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(71) Applicant: **Uponor Innovation AB**
73061 Virsbo (SE)

(72) Inventors:
• **Väyrynen, Harry**
73744, Fagersta (SE)
• **Persson, Håkan**
73070, Västerfärnebo (SE)

(74) Representative: **Rantanen, Reijo Kalervo**
Kolster Oy Ab
Iso Roobertinkatu 23
P.O. Box 148
00121 Helsinki (FI)

(54) **Sprinkler head box**

(57) A sprinkler head box (1) for assembling a pipe fitting (4) for a sprinkler head of a sprinkler system. The sprinkler head box (1) comprises a housing part (2) and a lid part (3). The housing part (2) and the lid part (3)

comprise mutually compatible fastening means (17, 19) that provide a snap-lock function for fastening the housing part (2) and the lid part (3) together in a watertight manner.

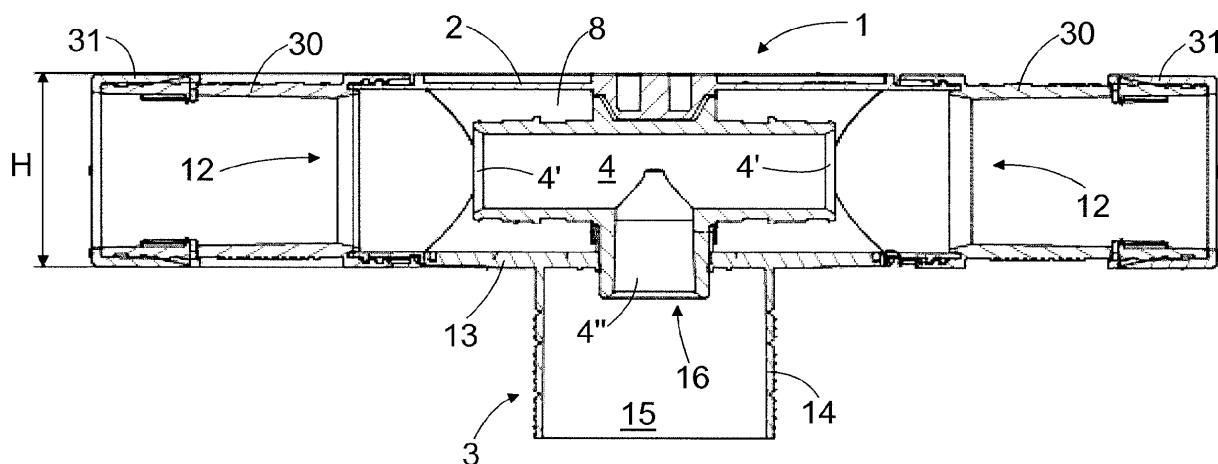


FIG. 1

Description

FIELD OF THE INVENTION

[0001] The invention relates to a sprinkler head box for assembling a pipe fitting for a sprinkler head of a sprinkler system.

BACKGROUND OF THE INVENTION

[0002] Fire safety systems may comprise not only fire detectors but also a sprinkler system to automatically put out fire by sprinkling water in the space where fire has been detected. The sprinkler system comprises among other things sprinkler heads for sprinkling water and water pipes for conveying water from a water source to the sprinkler heads.

[0003] The sprinkler head is connected to the water pipe by pipe fitting, which comprises necessary fittings for the sprinkler head and the water pipes. The sprinkler heads, water pipes and pipe fittings may be placed into the ceiling of the building such that only the outermost part of the sprinkler head remains visible.

[0004] Because the sprinkler system is mainly placed inside the ceiling of the building, thus being mainly invisible, possible leaks due to possible damages in the connections between the pipe fitting and water pipes may cause some leakage damages before being detected.

BRIEF DESCRIPTION OF THE INVENTION

[0005] An object of the present invention is to provide a watertight sprinkler head box for assembling a pipe fitting for a sprinkler head of a sprinkler system.

[0006] The sprinkler head box according to the invention is characterized in that the sprinkler head box comprises a housing part and a lid part and that the housing part and the lid part comprise mutually compatible fastening means that provide a snap-lock function for fastening the housing part and the lid part together in a watertight manner.

[0007] A sprinkler head box for assembling a pipe fitting for a sprinkler head of a sprinkler system comprises a housing part and a lid part and the housing part and the lid part comprise mutually compatible fastening means that provide a snap-lock function for fastening the housing part and the lid part together in a watertight manner.

[0008] With the snap-lock function between the housing part and the lid part the sprinkler head box may easily be provided with a watertight structure in order to prevent any leakage of water out of the sprinkler head box due to possible damages in the connection between the pipe fitting and the water pipes. At the same time the sprinkler head box provides a base for easy mounting of the pipe fitting and the sprinkler head in the ceiling of the building.

