their formation and finishing.

[0014] Not least, the material, if not particularly controlled with respect to its composition, releases health-risk substances into the water, such as heavy metals.

SUMMARY OF THE INVENTION.

[0015] The main aim of the present invention is to provide a spacer device for hydraulic apparatus, in particular taps, mixers and/or the like, and a hydraulic apparatus provided with the spacer elements, able to resolve the problems encountered in the prior art.

[0016] It is also an aim of the present invention to realise a spacer element which is light and economical.

[0017] A further aim of the present invention is to realise a spacer element which is easy and practical to construct.

[0018] A further aim is to disclose a manufactured item which is hygienic and which does not release damaging substances into the water.

[0019] A further aim of the present invention is to provide a spacer element which is quick to realise.

[0020] A further aim of the present invention is to provide a spacer element which reduces the overall costs of the taps and/or mixers to which it is associated.

[0021] The above aim, and more besides, are substantially attained by a spacer element for hydraulic apparatus, in particular taps, mixers and/or the like, and a hydraulic apparatus equipped with the spacer element, as set out and described in the following claims.

BRIEF DESCRIPTION OF THE DRAWINGS.

[0022] There now follows, by way of example, a description of a preferred but not exclusive embodiment of a spacer element for a hydraulic apparatus, in particular taps, mixers and/or the like, and a hydraulic apparatus equipped with the spacer element, according to the present invention.

[0023] The description will be made herein below with

reference to the accompanying figures of the drawings, provided merely by way of non-limiting example, in which:

figure 1 is a perspective exploded view of a spacer element for a hydraulic apparatus, in particular taps, mixers and/or the like, and some parts of a respective mixer to which the spacer element is associated:
figure 2 is a further perspective view of the spacer element of the preceding figure;
figure 3 is a further perspective view of the spacer element of the preceding figures;
figure 4 is a lateral view of the spacer element of the preceding figures;
figure 5 is a frontal view of the spacer element of the preceding figures;
figure 6 is a plan view of the spacer element of the preceding figures;
figure 7 is a further perspective view of the spacer element of the preceding figures, represented with respective cylindrical inserts in exploded view;
figure 8 is a longitudinal section of the spacer element of the preceding claims, assembled to the components of the mixer illustrated in figure 1;
figure 9 is a perspective view from below of the spacer element of the preceding figures, assembled to the components of the mixer illustrated in figures from 1 to 8;
figure 10 is a plan view of the mixer of the preceding figures assembled to the components of the mixer illustrated in figures 1, 8 and 9;
figure 11 is an assembled perspective view of a mixer equipped with the spacer element of the preceding figures;
figure 12 is a perspective view, partially exploded, of the mixer of the preceding figure;
figure 13 is a non-exploded view of a mixer provided with the spacer element of figures from 1 to 10;
figure 14 is an illustration of a detail of figures from 11 to 13;
figure 15 is a lateral illustration of the detail of the preceding figure;
figure 16 is a frontal illustration of the detail of figures 14 and 15;
figure 17 is a plan view illustration of the detail of figures from 14 to 16.

DETAILED DESCRIPTION

[0024] With reference to figures from 1 to 11, number 1 denotes in its entirety a spacer element for a hydraulic apparatus, in particular taps, mixers and/or the like, according to the present invention.

[0025] The spacer element 1 comprises a body 2 which exhibits a prevalent development axis X coinciding with the longitudinal axis thereof.

[0026] The body 2 comprises a first end portion 3 which preferably exhibits an external development that is substantially cylindrical. The first end 3 of the body 2 is externally provided with a first constraining element 4, for removably engaging the body 2 to a first body C1 (figures 1 and from 8 to 13), not being a part of the spacer element 1 as it constitutes a component of a hydraulic apparatus A (figures from 11 to 13), such as for example a tap, a mixer or a like fluid dispensing device.

[0027] The first constraining element 4 advantageously comprises at least an inclined coupling surface or a thread 4a. The thread 4a of the first constraining element 4 exhibits a substantially saw-tooth profile defined by a first surface 4b having a substantially helical development which extends from the first 3 to the second end 5 distancingly from the longitudinal axis X of the body 2 and a second surface 4c, also substantially helically-developing, which extends substantially perpendicularly to the longitudinal axis X of the body 2.

[0028] In other terms each thread exhibits, in section, an inclined tract with respect to the development axis X and with respect to the tract 4a and a tract 4a that is perpendicular to the development axis X.

[0029] The body 2 further exhibits a second end portion 5, opposite the first end portion 3 along the prevalent development axis X and preferably exhibiting an external enveloping that is substantially cylindrical. The second end portion 5 is advantageously externally provided with a second constraining element 6 for engaging, in particular removably, the body 2 to a second body C2 not being a part of the spacer element 1, as it constitutes a further component of the above-mentioned hydraulic apparatus A.

[0030] The second constraining element 6 comprises at least a thread 6a. The thread 6a of the second constraining portion 6 is defined by a first surface 6b having a substantially helical development which extends from the second 3 to the first end 5, distancingly from the longitudinal axis X of the body 2 and a second surface 6c, also having a substantially helical development, which extends from the second end 5 to the first end 3, nearingly to the longitudinal axis X of the body 2. Between the first and the second end portions 3, 5, the body 2 of the spacer element 1 also comprises an intermediate portion 7. The intermediate portion 7 is advantageously joined in a single piece to the first and the second end portions 3, 5 to form therewith a single block.

[0031] In an advantageous aspect of the present invention, the body 2 of the spacer element 1 is provided with a first through-channel 8 which extends from a mouth 8a (figures 3, 6 and 10) arranged at the first end portion 3 to a mouth 8b (figures 1, 2, 7 and 9) arranged at the second end portion 5.

[0032] The first through-channel 8 crosses the whole body 2 in order to enable transit of a respective fluid, in particular cold water coming from a respective first conduit T1 supplying the water (figures 11 and 13) that is hydraulically connectable to a suitable water supply.

[0033] The body 2 of the spacer element 1 further comprises a second through-channel 9 which extends from a mouth 9a (figures 3, 6 and 10) arranged at the first end

portion 3 to a mouth 9b (figures 2, 7 and 9) arranged at the second end portion 5. The second through-channel 9 completely crosses the body 2 in order to enable transit of a respective fluid, preferably hot water, coming from a respective second conduit T2 (figures 11 and 13) of supply of the hot water, connectable to an appropriate water supply, or a supply of hot water. Additionally, the body 2 of the spacer element 1 is further provided with a third through-channel 10 which extends from a mouth 10a (figures 1, 2 and from 7 to 9) arranged at the first end portion 3 to a mouth 10b (figures 3, 6 and 10) arranged at the second end portion 5.

[0034] Like the first and second through-channels 8, 9, the third through-channel 10 completely crosses the body 2 of the spacer element 1 in order to enable transit of a respective fluid, in particular mixed water obtained from mixing respectively the cold water and the hot water coming from the first 8 and the second channel 9.

[0035] The intermediate portion 7 of the body 2 advantageously exhibits a rounded wall 7a, preferably a plurality thereof, at least partially delimiting a respective channel 8, 9 and 10 of the body 2.

[0036] As can be seen in figures from 1 to 5, from 7 to 9 and 11, the body 2 exhibits, at the second end portion 3, a lateral narrowing 11, destined to define an access opening towards the intermediate portion 7 in use conditions of the spacer element 1.

[0037] In detail, the lateral narrowing 11 extends, at least partly, along the intermediate portion 7 of the body 2.

[0038] The lateral narrowing 11 advantageously extends for at least three quarters of the longitudinal extension of the intermediate portion 7.

[0039] With particular reference to figure 8, the lateral narrowing 11 gives the body 2, along a medial longitudinal section thereof, substantially an L-shape, in particular an upturned L-shape.

[0040] The body 2 of the spacer element is advantageously at least partly, and preferably entirely, made of a plastic material, in particular polyamide (PA-nylon) and/or propylene (PP-Moplen), and/or polyaryl amide (Ixef), and/or polyoxymethylene (POM-acetalic), and/or polycarbonate (PC-Trirex), and/or ABS polycarbonate alloy (PC/ABS - Giasiblend), and/or polyurethane (TPU - Laripur), and/or polyphenylene sulphide pPS - Supec), and/or polyetherimide (PEI - Ultem), and/or polybutylenterephthalate (PBT - Pibiter), and/or polysulphone (Udel) and/or polyphenyl oxide/ether PPO/PPE - Noryl) or like materials.

[0041] Still more advantageously, the body 2 of the spacer element 1 is made of a reinforced plastic material, in particular nylon reinforced with fibre, for example glass fibre, reinforced noryl, reinforced propylene, etc. (or one of the above-materials, suitably reinforced).

