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Remarks:

Amended claims in accordance with Rule 86 (2) EPC.

(54) **Attachment for flushing and servicing of a sprinkler head**

(57) An attachment (A_1) to a sprinkler head allowing for the flushing of water and debris from the sprinkler head after servicing thereof, without saturating the site of the sprinkler head with the flushed water. The device comprises a body having a first arm (32) directing water

generally upwardly from the sprinkler head, and a second arm (36) for directing water away from the site of the sprinkler head. A third arm (42) is provided for engagement by a user to facilitate connecting and disconnecting of the attachment to the sprinkler head.

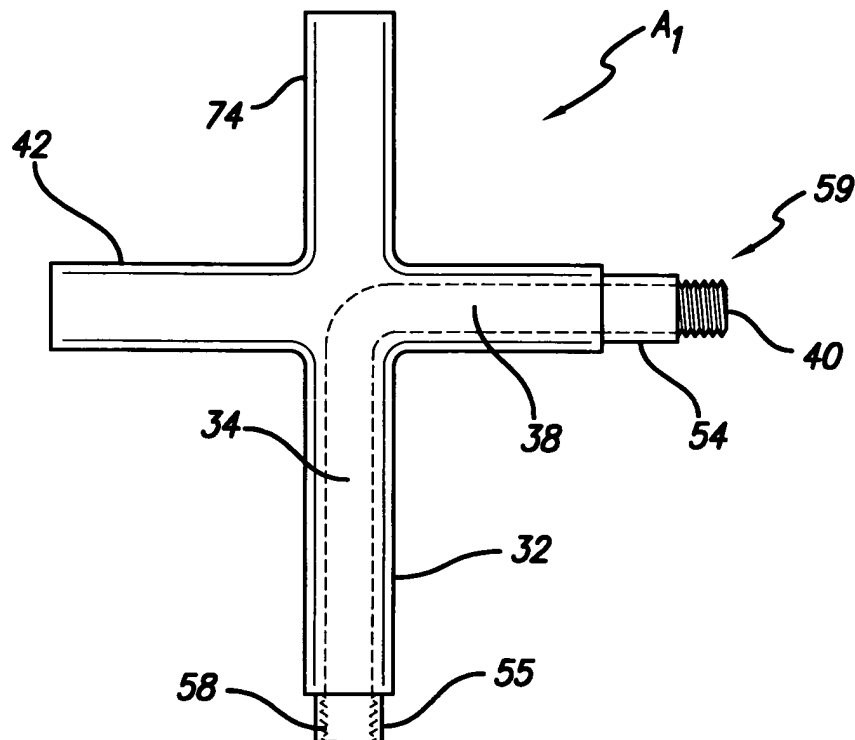


FIG. 1

Description

BACKGROUND OF THE INVENTION

[0001] All lawn sprinkler heads are constructed either of metal or plastics, such as ABS, or like moldable plastics. All spray type sprinkler heads, particularly lawn and garden sprinkler heads, are of the stationary or of the pop-up type. They are made, at least, of a two-piece construction, including a base or body along with an insert or nozzle which is threadedly mounted on the upper end of the base. In this way, the insert can be threadedly removed from the base to facilitate cleaning or adjustment.

[0002] All sprinkler heads will generally comprise at least a body or housing along with an insert or nozzle that allows for distribution of water to a ground surface. For pop-up type sprinkler heads the nozzle is generally threadedly mounted at the upper end of the riser stem which rests within the housing when not in use. On stationary heads, the nozzle is threadedly attached to the sprinkler head body, commonly referred to in the industry as a "shrub body". The terms "body" and "housing" will be used interchangeably herein.

[0003] Sprinkler heads frequently require cleaning and/or adjustment. Oftentimes, debris is carried in the municipal water supply to subterranean pipes and to the sprinkler head. This debris, such as dirt particles and the like may arise from installation of the sprinkler heads, from servicing and repair of the sprinkler system at an upstream location or enters the orifice of the nozzle from the surrounding soil or turf.

[0004] When cleaning a stationary sprinkler head, and in order to enable a flushing operation to occur, the service personnel will remove the insert, flush water under pressure through the body of the sprinkler head, as previously described, and adjust or replace the insert as may be required.