[0009] Some preferred embodiments of the sprinkler head box are presented in dependent claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] In the following the invention will be described in greater detail by means of preferred embodiments with reference to the attached drawings, in which

Figure 1 shows a side view of a sprinkler head box in cross-section;

Figure 2 shows a housing part of the sprinkler head box of Figure 1;

Figure 3 shows the housing part of Figure 2 from another angle;

Figure 4 shows a lid part of the sprinkler head box of Figure 1;

Figure 5 shows a side view of the lid part of Figure 4 in cross-section;

Figure 6 shows fastening means provided in the housing part of Figure 2;

Figure 7 shows fastening means provided in the lid part of Figure 4;

Figure 8 shows the fastening means of the housing part and the fastening means of the lid part when fastened to each other;

Figure 9 shows a detail of the sprinkler head box of Figure 2,

Figure 10 shows a mounting piece for a casing pipe of a water pipe of a sprinkler system; and

Figure 11 shows the mounting piece of Figure 10 in cross-section.

DETAILED DESCRIPTION OF THE INVENTION

[0011] Figure 1 shows a side view of a sprinkler head box 1 in cross-section. The sprinkler head box 1 comprises a housing part 2 and a lid part 3. The sprinkler head box 1 is intended to accommodate a pipe fitting 4 for assembling the pipe fitting 4 for a sprinkler head of a sprinkler system. The pipe fitting 4 provides a connection between a sprinkler head (not shown) of a sprinkler system and water pipes (not shown) for conveying water from a water source to the sprinkler heads. The water pipes are connected to fitting ends 4' of the pipe fitting 4 and the sprinkler head is connected to the fitting end 4" of the pipe fitting 4.

[0012] Figure 2 shows a housing part 2 of the sprinkler head box 1 of Figure 1 upside down in respect of the actual position of the housing part 2 when the sprinkler head box 1 has been installed in place. Figure 3 shows the housing part 2 of Figure 2 seen in a position it has when the sprinkler head 1 has been installed in place. The housing part 2 comprises a bottom 5 which is placed towards a ceiling when the sprinkler head box 1 is installed in place. The housing part 2 further comprises one or more flanks 6, one end of the flank(s) 6 being connected with the bottom 5 of the housing part 2 and the other end of the flank(s) 6 providing an opening 7 at the side of the housing part 2 opposite to the bottom 5 of the housing part 2. The bottom 5 of the housing part

2 and the flank(s) 6 of the housing part 2 together provide a space 8 into which the pipe fitting 4 may be placed. The housing part 2 comprises two somewhat flexible first projecting parts 9 having a space 10 between them. One end of the first projecting part 9 is fixed to the bottom 5 of the housing part 2 and the other end of the first projecting part 9 is free and directed towards the opening 7 of the housing part 2. The first projecting parts 9 provide attachment means for the pipe fitting 4 such that the pipe fitting 4 may be placed into the space 10 between the first projecting parts 9 in a releasable manner. When the pipe fitting 4 is installed in place, the pipe fitting 4 is pushed against the first projecting parts 9, whereby the first projecting parts 9 bend away from each other, allowing the pipe fitting 4 to move into the space 10 between the first projecting parts 9, against the bottom 5 of the housing part 2. The first projecting parts 9 are thus flexible for providing a quick clamping for the pipe fitting 4 between the first projecting parts 9. The first projecting parts 9 have, at their ends directed towards the opening 7 of the housing part 2, cams 11 which prevent the pipe fitting 4 from dropping away from the space 10 by accident. The housing part 2 further comprises holes 12, through which the water pipes may be led into connection with the fitting ends 4' of the pipe fitting 4.

[0013] Figure 4 shows a lid part 3 of the sprinkler head box 1 of Figure 1 in a position it has when the sprinkler head box has been installed in place. Figure 5 shows a side view of the lid part 3 of Figure 4 in cross-section. The lid part 3 comprises a substantially planar plate part 13 and a hollow extension part 14, or collar, fixedly attached to the plate part 13 and extending away from the housing part 2 of the sprinkler head box 1, the extension part 14 providing a space 15 into which a sprinkler head (not shown) may be at least partly placed. The lid part 3 further comprises a hole 16, through which the sprinkler head may be connected to the fitting end 4" of the pipe fitting 4.

[0014] The end of the flank(s) 6 providing the opening 7 of the housing part 2 comprises fastening means 17 and an edge 18 of the lid part 3 comprises fastening means 19, the fastening means 17 of the housing part 2 and the fastening means 19 of the lid part 3 being intended to provide together a watertight fastening between the housing part 2 and the lid part 3. The structure of the fastening means 17 in the housing part 2 is shown in more detail in Figure 6, and the structure of the fastening means 19 in the lid part is shown in more detail in Figure 7. The fastening means 17 of the housing part 2 comprise a groove 17' and a protrusion 17" surrounding the opening 7 of the housing part 2, the protrusion 17" being located towards the lid part 3 or away from the bottom 5 of the housing part 2 with respect to the groove 17'. The fastening means 19 of the lid part 3 comprise a groove 19' and a protrusion 19" surrounding the edge 18 of the lid part 3, the protrusion 19" being located with respect to the groove 19', away from the extension part 14 of the lid part 3 or towards the housing part 2 when the lid part

3 is to be fastened to the housing part 2.