[0042] In detail, the body 2 is advantageously obtained rapidly, practically and economically, by moulding of the above-mentioned plastic materials (and in particular by means of a single moulding operation on the plastic material).

[0043] In a further advantageous aspect of the present invention, the body 2 of the spacer element 1 is provided, for each channel 8, 9, 10, with at least a hollow cylindrical insert 12, 13, 14 (figure 7) .

[0044] Each hollow cylindrical insert 12, 13, 14, is preferably unremovably coupled to the respective through-channel 8, 9, 10 of the body 2, at the second end portion 5 thereof.

[0045] As can be seen in figure 7, each cylindrical insert 12, 13 and 14 is internally threaded to enable removable connection of the respective channel 8, 9, 10 of the body 2 to at least a respective conduit T1, T2 and T3, not part of the spacer element itself.

[0046] Still with reference to figure 7, in which each hollow cylindrical insert 12, 13, 14 exhibits an external cylindrical surface provided with at least an annular channel 12a, 13a, 14a, preferably a plurality, which extend transversally to the longitudinal axis thereof, parallel to one another. The annular channels 12a, 13a, 14a are predisposed to accommodate the formed plastic material of the body 2, during the stage of moulding thereof, in order to guarantee the unremovable jointing of the respective cylindrical inserts 12, 13, 14 there-with.

[0047] Each hollow cylindrical insert 12, 13, 14 is advantageously made of a metal material, in particular brass (obviously reinforced plastic materials can be used to define the cylindrical inserts) such that the jointing of the latter with the body 2 is achieved by co-moulding.

[0048] Alternatively the thread in the three channels can be obtained directly on the reinforced plastic material of which the body 2 is made.

[0049] In a further variant, a different reinforced material can be used to define the threaded mouths of the channels, in particular by co-moulding the two plastic materials and then threading the channels.

[0050] As can be seen in figures from 1 to 7, the body 2 exhibits a plurality of lightening cavities 15, in particular made by moulding during the stage of forming the body 2. The lightening portions 15 are advantageously distributed at the first end portion 3 and the intermediate portion 7.

[0051] Still with reference to figures from 1 to 7, the lightening cavities 15 of the intermediate portion 7 develop substantially parallel to the longitudinal axis X of the body 2. In detail, the lightening portions 15 of the intermediate portion 7 of the body 2 extend along the whole development of the intermediate portion.

[0052] In more detail, the lightening cavities 15 of the body 2 are delimited by respective reinforcing ribs 16, preferably plate-shaped, which develop from a peripheral zone of the body 2 towards an internal zone of the body 2 according to planes passing through the axis of development.

[0053] In still other terms, the lightening portions 15 defined by the absence of material with respect to the cylindrical enveloping of the spacer are not realisable by removal of material because of the narrowings which are defined on the spacer; a moulding production process is

therefore required. As can be seen in figures from 11 to 17, the spacer element 1 can be provided with at least a fastening bracket 17 which exhibits a substantially elongate body 18.

[0054] The fastening bracket 17 is predisposed to operate below a respective fixing plane (not illustrated) on which the above-mentioned hydraulic apparatus A is fixed, such as for example a sink or a like plane arranged in proximity of at least a tub (not illustrated) of a respective kitchen (not illustrated). In other words, the fastening bracket 17 is predisposed to operated in a opposition to the second end portion 3 of the spacer element 1 of the hydraulic apparatus A in such a way that the respective plane of the respective sink destined to support it remains interposed between the spacer element 1 and the fastening bracket 17.

[0055] Still with reference to figures from 11 to 17, the elongate body 18 of the fastening bracket 17 exhibits a first end 18a destined to engaged, via the interposing of the above-mentioned sink plane, and suitable connecting elements (not illustrated in the figures), the second end portion 5 of the body 2 of the spacer element 1, and a second end 18b, opposite the first end 18a, provided with suitable blocking means 19 able to pack the spacer element 1 and the fastening bracket 17.

[0056] The elongate body 18 is thus suitable for spacing the end zone 18a which abuts the rest plane from the end zone 18b where the blocking means operate; this distance is in general greater than 7cm and in particular greater than 10-15 cm such as to enable the operator to manoeuvre the blocking means also in the presence of the sinks or tubs which project inferiorly from the rest plane and which normally interfere with the engaging/disengaging activities.

[0057] As can be seen in figures from 11 to 17, the first end 18a of the elongate body 18 exhibits a rest plate 18c having a substantially triangular shape. The rest plate 18c of the first end 18a of the elongate body 18 exhibits, at one of the three angles, at least a through-opening 18d coinciding, in an assembled condition to the spacer element 1, with the narrowing 11 thereof. In other words, the through-opening 18d and the narrowing 11 of the body 2 of the spacer element 1 are in communication when reciprocally engaged.

[0058] As can be seen in figures from 11 to 16, the elongate body 18 comprises at least a body having a substantially cylindrical/tubular conformation which extends from the rest plate 18d distancingly therefrom (and which has a greater development than the largest dimension of the rest plate). The fastening bracket 17 advantageously further exhibits at least a channel 20 (figures from 12 to 14 and 17) which extends between the first and the second end 18a, 18b of the elongate body 18. The channel 20 is preferably (though not necessarily) destined to engagingly receive a support rod or a respective conduit T3 for supply of a mixed fluid coming from the hydraulic apparatus A.

[0059] The conduit T3 advantageously connects the third through-channel 10 of the body 2 of the spacer element 1 to a preferably-flexible dispensing conduit T4 (figure 11) that extends across the through-opening 18d of the rest plate 18c of the first end 18a of the elongate body 18 of the bracket itself and across the narrowing 11 of the body 2 of the spacer element 1, in order to connect hydraulically to at least a head S (figures from 11 to 13) of the hydraulic apparatus A.

[0060] The blocking means 19 advantageously comprise at least a nut 19a and a lock-nut 9b operatively engageable on the conduit T4 or support rod to push the fastening bracket 27 against the body of the spacer element 1.

[0061] Figure 13 illustrates an applied example of the spacer element 1 internally of a sanitary installation (hydraulic apparatus A).

[0062] The hydraulic apparatus comprises the hot water with respective flexible extensions.

[0063] These conduits cross the fastening bracket 17 and the base 21 (provided with a gasket) and convey the liquids of respective channels of the spacer.

[0064] The hot and cold water cross the spacer (and consequently the extractable shower mouth) and reach the brass beaker C1 with internal threading, internally of which the mixer cartridge 22 is located.

[0065] The mixer cartridge 22 is internally constrained to the beaker C1 by means of a washer 23 (for example made of brass) on which a cap 24 is superposed, and where the handle with the mixer lever 25 is located (fastened with a suitable grubscrew).

[0066] Obviously the apparatus exhibits the necessary 0-rings 26 and the Teflon rings 27 to guarantee the seal, in particular the seal of the spacer.

[0067] The mixed water runs along a reverse pathway, from top downwards to reach the shower head S via the flexible tube. The spacer element of the present invention obviates the problems encountered in the prior art and attains important advantages.

[0068] Primarily, the above-described spacer element can be realised by casing of any existing plastic material, and is particularly light and resistant to the oxidising action of the water; it is also free of pollutants.

[0069] Naturally, as they are made by moulding of suitable plastic materials, the above-described spacer elements are rapidly manufacturable, are practical to produce and require no specialised operatives.

[0070] A further consideration is that the use of cheaper plastic materials with respect to brass, together with the simple, rapid and economical stage of moulding the spacer elements, enables a significant reduction in overall production costs and/or marketing of the spacers and the mixers to which they are associated.