[0005] In the case of pop-up sprinkler heads, the pop-up riser stem forming part of that head can, with various degrees of difficulty, be manually grasped and pulled up to an extended position in order to remove the nozzle. In this way, the water under pressure is flushed through the pop-up riser, thereby clearing any debris. Once the water is turned off, the pop-up riser will be spring-biased to return to a position hidden within the sprinkler head housing.

[0006] Essentially all lawn and garden sprinkler heads are devoid of any control valve at the sprinkler head that allows for turning off water flow at that particular sprinkler head. However and more specifically, when an individual control valve is not provided at a sprinkler head, the turning on of water with a full force usually creates a substantial water stream.

BRIEF SUMMARY OF THE INVENTION

[0007] An attachment for a water sprinkler head which

may be of a stationary type or a pop-up type and which carries either a male or female nozzle. The attachment may be described in its simplest form as an elbow which is adapted for attachment to an upper end of the body of the sprinkler head, after the insert or nozzle therefor has been removed. The arrangement then allows for water from a subterranean water supply line to be delivered to the sprinkler head body under pressure, allowing for the water to flush debris from the body of the sprinkler head, and any debris which may be contained in the line, outwardly from the upper end of the sprinkler head body. The elbow thereby provides for directional flow of the water away from the site of the sprinkler head.

[0008] An attachment for a spray-type water sprinkler head which may have a portion at the same level and the above the ground level, to allow for flushing of the sprinkler head without saturating the immediate area around the sprinkler head. This attachment comprises a body having a first arm with a duct for directing water and any debris generally upwardly. A second arm has a duct extending therethrough which is arranged with respect to the first arm to allow for redirection of the water and any debris carried to a location away from the sprinkler head. Finally, the attachment comprises a third arm engaged by a user to facilitate a connection and disconnection of the sprinkler head.

[0009] In broad terms the method of the invention may be described as a method for directing water from a sprinkler in a spray-type sprinkler and an impact sprinkler system along with any debris collected in that system to be flushed from the sprinkler head and away from the site of that sprinkler head. This improved method comprises directing the flushing water through the sprinkler head after connecting the attachment to the body or to a riser of the sprinkler head. This water is then directed upwardly initially and thereafter directed through an angularly arranged pipe in the attachment to a position away from the sprinkler head.

[0010] In actual modes of construction, the attachment comprises a body having a first arm with a duct extending therethrough to direct water and the debris carried in that water stream in a generally upward direction, to allow for any flushing of the sprinkler head. A second arm, also having a duct extending therethrough, is connected to the first arm to allow for redirection of the water, and also any debris carried therewith, away from the site of the sprinkler head. This attachment may also include an outwardly extending third arm which can be manually engaged by a user of the attachment to facilitate connection and disconnection of the attachment to the nozzleless sprinkler head. In this way, manual dexterity is made easier providing quick and convenient attachment to and from a nozzleless sprinkler head.

[0011] In a more preferred embodiment, the device of the invention is provided with four arms, so that they are essentially located in the shape of a cross. In this way, connection to and removal from the sprinkler head body is further facilitated.

[0012] The ends of certain of the arms carrying the flushing water therethrough also may be externally threaded to allow for an extension pipe to be connected thereto. In this way, the size of the attachment can be extended and the extension thereof can easily be removed. The ends of any of the arms could be constructed so that a garden hose may also be connected thereto.

[0013] A small control valve of the type described in my co-pending U.S. Patent No. 6/568,608 B2, dated May 27, 2003, may be installed into one of the arms through which water is flushed. In this way, a method to conserve water is available and water spillage can be reduced.

[0014] The attachment of the invention also is effective at providing quick retrieval of the pop-up riser stem after the nozzle has been removed. Normally to remove the nozzle the water must be turned off. With no water pressure pushing upwards on the riser stem, the stem is spring-biased to stay depressed within the housing.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] Having thus described the invention in general terms, reference will now be made to the accompanying drawings in which:

Figure 1 is a side elevational view of an attachment for use with a sprinkler head for flushing water away from the site of a sprinkler head;

Figure 2A is an exploded side elevational view showing the attachment for connection to a sprinkler head;

Figure 2B is a partial schematic side elevational view showing the attachment of the present invention connected to a sprinkler head, and showing the directing of water away from the site of the sprinkler head;