[0015] Figure 8 shows a situation where the fastening means 17 of the housing part 2 and the fastening means 19 of the lid part 3 have been fastened to each other. When the lid part 3 is to be installed to the housing part 2, the protrusion 19" of the fastening means 19 of the lid part 3 is placed against the protrusion 17" of the fastening means 17 of the housing part 2. When the lid part 3 is pressed towards the housing part 2, the protrusion 19" of the fastening means 19 of the lid part 3 presses against the protrusion 17" of the fastening means 17 of the housing part 2. When the pressing force is high enough, a somewhat flexible joint between the fastening means 17 and the housing part 2 and a somewhat flexible joint between the fastening means 19 and the lid part 3 and a first oblique surface 19'" located in the protrusion 19" and directed away from the groove 19' and a first oblique surface 17'" located in the protrusion 17" and directed away from the groove 17' cause the fastening means 17 and 19 to bend away from each other, allowing the protrusion 19" of the fastening means 19 of the lid part 3 to slide over the protrusion 17" of the fastening means 17 of the housing part 2 such that the protrusion 19" of the fastening means 19 of the lid part 3 settles in the groove 17' of the fastening means 17 of the housing part 2 and the protrusion 17" of the fastening means 17 of the housing part 2 settles in the groove 19' of the fastening means 19 of the lid part 3, as shown in Figure 8. The fastening means 17 of the housing part 2 form a male part and the fastening means 19 of the lid part 3 form a female part in the fastening between the housing part 2 and the lid part 3.

[0016] In the fastening, the protrusion 19" in the edge 18 of the lid part 3 is thus arranged to be accommodated in the groove 17' in the opening 7 of the housing part 2, and the protrusion 17" in the opening 7 of the housing part 2 is thus arranged to be accommodated in the groove 19' in the edge 18 of the lid part 3, thus providing a snap-lock function or fastening between the housing part 2 and the lid part 3. The housing part 2 and the lid part 3 thus comprise mutually compatible fastening means 17 and 19 that provide a snap-lock function for fastening the housing part 2 and the lid part 3 together.

[0017] The fastening means 17 of the housing part 2 and the fastening means 19 of the lid part 3 thus provide a snap-lock fastening or a snap-locking function for fastening the housing part 2 and the lid part 3 together such that the opening 7 in the housing part 2 may be closed or shut in a watertight manner by the lid part 3. The watertight structure of the sprinkler head box 1 prevents the leakage of water out of the box 1 should a connection between the pipe fitting 4 and the water pipe become damaged for some reason. The collar 20 around the hole 16 in the lid part 3, in turn, prevents the flow of water past the connection between the pipe fitting 4 and the sprinkler head. When the sprinkler system is provided with casing pipes surrounding the water pipes as discussed later, leakage damages due to possible leakages in any part

of the sprinkler system may be prevented by guiding the leakage flows of water outside the sprinkler system, for example to a sewerage, at suitable locations of the sprinkler system.

[0018] The structure of the fastening means 17 of the housing part 2 and the structure of the fastening means 19 of the lid part 3 allow the detachment of the housing part 2 and the lid part 3 without breaking down the structure of the housing part 2 and the lid part 3. The protrusion 17" of the fastening means 17 comprises a second oblique surface 17"" directed towards the groove 17' and the protrusion 19" of the fastening means 19 comprises a second oblique surface 19"" directed towards the groove 19' such that when a force is applied to the lid part 3 for detaching the lid part 3 from the housing part 2, the oblique surfaces 17"" and 19"" allow the protrusion 19" to slide over the protrusion 17" without breaking the fastening means 17 and 19.

[0019] The housing part 2 further comprises two second projecting parts 21 next to the first projecting parts 9 such that the second projecting parts 21 are next to the first projecting parts 9 on the side of the first projecting part 9 facing away from the space 10 such that there is a space 22 between each of the first projecting parts 9 and each of the second projecting parts 21. The second projecting parts 21 form an integral structure with the bottom 5 of the housing part 2 and the flank 6 of the housing part 2 such that the structure of the second projecting parts 21 is substantially rigid. The plate part 13 of the lid part 3, in turn, further comprises two projecting parts 23 extending away from the extension part 14, the projecting parts 23 being located in the lid part 3 and being designed in such a manner that the projecting parts 23 are placed in the spaces 22 between the first 9 and second 21 projecting parts in the housing part 2 when the lid part 3 is fastened to the housing part 2. The projecting parts 23 together with the first 9 and second 21 projecting parts provide means to align the lid part 3 in a proper position and location in respect of the housing part 2 when the lid part 3 is fastened to the housing part 2. For that purpose the projecting parts 23 are preferably substantially rigid. In addition to that, the length of the projecting parts 23 may be designed such that the free end of the projecting parts 23 may settle against the bottom of the space 22 between the first 9 and second 21 projecting parts when the fastening means 17 and 19 are snapped to each other as shown in Figure 8. This prevents excessive force from being directed to the fastening provided by the fastening means 17 and 19, thus preventing the breakage of the fastening means 17 and/or 19.