Legend

[0071]

1 Spacer element

X	Prevalent or longitudinal axis of the spacer element
2	Body of the spacer element
3	First end portion of the body 2
4	First constraining element of the first end portion 3
4a	Thread of the first constraining element 4
4b	First surface of the first constraining element 4
4c	Second surface of the first constraining element 4
5	Second end portion of the body 2
6	Second constraining element of the second end portion 5
6a	Thread of the second constraining element 5
6b	First surface of the second constraining element 5
6c	Second surface of the second constraining element 5
7	Intermediate portion of the body 2
7a	Rounded wall of the intermediate portion
8	First through-channel of the body 2
8a	Mouth of the first channel 8 at the first end portion 3
8b	Mouth of the first channel 8 at the second end portion 5
9	Second through-channel of the body 2
9a	Mouth of the second channel 9 at the first end portion 3
9b	Mouth of the second channel 9 at the second end portion 5
10	Third through-channel of the body 2
10a	Mouth of the third channel 9 at the first end portion 3
10b	Mouth of the third channel 9 at the second end portion 5
11	Narrowing
12	Cylindrical insert of first channel 8
12a	Annular channels of insert 12
13	Cylindrical insert of second channel 9
13a	Annular channels of insert 13
14	Cylindrical insert of third channel 10
14a	Annular channels of insert 14
15	Lightening cavity
16	Reinforcing ribs
17	Fastening bracket
18	Elongate body of the fastening bracket 17
18a	First end of the elongate body 18
18b	Second end of the elongate body 18
18c	Rest plate of the first end 18a
18d	Through-opening of the rest plate 18d
19	Blocking means
19a	Nut of the blocking means
19b	Lock-nut of the blocking means
20	Channel of elongate body 1
A	Hydraulic apparatus
C1	First body of hydraulic apparatus A
C2	Second body of hydraulic apparatus A
T1	First conduit
T2	Second conduit
T3	Third conduit
T4	Dispensing conduit
S	Head
21	base
22	mixer cartridge
23	washer
24	cap

25 knob with lever

26 o-ring

27 Teflon ring

Claims

1. A spacer element for hydraulic apparatus, in particular taps, mixers and/or the like, the spacer element (1) comprising a body (2) having a prevalent development axis (X) and exhibiting:

a first end portion (3) provided externally with a first constraining element (4) for engaging, in particular removably, the first constraining element (4) to a first body (C1) which is not a part of the spacer element (1);
a second end portion (5), opposite the first end portion (3) along the prevalent development axis (X), externally provided with a second constraining element (6) for engaging, in particular removably, the second constraining element (6) to a second body (C2) which is not a part of the spacer element (1);
an intermediate portion (7) interposed and joined in a single piece (3) with the first end portion (3) and the second end portion (5);
a first through-channel (8) which extends from a mouth (8a) arranged at the first end portion (3) to a mouth (8b) arranged at the second end portion (5), the first through-channel (8) crossing the intermediate portion (7) in order to enable transit of a respective fluid;
a second through-channel (9) which extends from a mouth (9a) arranged at the first end portion (3) to a mouth (9b) arranged at the second end portion (5), the second through-channel (9) crossing the intermediate portion (7) in order to enable transit of a respective fluid;
a third channel (10) which extends from a mouth (10a) arranged at the first end portion (3) to a mouth (10b) arranged at the second end portion (5), the third through-channel (10) crossing the intermediate portion (7) in order to enable transit of a respective fluid, in particular a mixed fluid,
at least the first and the second end portions (3, 5) exhibiting an external enveloping which is substantially cylindrical,
the body (2) exhibiting, at the second end portion (3), a lateral reduction (11) destined to define an access opening towards the intermediate portion (7) in use conditions of the spacer element (1), the body (2) being at least partly made of a plastic material,
the body (2) being optionally obtained by moulding.

2. The spacer element of claim 1, wherein the first, second and third through-channel (8, 9, 10) exhibit respective internal surfaces destined to come into contact with the fluid, which internal surfaces are defined at least along a prevalent tract of the development thereof by the material constituting the body (2), in particular by the first end portion (3) and the intermediate portion (7).

3. The spacer element of claim 1 or 2, wherein the first and the second end portion (3, 5) and the intermediate portion (7) are substantially full and do not comprise further channels or cavities passing from the first to the second end portion in addition to the said first, second and third through-channel (8, 9, 10).

4. The spacer element of claim 1 or 2 or 3, wherein the body (2) is made of a reinforced plastic material, in particular polyamide and/or propylene, and/or polyarylamide, and/or polyoxymethylene, and/or polycarbonate, and/or ABS polycarbonate alloy, and/or polyurethane, and/or polyphenylene sulphide, and/or polyetherimide, and/or polybutylenterephthalate, and/or polysulphone and/or fibre-reinforced polyphenyl oxide/ether, for example reinforced with glass fibre, the body (2) being obtained by moulding of the reinforced plastic material.

5. The element of claim 1 or 2 or 3 or 4, wherein the lateral reduction (11) extends at least partially along the intermediate portion (7) of the body (2), in particular the lateral reduction (11) extending over at least three quarters of the longitudinal extension of the intermediate portion (7), the lateral reduction (11) giving the body (2), along a median longitudinal section thereof, a substantially L-shaped form, in particular an upturned L-shape.

6. The spacer element of one or more of the preceding claims, wherein the first constraining element (4) comprises at least a thread (4a) exhibiting a substantially saw-tooth profile, defined by a first surface (4b) having a substantially helical development which extends from the first end portion (3) to the second end portion (5) in a distancing direction from a respective prevalent axis (X) of the body (2) and a second surface (4c) which is also substantially helical and extends substantially perpendicular to the prevalent axis (X) of the body (2).

7. The spacer element of one or more of the preceding claims, wherein the body (2) is provided, for each through-channel (8, 9, 10) with at least a hollow cylindrical insert (12, 13, 14), each hollow cylindrical insert (12, 13, 14) being unremovably coupled to the body (2) at the second end portion (5) thereof and being internally threaded such as to enable removable connection of the respective through-channel

(8, 9, 10) to at least a conduit (T1, T2, T3) not being a part of the spacer element (1).

8. The spacer element of the preceding claim, wherein each hollow cylindrical insert (12, 13, 14) exhibits a cylindrical external surface which is provided with at least an annular channel (12a, 13a, 14a) extending transversally to a longitudinal axis thereof, the annular channel (12a, 13a, 14a) receiving the plastic material of the body (2), during a stage of moulding thereof, in order to ensure an unremovable joining there-with.

9. The spacer element of one or more of the preceding claims, wherein the body (2) exhibits a plurality of reinforcing ribs (16) defining lightening cavities (15), in particular made by moulding, distributed in the first end portion (3) and the intermediate portion (7), the lightening cavities (15) of the intermediate portion (7) extending substantially parallel to the prevalent axis (X) of the body (2), in particular along the whole development of the intermediate portion (7).

10. The spacer element of one or more of the preceding claims, wherein the intermediate portion (7) of the body (2) exhibits at least a rounded wall (7a) at least in part delimiting a respective through-channel (8, 9, 10) of the body (2) of the spacer element (1).

11. A process for realising a spacer element for hydraulic apparatus, in particular taps, mixers and/or the like, the spacer element (1) comprising a body (2) having a prevalent development axis (X) and exhibiting:

a first end portion (3) provided externally with a first constraining element (4) for engaging, in particular removably, the first constraining element (4) to a first body (C1) which is not a part of the spacer element (1);
a second end portion (5), opposite the first end portion (3) along the prevalent development axis (X), externally provided with a second constraining element (6) for engaging, in particular removably, to a second body (C2) which is not a part of the spacer element (1);
an intermediate portion (7) interposed and joined in a single piece (3) with the first end portion (3) and the second end portion (5);
a first through-channel (8) which extends from a mouth (8a) arranged at the first end portion (3) to a mouth (8b) arranged at the second end portion (5), the first through-channel (8) crossing the intermediate portion (7) in order to enable transit of a respective fluid;
a second through-channel (9) which extends from a mouth (9a) arranged at the first end portion (3) to a mouth (9b) arranged at the second end portion (5), the second through-channel (9) crossing the intermediate portion (7) in order to enable transit of a respective fluid;
a third channel (10) which extends from a mouth (10a) arranged at the first end portion (3) to a mouth (10b) arranged at the second end portion (5), the third through-channel (10) crossing the intermediate portion (7) in order
to enable transit of a respective fluid, in particular a mixed fluid,
at least the first and the second end portions (3, 5) exhibiting an external enveloping which is substantially cylindrical,
the body (2) exhibiting, at the second end portion (3), a lateral reduction (11) destined to define an access opening towards the intermediate portion (7) in use conditions of the spacer element (1), the body (2) being at least partly made of a plastic material,
the body (2) being optionally obtained by moulding, the process comprising following stages:

predisposing a die exhibiting an internal cavity at least partially complementarily shaped to the first end portion, the second end portion and the intermediate portion;
moulding, for example by injection, and using a plastic material, in particular a reinforced plastic material, the spacer element in order to realise the end portions and the intermediate portion (3, 5, 7);
realising the first, second and third through-channel (8, 9, 10) alternatively by means of positioning of at least a first, a second and a third core internally of the die in order to define the first, the second and the third through-channel before the stage of moulding or by means of working by removal of material after the moulding stage; realising the first constraining element (4) and the second constraining element (6) alternatively in the moulding stage or successively to the moulding stage by working by removal of material.

12. The spacer element, in particular as in one or more of the preceding claims, wherein the spacer element (1) is provided with at least a fastening bracket (17) exhibiting a substantially elongate body (18), the elongate body (18) of the fastening bracket (17) exhibiting a first end (18a) which is destined to engage the second end portion (5) of the body (2) of the spacer element (1) and a second end (18b), opposite the first end (18a), provided with blocking means (19) able to pack the spacer element (1) and the fastening bracket (17), the fastening bracket (17) exhibiting at least a channel (20) which extends between the first end (18a) and the second end (18b), the channel (20) being engageable by a conduit (T3) or a support

rod.