Figure 3 is a side elevational view of a sprinkler head mounted in a position within the ground, and showing the insert thereof partially removed;

Figure 4 is an exploded side elevational view, partially in section, and showing the attachment of the invention in relation to the upper end of a sprinkler head body;

Figure 5 is an exploded plan view showing an attachment of the invention in spaced relation to the upper end of a pop-up sprinkler riser stem forming part of a pop-up sprinkler head;

Figure 6 is a plan view showing an attachment of the invention connected to a pop-up sprinkler head of Figure 5, with the pop-up shaft thereof extended;

Figure 7 is an exploded plan view showing a modified form of attachment in the shape of a cross having four arms, with a threaded fitting to be connected thereto and which fitting is then connected to an extension pipe;

Figure 8 is a plan view, similar to Figure 7, and showing a modified form of a four-armed attachment adapted for a hose to be connected thereto;

Figure 9 is a plan view of another modified form of a four-armed attachment which is similar to Figure

7 but using PVC slip couplings thereon for connection to an extension pipe;

Figure 10 is a side elevational view of a further modified form of attachment primarily adapted for use with pop-up sprinkler heads; and

Figure 11 is a side elevational view of still a further modified form of attachment for use with the present invention with auxiliary items incorporated into the arms.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0016] Referring now in more detail and by reference characters to the drawings, which illustrate several preferred embodiments of the present invention, A₁ through A₆ designates various embodiments of attachments for diverting flushing water, and any debris carried therewith, from a sprinkler head SS, for stationary heads, and PS for pop-up sprinklers.

[0017] In a more preferred embodiment of the invention, and by reference to Figures 2A and 2B, the sprinkler head SS with which the attachment A₁ is used, is generally of a conventional construction, and comprises a body 20 having a lower end 22 connected to a vertically arranged supply line 24, and which receives water under pressure from a water delivery line 26. In accordance with the above-identified construction, it can be observed that the sprinkler head body 20 would be located above the ground surface 53 if the sprinkler were of the shrub head type. The body carries an upper member 21 which is referred to as the nozzle.

[0018] In another type of sprinkler head, there is a housing generally at the ground level as shown in Fig. 5. Moreover, the sprinkler head PS includes a pop-up mechanism within the housing that operates in conjunction with a spring (not shown) biased pop-up stem 60, and the latter of which allows for connection of a spray-emitting nozzle (not shown) at its upper end 66. This type of sprinkler is typically referred to as a "pop-up" sprinkler head. As indicated previously, the housing of the sprinkler head may be referred to as a body or a housing regardless of the type of sprinkler head in which employed.

[0019] The attachments A₁ to A₄ of the present invention, are preferred embodiments and are in the shape of a cross. In accordance with Figures 1 and 2B, it can be observed that when the attachment A₁ is connected to the upper end of the sprinkler head body 20, water will pass through the ducts 34 and 38 of the attachment and out of the open end 40 of the arm 36. In this way, water stream 46 will be directed away from the site of the sprinkler head SS itself.

[0020] Essentially all sprinkler head bodies 20 are provided at their upper end with a threaded section for attachment of the nozzle 21 as shown in Fig. 2A in conjunction with Fig. 3. The threaded section may be an internally threaded section, such as a female threaded sec-

tion, or otherwise, it may be externally threaded, such as a male threaded section 50 as shown in Figure 3. In this case and for explanation purposes only, by reference to Fig. 3, the sprinkler head body 20 is provided at its upper end with an externally threaded section or so-called male threaded section 50, adapted for engagement with an internally threaded section 52 of a nozzle 21. Thus, when the nozzle 21 is removed and the attachment A₁ is to be connected to the sprinkler head body 20, arm 32 of the attachment A₁ is provided with an internally threaded section 58, for engagement with the externally threaded section 50 of the sprinkler head body, as shown in Figure 4.

[0021] Figures 5 and 6 illustrate the invention as being effective for holding a pop-up riser stem 60, of a pop-up sprinkler head PS, in an extended position or allowing for easy retrievability. In this case, a pop-up riser stem 60 is shown as being extended upwardly and outwardly of the housing 62 of the sprinkler head PS against the action of a tension spring (not shown) in the body. Moreover, it is threadedly connected to the lower end 70 of the attachment A₁, in accordance with the present invention. In this case, a pop-up riser stem 60 has an externally threaded section 66, mating with an internally threaded section 58 on the attachment.