[0020] The housing part 2 further comprises brackets 24 having a hole 25. The lid part 3, too, further comprises at corresponding locations brackets 26 with a hole 27. When the sprinkler head box 1 is mounted in place, with the lid part 3 already fastened to the housing part 2, a screw, for example, may be inserted through the holes 27 and 25 to provide at the same time the fastening of

the sprinkler head box 1 into the ceiling and to secure the fastening between the housing part 2 and the lid part 3.

[0021] The sprinkler head box 1 according to Figures 1 to 8 has a mainly oval or elliptical shape or appearance but the shape of the sprinkler head box 1 may vary. The size of the sprinkler head box 1 may also vary. Preferably, the size of the sprinkler head box 1 is such that the height H of the sprinkler head box 1 is, except for the extension part 14 of the lid part 3, for example about two inches or 44 to 48 mm, whereby it is very easy to provide even an old building with a sprinkler system by lowering the inner roof only with a studwork of two inches, for example. The height H of the sprinkler head box 1 may be also less than two inches, for example only one inch or 22 to 24 mm, if instead of water gas, for example, is used as a fire extinguishing medium.

[0022] The sprinkler head box 1 according to Figures 1 to 8 is intended for a single pipe fitting 4 and a single sprinkler head, but the sprinkler head box may have a size and/or shape allowing the accommodation of more than one pipe fitting 4 and the sprinkler head.

[0023] In the lid part 3, the outer surface of the extension part 14, or collar 14, comprises corrugation 28, which helps to cut the extension part 14 into a suitable length with respect to the ceiling level. Alternatively, the corrugation 28 may provide an area of adhesion for a cover piece which can be placed on the top of the extension part to prevent the sprinkler head from being visible, but which cover piece will naturally break down when the sprinkler head starts to supply water.

[0024] The sprinkler head box 1 may be made of different materials but preferably it is made of plastic.

[0025] The housing part 2 according to Figure 2 further comprises fittings 29 surrounding the holes 12. Figure 9 shows a detail of fitting 29. The fitting 29 provides an element for mounting a mounting piece 30 for a casing pipe of a water pipe in connection with the sprinkler head box 1. One type of mounting piece is shown in Figures 10 and 11 and in Figure 1, where there are two mounting pieces 30 connected to the sprinkler head box 1 and which further shows caps 31 intended to secure the connection between the mounting piece 30 and casing pipe (not shown) of the water pipe (not shown). The mounting piece 30 and the cap 31 are preferably made of the same material as the sprinkler head box 1.

[0026] The fitting 29 comprises on its outer surface a thread structure 31 and the mounting piece 30 comprises on its inner surface a corresponding thread structure 32, the thread structures 30 and 32 providing easy fitting between the fitting 29 and the mounting piece 30. The thread structures 30 and 32 shown in the figures are of an elongated bayonet structure with a double thread, whereby the mounting piece 30 may easily be fitted to the fitting 29 by revolving the mounting piece 30 only a half revolution with respect to the fitting 29. However, the elongated bayonet structure may be implemented with 1 to 8 threads, i.e., 1/8 to 1 revolution, for providing an easy

fitting between the mounting piece 30 and the fitting 29.

[0027] The fitting 29 further comprises a locking shoulder 33 and the mounting piece 30 comprises a slot 34 so that when the mounting piece 30 is fitted to the fitting 29, the locking shoulder 33 may be placed in the slot 34, thus locking the mounting piece 30 and the fitting 29 together to prevent an unintentional opening of the fitting between the mounting piece 30 and the fitting 29.

[0028] The mounting piece 30 according to Figures 10 and 11 may further comprise one or more lips 35 for providing a better grip when the mounting piece 30 is fitted to the fitting 29. Further, the mounting piece 30 according to Figures 10 and 11 comprises a fitting lip 36 for fitting the casing pipe of the water pipe to the mounting piece 30.

[0029] It is also possible that there are no mounting pieces 30 at all and the casing pipes of the water pipes are attached directly to the fittings 29 of the housing part 2 of the sprinkler head box 1. The outer diameter of the casing pipes may be about 34 mm, for example, if the outer diameter of the water pipes is about 20 — 25 mm, for example.

[0030] It will be obvious to a person skilled in the art that, as the technology advances, the inventive concept can be implemented in various ways. The invention and its embodiments are not limited to the examples described above but may vary within the scope of the claims.