13. The spacer element of claim 12, wherein the blocking means (19) comprise at least a nut (19a) and a locknut (19b) operatively engageable on the conduit (T3) or support rod in order to push the fastening bracket (17) against the body (2) of the spacer element (1).

14. A hydraulic apparatus, in particular a tap, mixer or a like regulating device for liquid flows, comprising at least a dispensing device (S) of a fluid, switchable between a non-operative position in which it dispenses no fluid, and an operative condition, in which it dispenses at least a fluid, at least a hollow body (C1) being destined to enable mixing of fluids and being in fluid communication with the dispensing device (S),
characterised in that it comprises at least a spacer element (1) according to one or more of the preceding claims destined to enable passage of two distinct fluids into the hollow body and destined to enable passage of a mixed fluid towards the dispensing device (S).

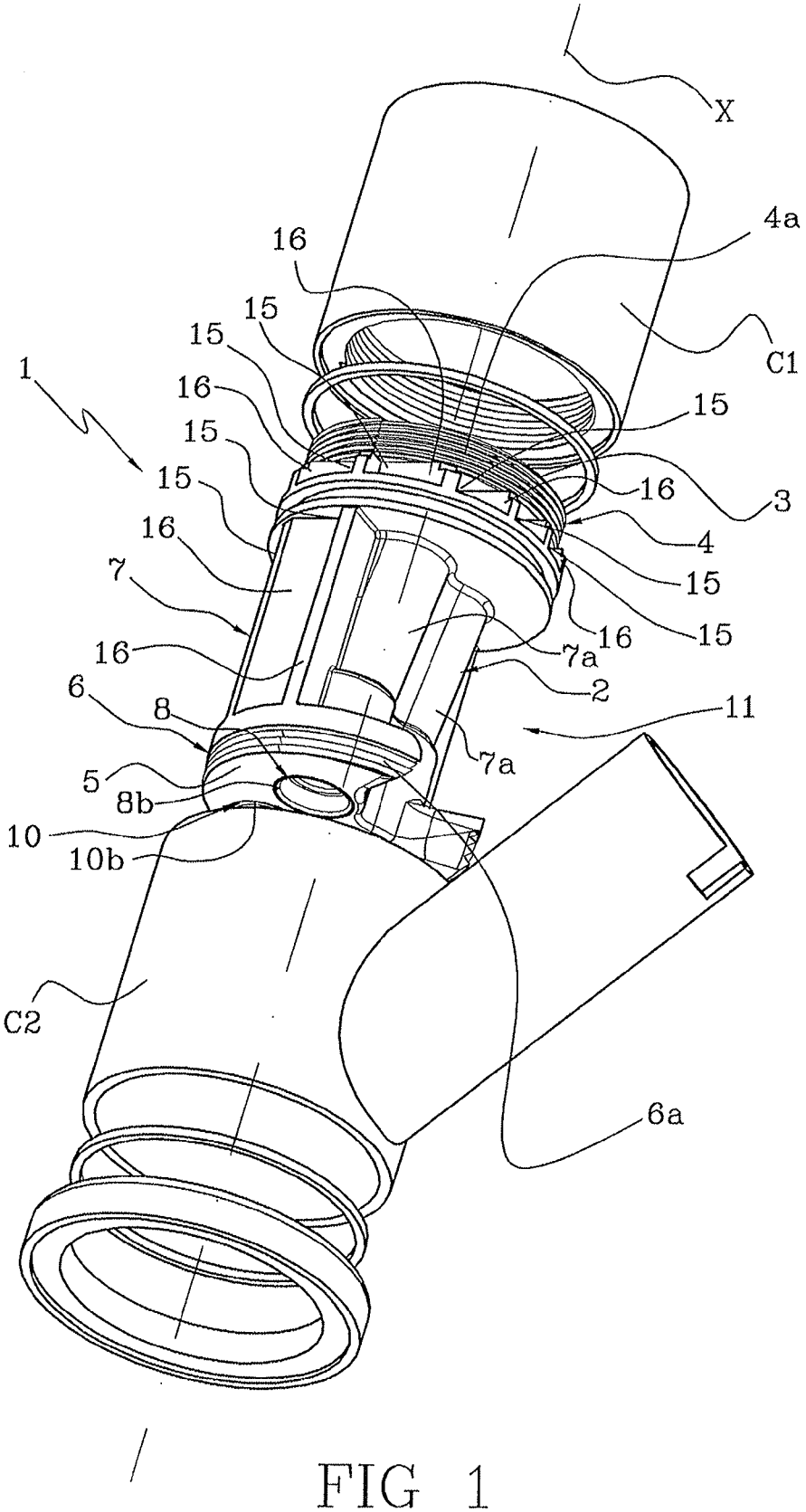

X
4a
16
15
15
C1
1
16
15
15
16
3
15
4
16
15
7
15
16
7a
16
2
6
11
8
7a
5
8b
10
10b
C2
6a