[0022] For the attachment to be of use with pop-up sprinkler heads, the ends 54 and 55 of arms 32 and 36 (Figures 1 and 4) must be of the same approximate diameter as the pop-up riser stem 60 (Figure 5) in order to pass through the hole in the pop-up sprinkler head cap 64 (Figure 6) through which the pop-up riser stem 60 extends. As shown in Figs. 5 and 6, the attachment can be connected to the top of the riser stem after removal of the nozzle. This is applicable even when the stem has retreated back into the pop-up housing, because of the action of the spring bias when the service personnel releases the extended riser stem.

[0023] At the lower end 70 of the attachment A₁, the threads 58 can engage the threads 66 at the upper end 71 of the pop-up riser stem 60, as shown in Figure 5. In this way, the pop-up riser stem 60 can be held in an extended position or can easily be retrieved if it is allowed to drop back into the housing 62. The end of the pop-up riser stem 60 would extend sufficiently inwardly into the duct 34 of the attachment A₁, so that the pop-up riser stem 60 and the attachment A₁ would be threaded together. In this way, the duct 45 of the pop-up riser stem 60 and the duct 34 of the attachment A₁ would be conjoined and in fluid communication with each other, as shown in Figure 6. This would allow for effective cleaning or servicing of the sprinkler head.

[0024] Figure 7 illustrates another embodiment of the attachment that is also in the shape of a cross. In this respect, the attachment A₂ is similar to the attachment A₁ of Figure 1, and includes the arms 32, 36, 42 and 74. In addition, this embodiment of the attachment includes the providing of the arms 32 and 36 with externally threaded sections 80, generally in accordance with national IPT

standards.

[0025] In this way, a fitting 76, such as a standard coupling with 3/4" IPT internal threads 78 can be connected to the external threads 80 allowing for additional extension piping 82 to be joined to the arms 32 or 36 for remote discharge of the water being flushed through duct 34.

[0026] Figure 8 illustrates another embodiment of the invention, attachment A₃, which is provided with an individual duct 86 in each arm, and all of which are in communication with one another. Moreover, each of the arms, such as, for example, the arms 32, 36, 42 and 74, are provided with an internal duct, such that all ducts meet at the center. Moreover, in order to close off either or both of the open ends 90, the attachment may be provided with one or more commonly available caps 94. These caps may have internally threaded sections 96, for attachment to an externally threaded section 98, on one or both of the arms 42 and 74, as shown therein.

[0027] The embodiment of the invention, as shown in Figure 8, is also highly effective, in that it has an externally threaded hub 102, for attachment to a hose coupling 106 on a hose 108. In this way, water can be directed to a site which may be fairly distant from the site of the sprinkler head. The threaded section 102 would be of a different configuration than the threaded sections for receiving pipe fittings or the like, i.e. 80 and 98.

[0028] Figure 9 illustrates an embodiment of the invention in which there is a four-armed attachment A₄, similar to those shown in Figures 7 and 8, which can connect to a PVC slip coupling 112, on any one or more of the arms. In this way, a slip coupling may be located on an arm 114 for receiving a pipe 116. The same holds true of all the other arms, i.e. arm 118, located in perpendicular arrangement thereto.

[0029] Figure 10 illustrates still a further embodiment of an attachment, A₅, generally for use with a pop-up sprinkler head. In accordance with the embodiment of the invention as shown in Figure 10, there is provided a straight pipe section 120, having an internal duct 122 extending therethrough. In this embodiment, one end of the pipe is provided with an internally threaded section 124, and the opposite end is provided with an externally threaded section 126.

[0030] In accordance with the construction of the embodiment as shown in Figure 10, it can be observed that one end, such as, for example, the internally threaded section 124, can be threadedly attached to an externally threaded sprinkler head body 20 (Figure 3) or pop-up riser stem 60 (Figure 5). In like manner, the opposite end, which is provided with an externally threaded section 126, can be attached to the internally threaded section of a sprinkler head or of a pop-up riser stem forming part of the sprinkler head. Upon connecting the attachment A₅, it extends above the surrounding soil level making the pop-up riser stem easily retrievable.