Claims

1. A sprinkler head box (1) for assembling a pipe fitting (4) for a sprinkler head of a sprinkler system, **characterized in that** the sprinkler head box (1) comprises a housing part (2) and a lid part (3) and that the housing part (2) and the lid part (3) comprise mutually compatible fastening means (17, 19) that provide a snap-lock function for fastening the housing part (2) and the lid part (3) together in a watertight manner.
2. A sprinkler head box (1) according to claim 1, **characterized in that** the housing part (2) comprises a groove (17') and a protrusion (17'') surrounding the opening (7) of the housing part (2), the protrusion (17'') of the housing part (2) being located towards the lid part (3) in respect of the groove (17') of the housing part (2) when the lid part (3) is to be fastened to the housing part (2), and that the lid part (3) comprises a groove (19') and a protrusion (19'') surrounding the edge of the lid part (3), the protrusion (19'') of the lid part (3) being located towards the housing part (2) in respect of the groove (19') of the lid part (3) when the lid part (3) is to be fastened to the housing part (2), whereby the protrusion (19'') of the lid part (3) is arranged to be accommodated in the groove (17') of the housing

part (2) and the protrusion (17'') of the housing part (2) is arranged to be accommodated in the groove (19') of the lid part (3) for providing the snap-lock function between the housing part (2) and the lid part (3).

3. A sprinkler head box (1) as claimed in claim 1 or 2, **characterized in that** the housing part (3) comprises at least two first projecting parts (9) having a distance between them for providing a space (10) for accommodating at least one pipe fitting (4).
4. A sprinkler head box (1) as claimed in claim 3, **characterized in that** the first projecting parts (9) are flexible for providing a quick clamping for the pipe fitting (4) between the first projecting parts (9).
5. A sprinkler head box (1) as claimed in claim 3 or 4, **characterized in that** the housing part (2) comprises at least two second projecting parts (21) extending towards the opening (7) of the housing part (2) and being located next to the first projecting parts (9) such that there is a distance between the first projecting parts (9) and the second projecting parts (21) and that the lid part (3) comprises at least two projecting parts (23) extending towards the housing part (2) such that when the lid part (3) is to be fastened to the housing part (2), the projecting parts (23) of the lid part (3) are arranged to be accommodated between the first (9) and second (21) projecting parts of the housing part (2).
6. A sprinkler head box (1) as claimed in any one of the preceding claims, **characterized in that** the lid part (3) comprises a hollow extension part (14) extending away from the housing part (2) and providing a space (15) for accommodating at least partly at least one sprinkler head, which is to be fastened to the pipe fitting (4).
7. A sprinkler head box (1) as claimed in any one of the preceding claims, **characterized in that** the housing part (2) of the sprinkler head box (1) comprises one or more fittings (29) surrounding holes (12), the holes (12) providing a way for water pipes of a sprinkler system to be fastened to the pipe fitting (4).
8. A sprinkler head box (1) as claimed in claim 7, **characterized in that** the outer surface of the fittings (29) comprises an elongated bayonet of 1 to 8 threads or 1/8 to 1 revolution for providing fastening between the sprinkler head box (1) and a casing pipe of a water pipe of a sprinkler system.
9. A sprinkler head box (1) as claimed in claim 7 or 8, **characterized in that** the sprinkler head box (1) further comprises at least two mounting pieces (30) ar-

ranged to be fastened with the fittings (29) in a detachable manner for providing adapters for fastening a casing pipe of the water pipe to the fittings (29) of the housing part (2).

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10. A sprinkler head box (1) as claimed in any one of claims 7 to 9, **characterized in that** the outer surface of the fittings (29) of the housing part (2) comprises a locking shoulder (33), and a mounting piece (30) for a casing pipe of the water pipe comprises a slot (34), whereby the locking shoulder (33) and the slot (34) are arranged to prevent the rotation of the mounting piece (30) with respect to the fitting (29) of the housing part (2) when the locking shoulder (33) is in the slot (34). 10 15
11. A sprinkler head box (1) as claimed in any one of the preceding claims, **characterized in that** the height (H) of the sprinkler head box (1) except for an extension part (14) of the lid part (3) is about 22 to 48 mm. 20
12. A sprinkler head box (1) as claimed in any one of the preceding claims, **characterized in that** the housing part (2), the lid part (3) and the mounting piece (30) are made of plastic. 25