FIG 1

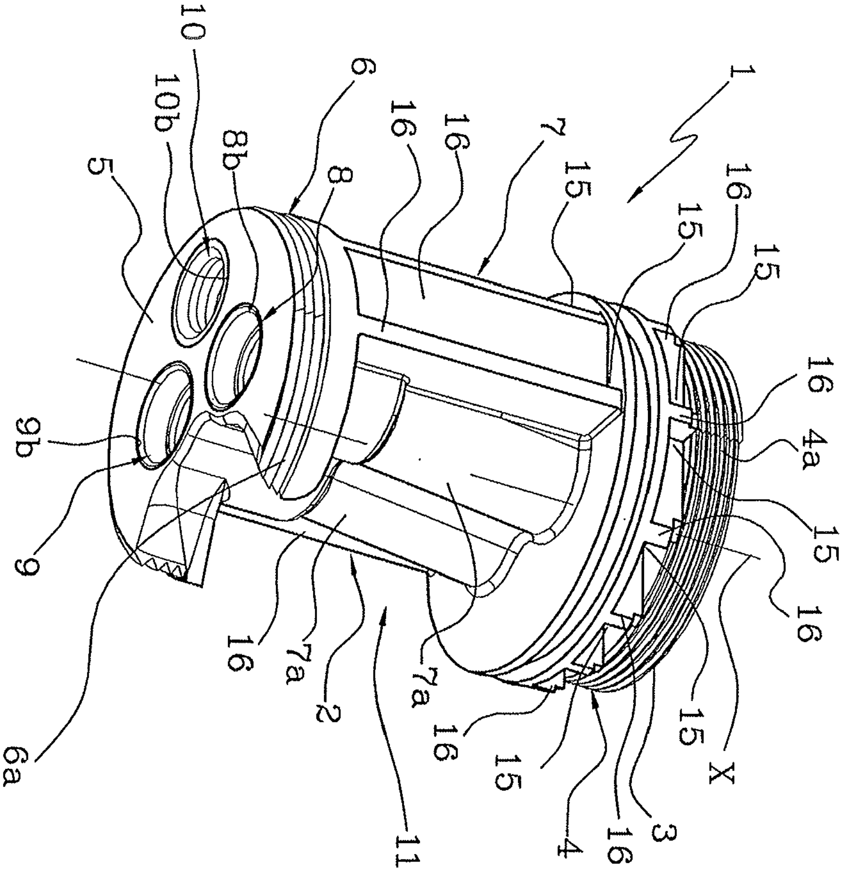


FIG 2

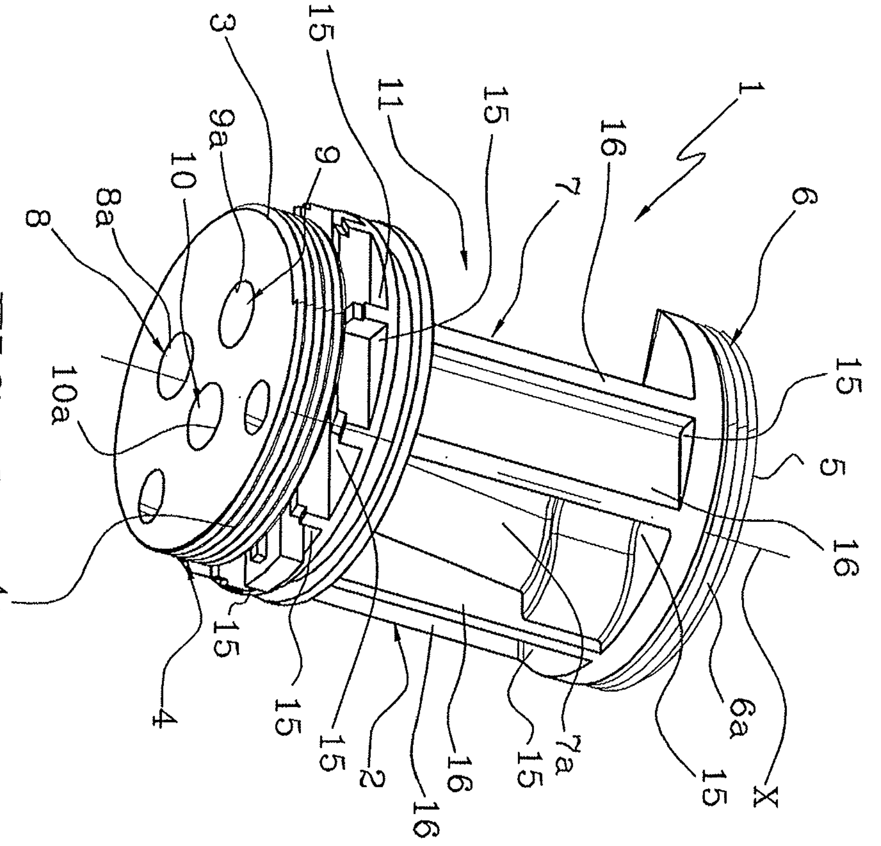


FIG 3

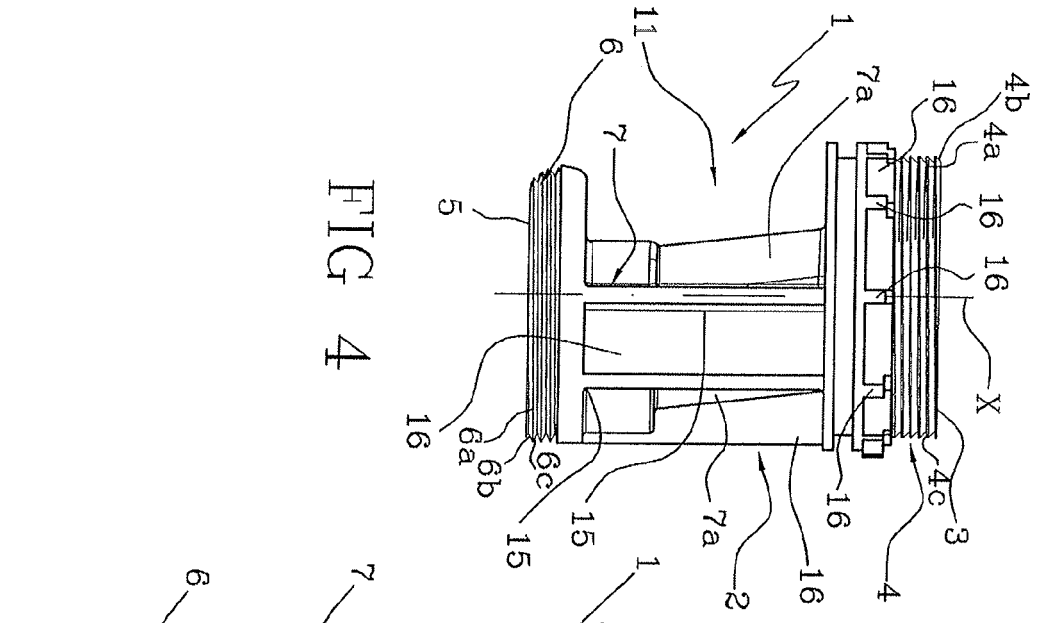


FIG 4

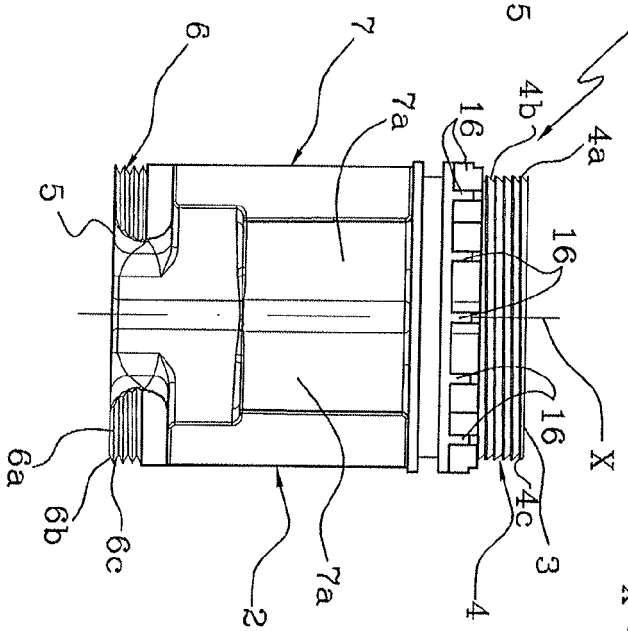


FIG 5

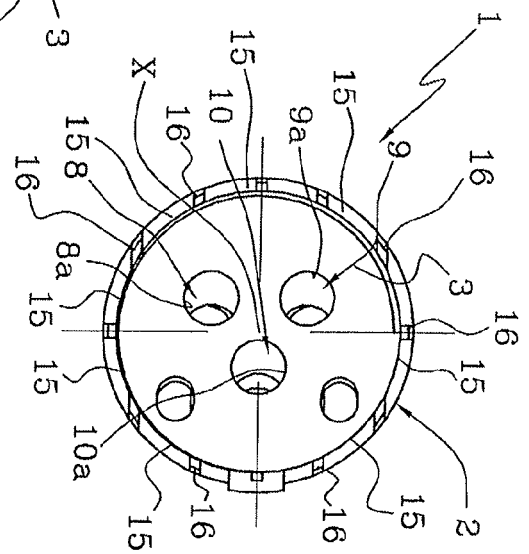