[0031] The attachment A₅ can be constructed at both ends 129 with either exterior male pipe threads or accommodate PVC slip fittings. In this way, the end 124 or

126 which is not connected to the pop-up riser stem 60, can provide for attachment of another fitting or a hose, or the like. In this way, the attachment of Figure 10, although quite simple, is still quite versatile.

[0032] Figure 11 illustrates still a further and preferred embodiment of the invention, A₅, which includes a somewhat similar arm arrangement as illustrated in Figure 7. In this case, there is an internally threaded section 58 on an arm 32 for attachment to an externally threaded stationary sprinkler head body 20 or pop-up riser stem 60. The arm 32 is similar to the previously described arm 32, but is of longer length, as hereinafter described.

[0033] The arm 36 similarly includes an externally threaded section 59, for connection to an internally threaded sprinkler head body 20 or pop-up riser stem 60. The arm 36 preferably is of the same length as the previously described arm 36. Further, an end 149 of the arm 42 is sized to receive a permanently fixed plug 154 with a hole 155 therein allowing for storage within an internal cavity 157 of a tool, such as an Allen wrench in which the longest part thereof is inserted through the hole and holstered therein when not in use. In this embodiment, the tool, not shown, could be removed from its storage cavity within the arm 42 and used to control a valve 160 located in one of the arms, such as the arm 32. For this reason, the arm 32 has a length greater than the others of the arms, although for balancing purposes, it may be preferable to increase the length of parallel arm 74 to equal that of arm 32.

[0034] The valve 160 is a relatively small valve designed to control the flow of fluid through the attachment in order to control the water being flushed during cleaning or servicing of a sprinkler head. The valve 160 is patterned after and operates similar to this applicant's U.S. Patent No. 6,568,608.

[0035] In the embodiment as shown in Figure 11, there is also provided a tool head 158 at the end of arm 74 having a tool that could be used with sprinkler systems or any other type of system. The preferred type of tool would be a small screwdriver sized to operate the small flow-adjusting screw found in the top portion of the nozzles manufactured by virtually every producer of plastic sprinkler heads worldwide. It would be preferable that the tool head 158 be permanently affixed to the end of arm 74 in a similar manner as the plug 154 at arm 42.

Claims

1. An attachment to a spray-type water sprinkler head which has a portion which is generally at the same level as or above a ground surface for allowing of flushing of the sprinkler head without saturating the immediate area around the sprinkler head, said attachment comprising:

a) a body having a first arm with a duct extending therethrough to direct water and any debris in a

generally upward direction to thereby allow any flushing of the head;

b) a second arm having a duct extending there-through and angularly arranged to said first arm to allow for redirection of the water and any debris carried therewith to a location away from the site of the sprinkler head; and

c) an outwardly extending third arm which can be engaged by a user of the attachment to facilitate connection and disconnection of the attachment to the sprinkler head.

2. The attachment for a sprinkler head of Claim 1 further **characterized in that** said second arm directs water and any debris carried therewith in a direction of approximately 90° with respect to the duct in said first arm.
3. The attachment for a sprinkler head of Claim 1 further **characterized in that** said third arm is integral with said first and second arms and extends in a direction generally parallel to one of said first and second arms and generally perpendicular to the other said first and second arms, and that a fourth arm is also connected to said first, second and third arms also in a direction parallel to one of said first and second arms and generally perpendicular to the other of said first and second arms.
4. An attachment of Claim 3 for connection and disconnection to a water sprinkler head to allow flushing of the head, said attachment comprising threaded connection means on certain of said arms for direct connection to a threaded section of an upper end of said sprinkler head.
5. A method for directing water from a sprinkler head in a spray-type non-rotor and non-impact sprinkler system along with any debris therein being flushed through the sprinkler head and away from the site of the sprinkler head, an improvement in said method comprising:
 - a) directing flushing water under pressure through a sprinkler head body;
 - b) connecting an attachment to the sprinkler head body or a riser therefor;
 - c) directing the water flushing from the sprinkler head body through an upwardly arranged pipe on said attachment; and
 - d) thereafter directing the flushing water through an angularly arranged pipe on said attachment to thereby direct the water away from the site of the sprinkler head.
6. The method for directing water from a sprinkler head body of Claim 5 further **characterized in that** said method comprises directing the flushing water away

from the site of the sprinkler head at an angle of about 90° with respect to the vertically arranged pipe.