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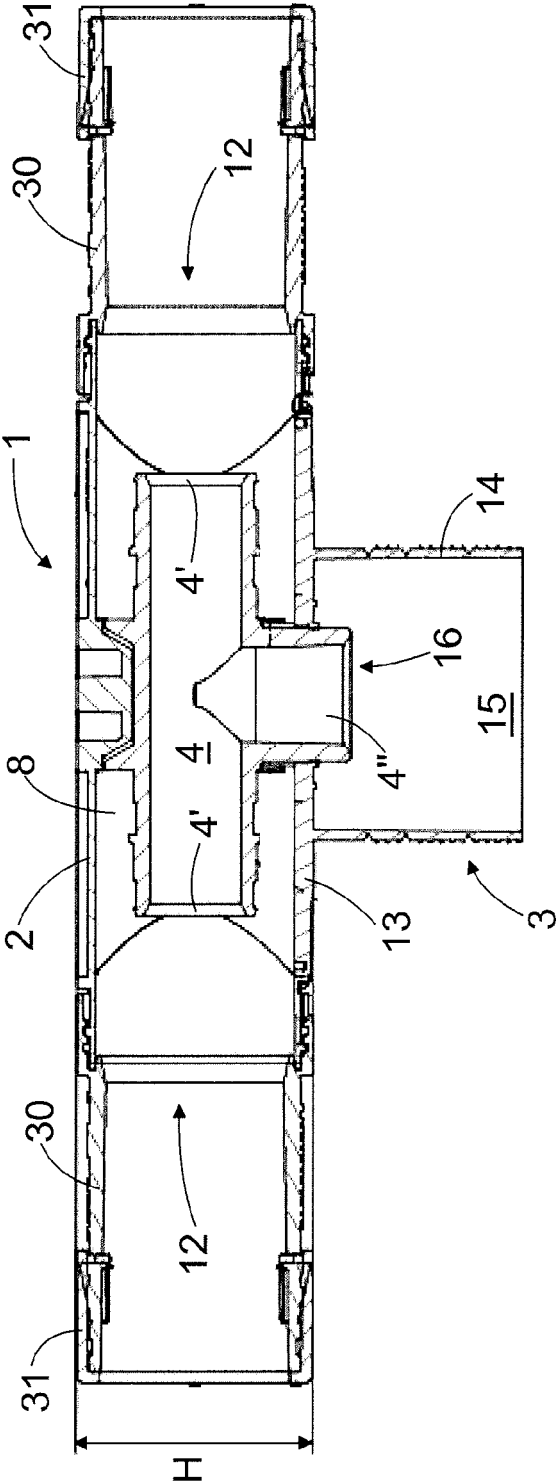