FIG 6

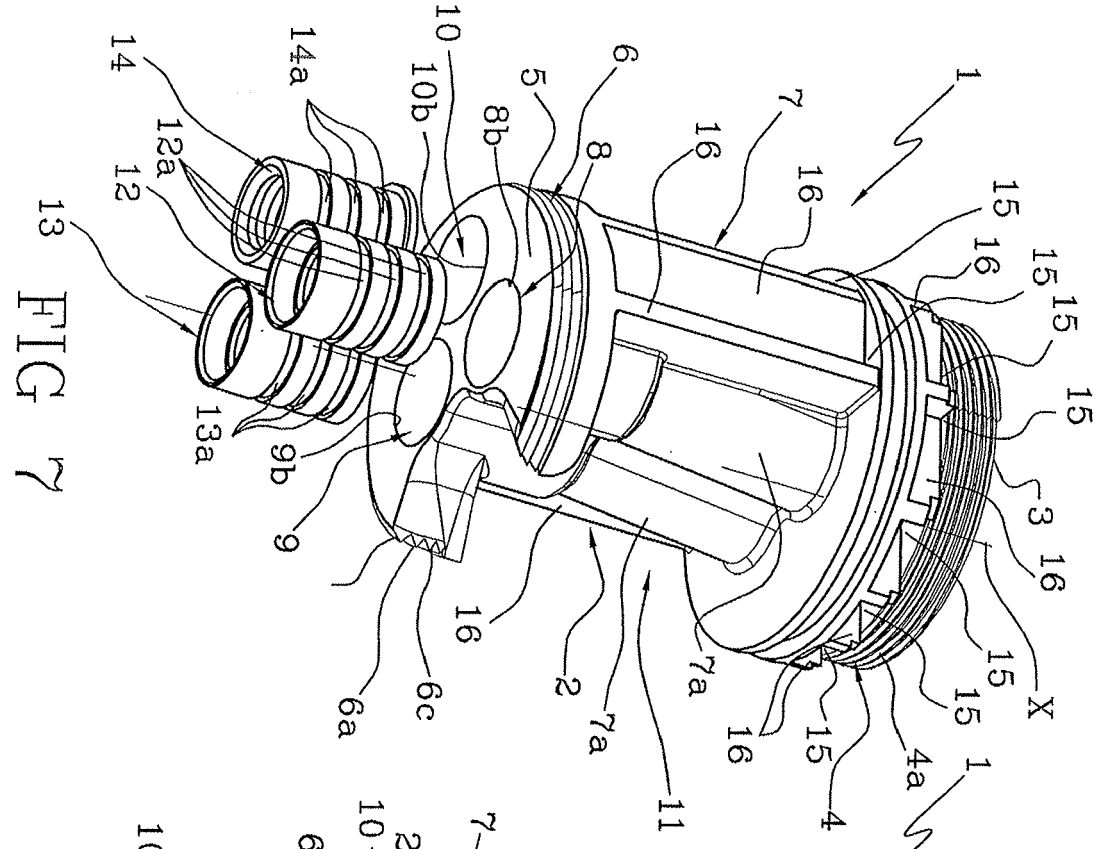

1
2
3
4
4a
5
6
6a
6c
7
7a
8
8b
9
9b
10
10b
11
12
12a
13
13a
14
14a
15
16
X

FIG 7

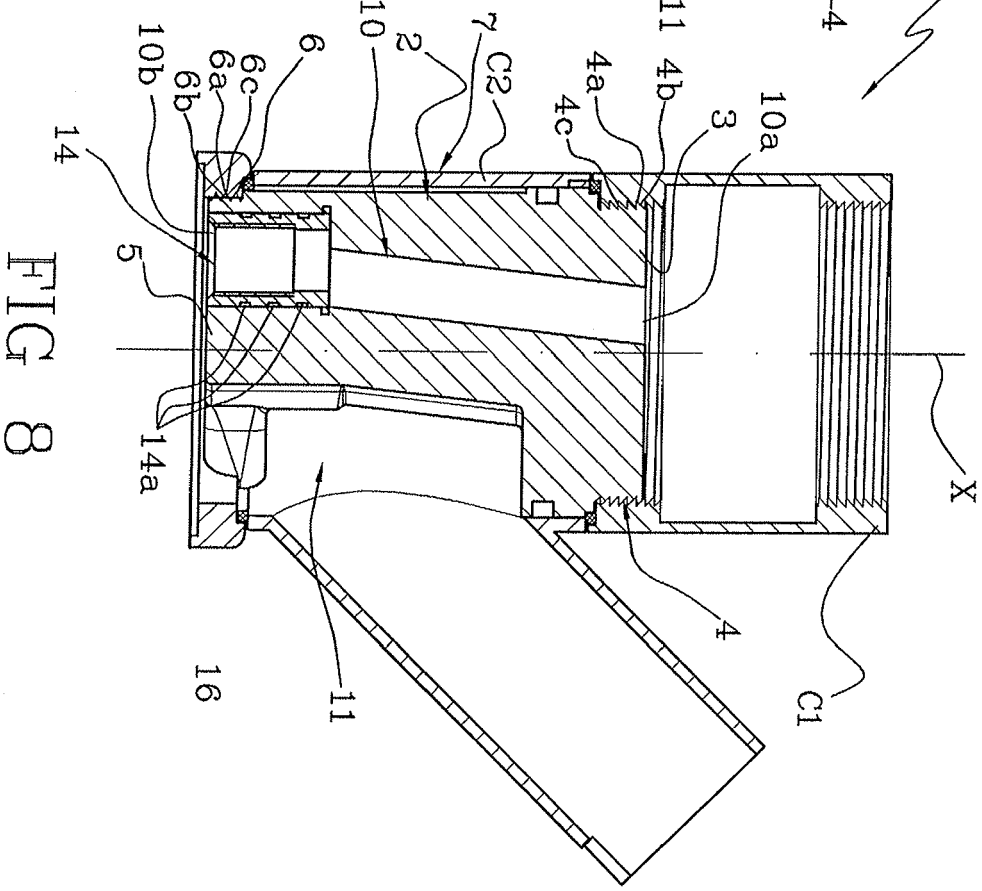

1
2
3
4
4a
4b
4c
5
6
6a
6b
6c
7
10
10a
10b
11
14
14a
16
C1
C2
X

FIG 8

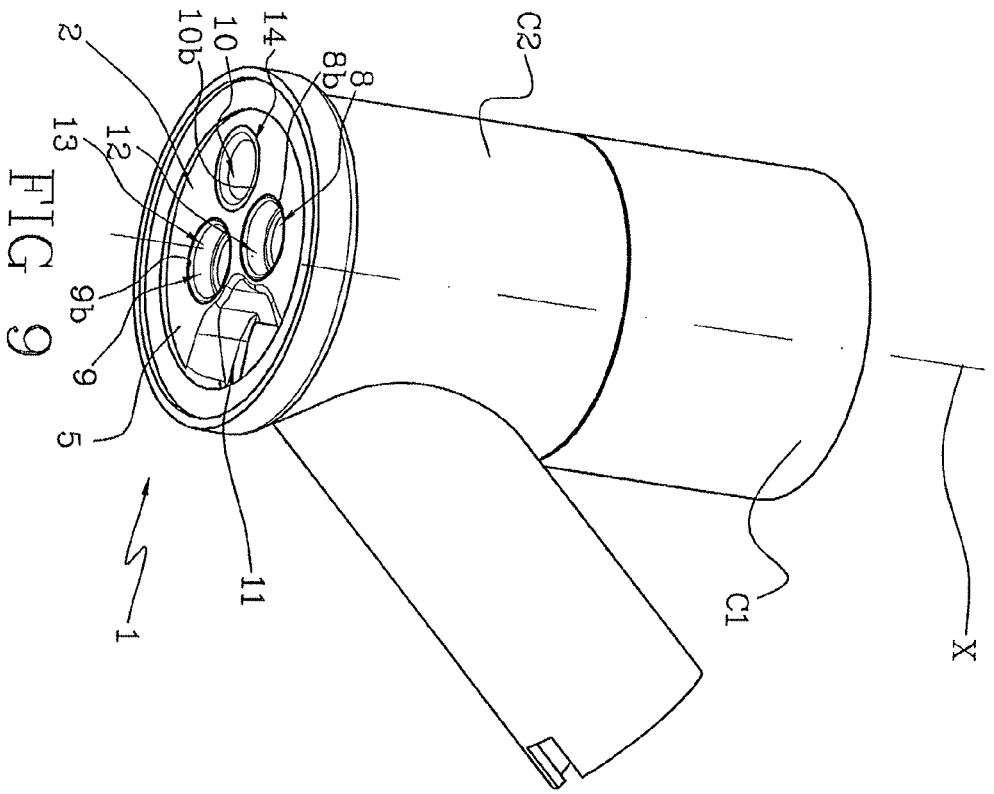


FIG 9

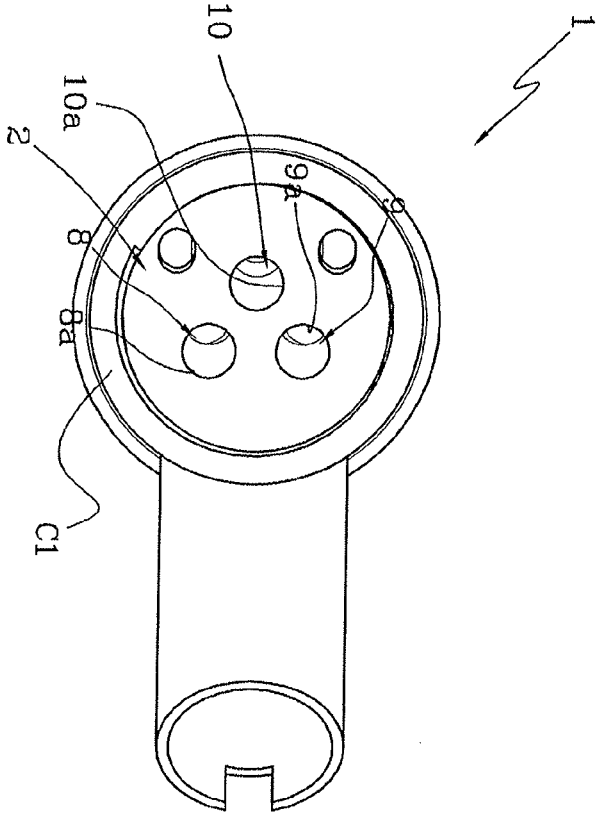


FIG 10

FIG 11

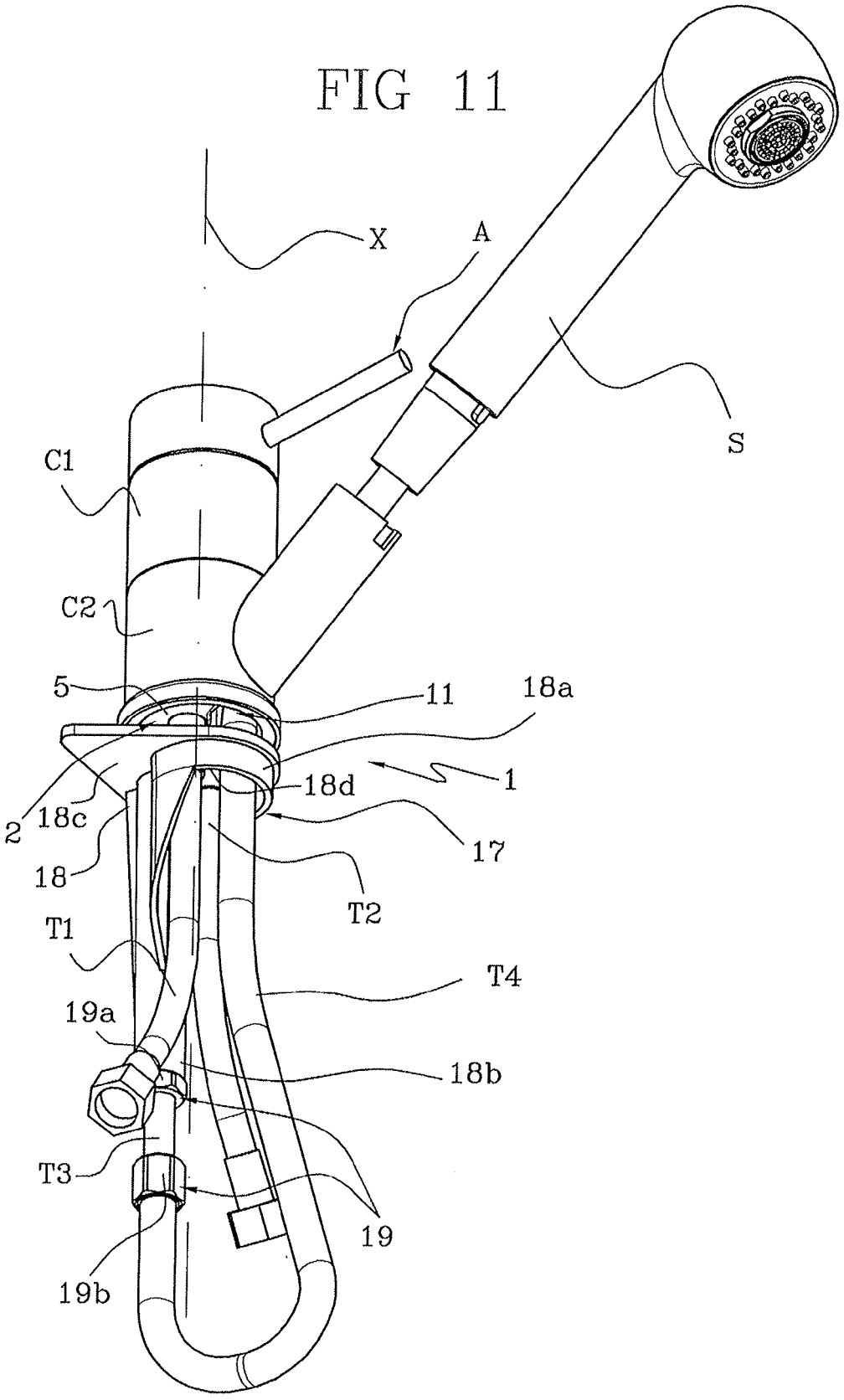
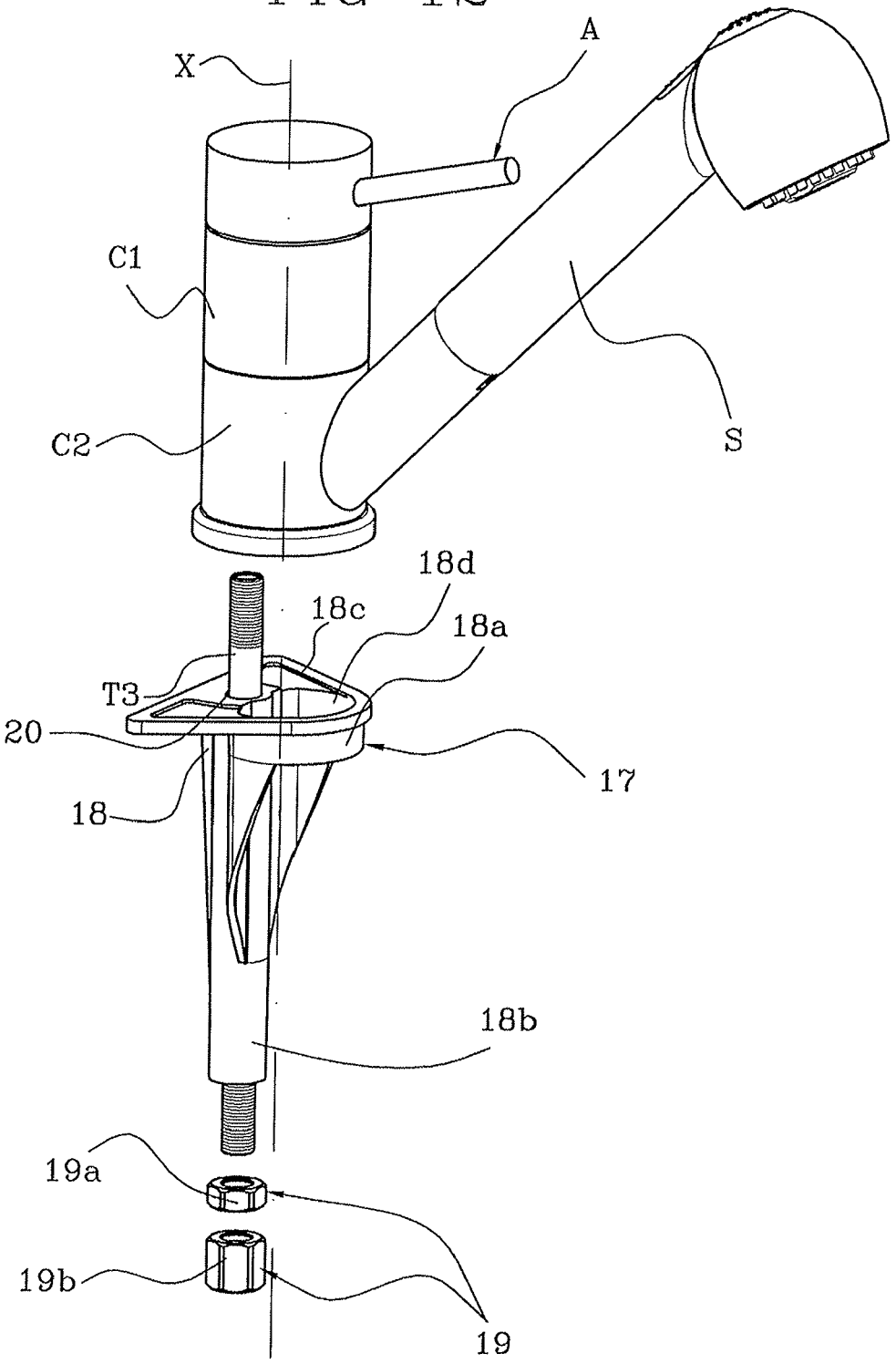