FIG. 1

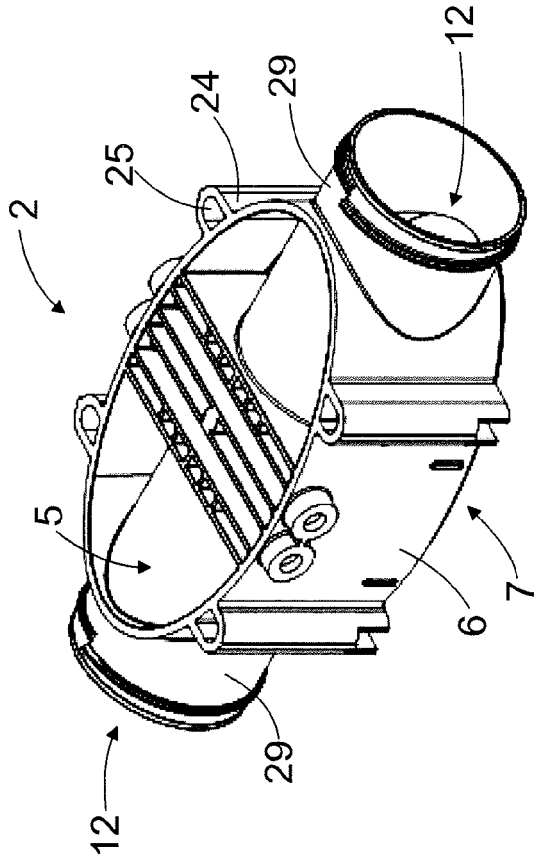
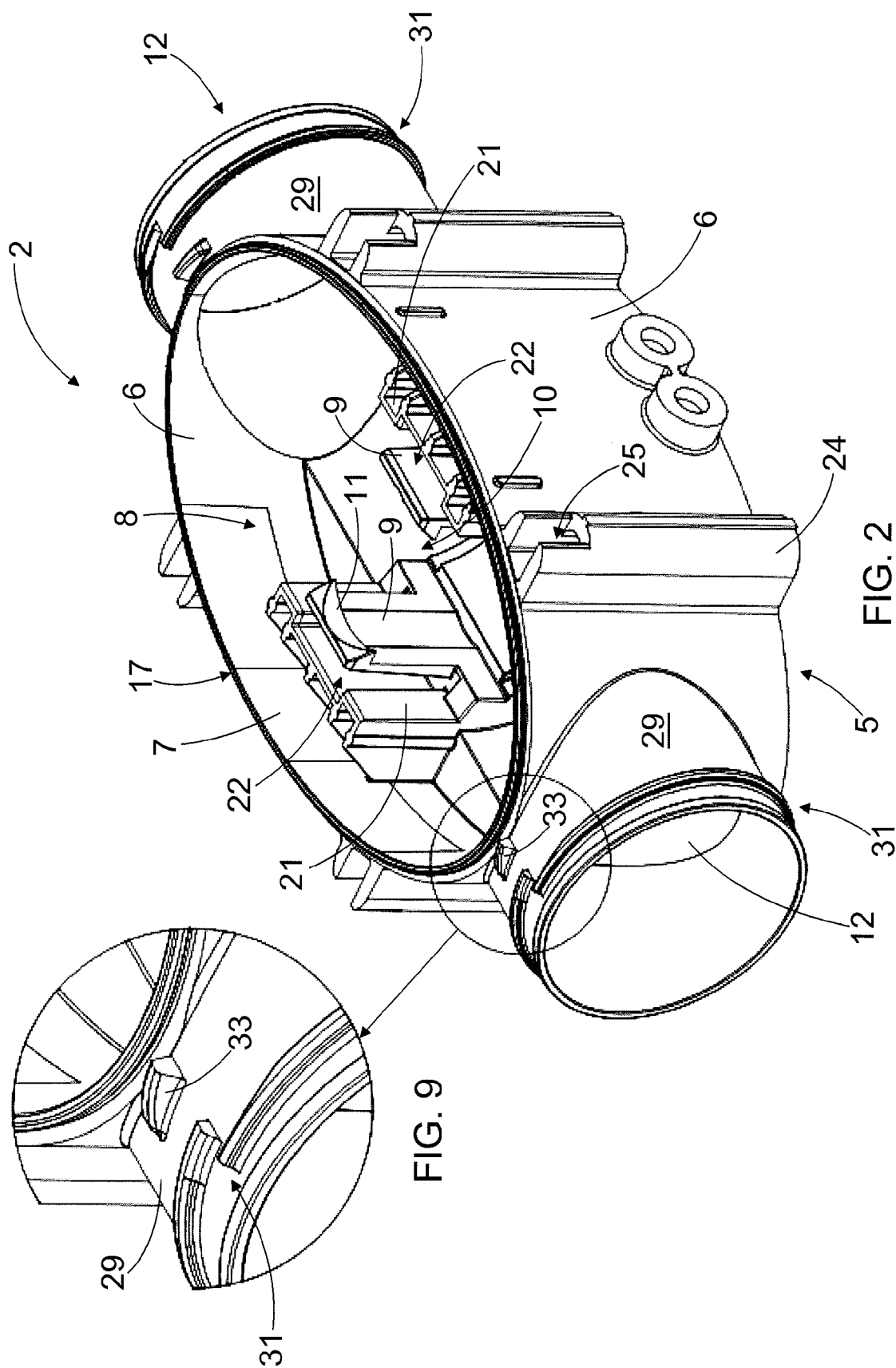