FIG 12



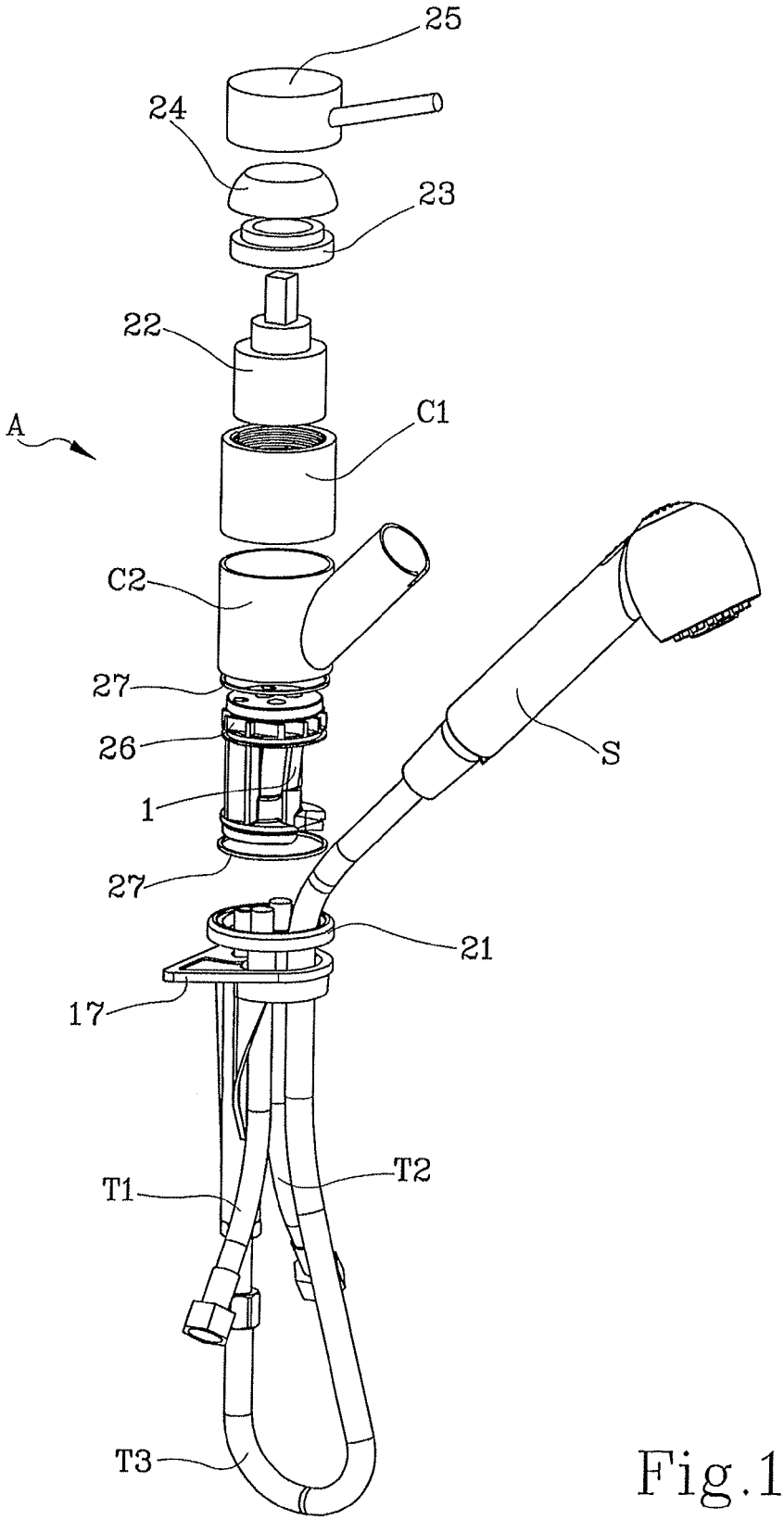


Fig.13

FIG 14

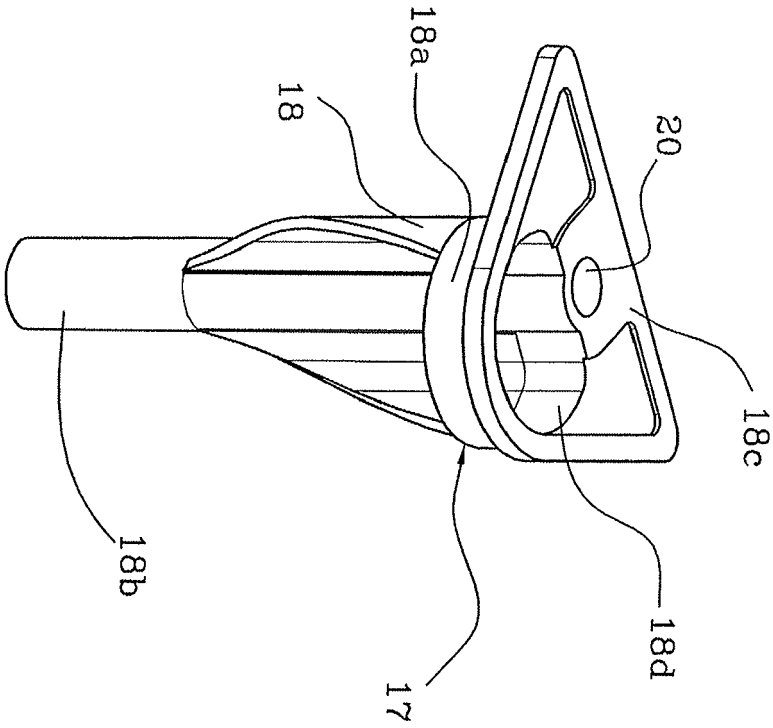
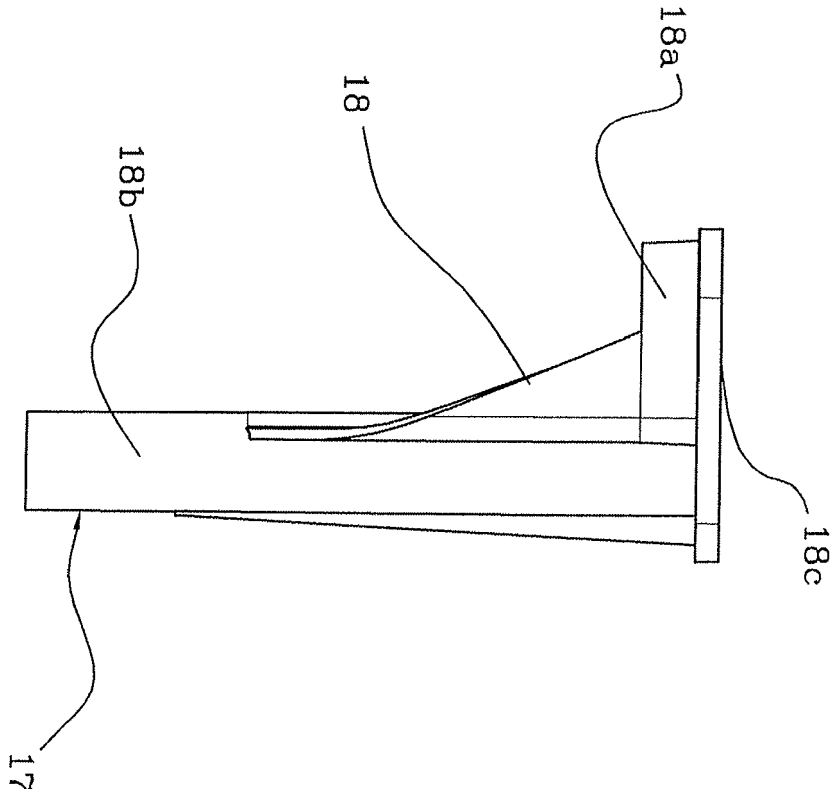


FIG 15



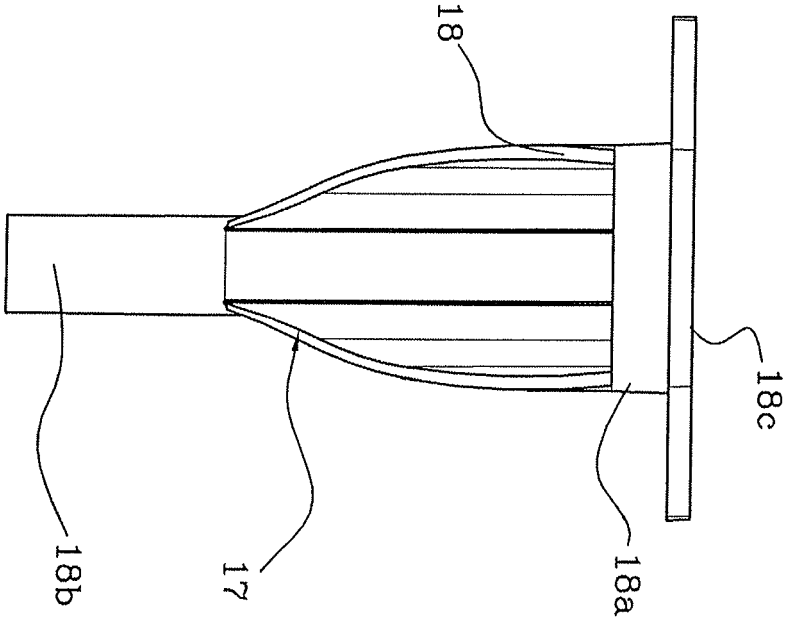


FIG 16

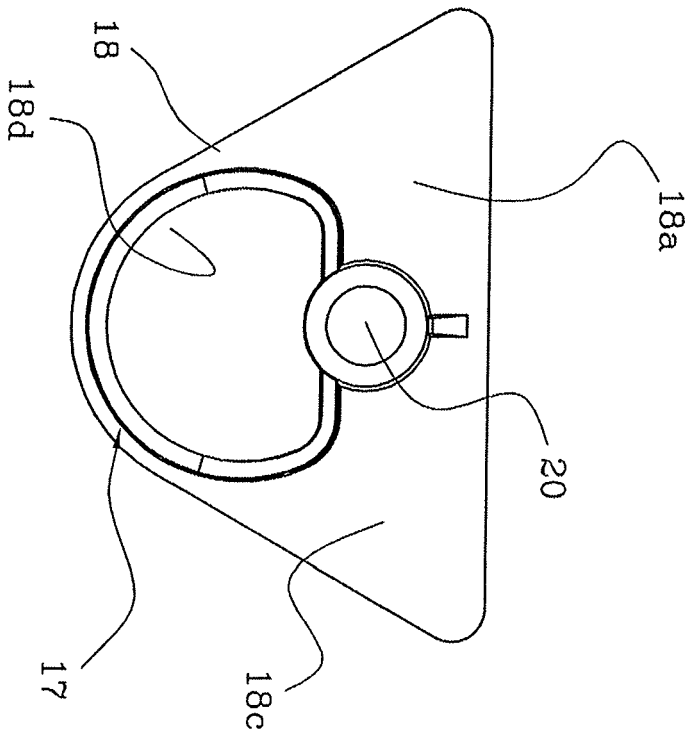


FIG 17