FIG. 3



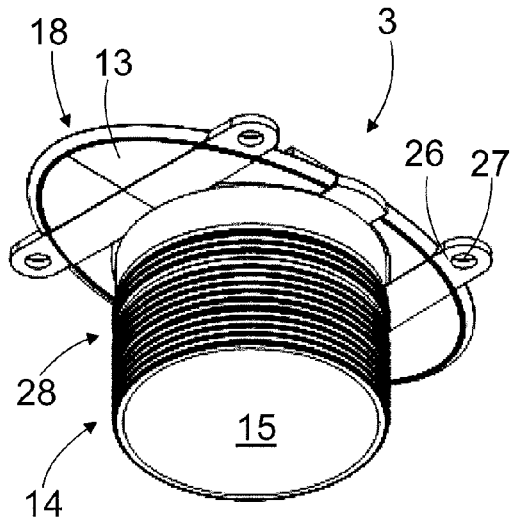


FIG. 4

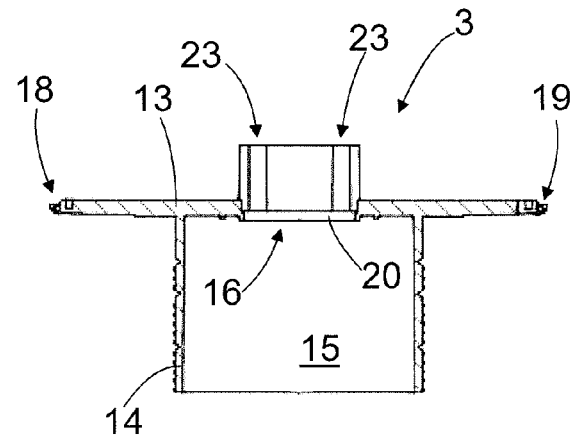


FIG. 5

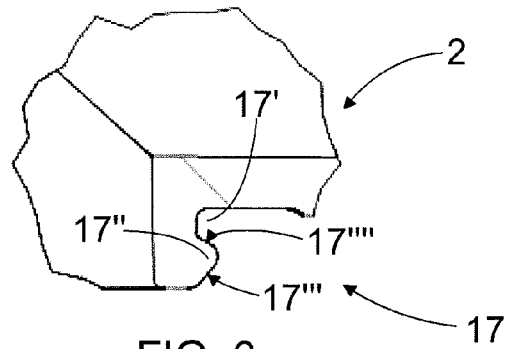


FIG. 6

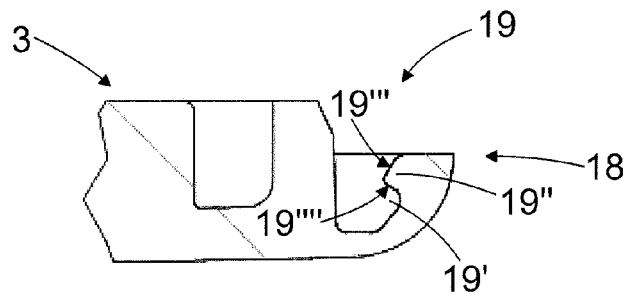


FIG. 7

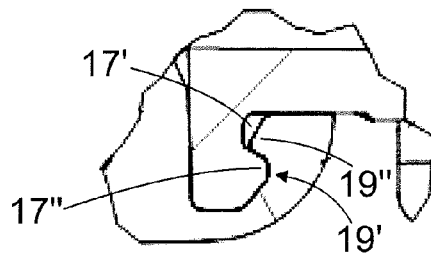
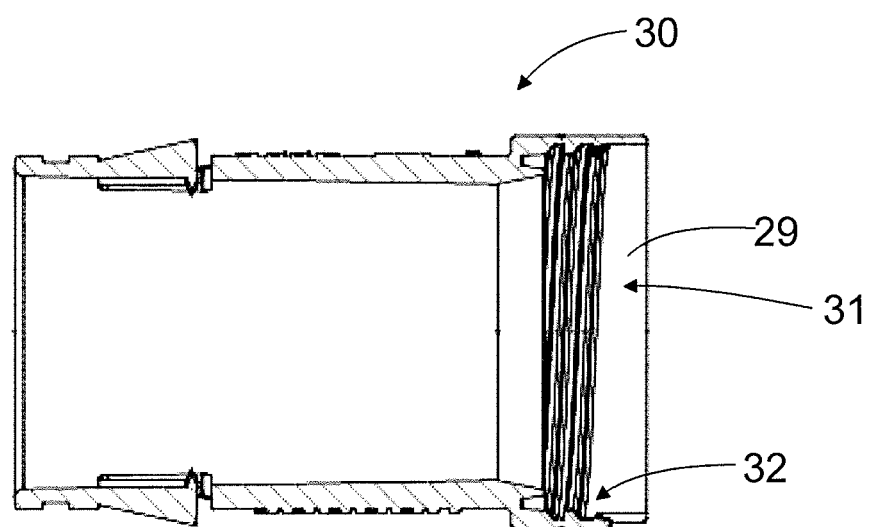
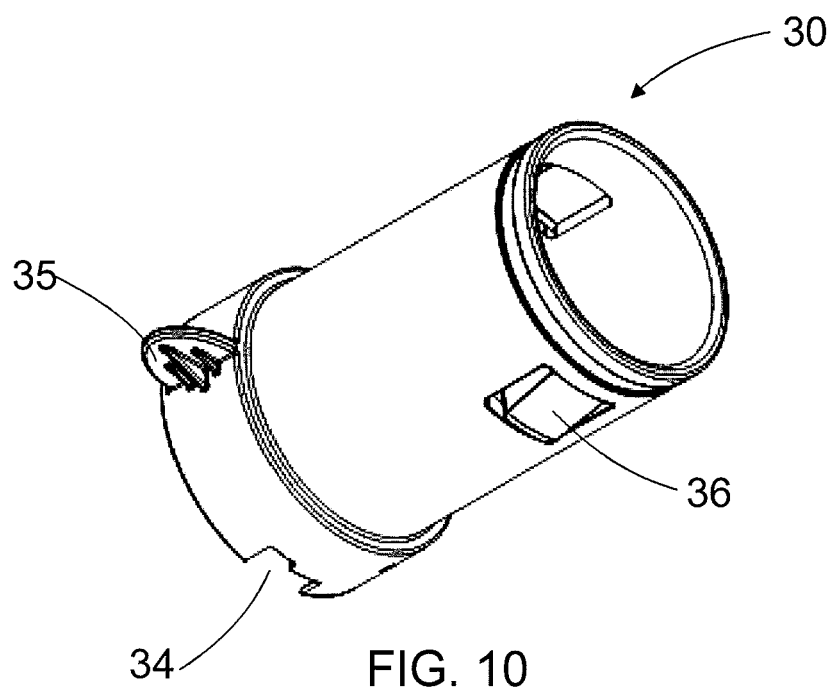


FIG. 8





EUROPEAN SEARCH REPORT

Application Number
EP 10 16 8670

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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			TECHNICAL FIELDS SEARCHED (IPC)
			A62C F16L H02G B05B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 21 December 2010	Examiner Vervenne, Koen
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			

 1
EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 10 16 8670

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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