7. The method for directing water from a sprinkler head body of Claim 5 further **characterized in that** said method comprises first removing an insert in the sprinkler head and thereafter attaching to said sprinkler head body a device comprising the upwardly arranged pipe and the angularly arranged pipe.
8. The attachment of Claim 1 wherein the attachment functions as part of an arrangement for holding a pop-up stem of a pop-up spray-type riser stem head in a partially extended position, said arrangement comprising:
 - a) an inner duct in one of said arms being arranged for removable attachment to an upper end of said pop-up riser stem in said sprinkler head so that the arm is generally vertically arranged and the lower end of said duct is sized to engage an upper end of said sprinkler head when attached to the pop-up riser stem;
 - b) said attachment further comprising first threaded connection means at said arm for mating threaded connection to the upper end of said pop-up riser stem of said sprinkler head such that the arm is generally vertically arranged and second threaded connection means at said duct and also allowing for attachment to a different type of threaded connection on another type of pop-up stem.

Amended claims in accordance with Rule 86(2) EPC.

1. An attachment (A) to a water sprinkler head (20, 21) having a portion (24) which is generally at the same level as or above a ground surface (53) and which allows for flushing of the sprinkler head without saturating the immediate area around the sprinkler head, said attachment having a body having a first arm (32) with a duct (34) extending therethrough to direct water and any debris to thereby cause flushing of the head, comprising:
 - a) said first arm (32) causing water to be directed in generally upward direction;
 - b) a second arm (38) having a duct extending therethrough and angularly arranged to said first arm to allow for redirection of the water and any debris carried therewith to a location away from the site of the sprinkler head; and
 - c) an outwardly extending third arm (42, 74) which can be engaged by a user of the attachment to facilitate connection and disconnection of the attachment to the sprinkler head.

2. The attachment for a sprinkler head of claim 1 further **characterized in that** said second arm (38) directs water and any debris carried therewith in a direction of approximately 90° with respect to the duct in said first arm (32).

3. The attachment for a sprinkler head of claim 1 further **characterized in that** said third arm (42, 74) is integral with said first and second arms and extends in a direction generally parallel to one of said first and second arms and generally perpendicular to the other said first and second arms, and that a fourth arm (42, 74) is also connected to said first, second and third arms also in a direction parallel to one of said first and second arms and generally perpendicular to the other of said first and second arms.

4. The attachment of claim 3 for connection and disconnection to a water sprinkler head to allow flushing of the head, said attachment comprising threaded connection means (58) on certain of said arms for direct connection to a threaded section of an upper end (21) of said sprinkler head.

5. A method for directing water from a sprinkler head (20, 21) in a spray-type non-rotor and non-impact sprinkler system along with any debris therein being flushed through the sprinkler head and away from the site of the sprinkler head, an improvement in said method comprising:

- a) directing flushing water under pressure through a sprinkler head body (20, 21);
- b) connecting an attachment (A) to the sprinkler head body or a riser therefore;
- c) directing the water flushing from the sprinkler head body through an upwardly arranged pipe (32) on said attachment; and
- d) thereafter directing the flushing water through an angularly arranged pipe (38) on said attachment to thereby direct the water away from the site of the sprinkler head.

6. The method for directing water from a sprinkler head body of claim 5 further **characterized by** directing the flushing water away from the site of the sprinkler head at an angle of about 90° with respect to the vertically arranged pipe.

7. The method for directing water from a sprinkler head body of claim 5 further **characterized by** first removing an insert in the sprinkler head and thereafter attaching to said sprinkler head body a

device comprising the upwardly arranged pipe (32) and the angularly arranged pipe (38).

8. The attachment of claim 1, wherein the attachment functions as part of an arrangement for holding a pop-up stem (60) of a pop-up spray-type riser stem head (62) in a partially extended position, said arrangement comprising:

- a) an inner duct (34) in one of said arms (32) being arranged for removable attachment to an upper end of said pop-up riser stem (60) in said sprinkler head so that the arm is generally vertically arranged and the lower end of said duct is sized to engage an upper end of said sprinkler head when attached to the pop-up riser stem;
- b) said attachment further comprising first threaded connection means at said arm for mating threaded connection to the upper end of said pop-up riser stem of said sprinkler head such that the arm is generally vertically arranged and second threaded connection means at said duct and also allowing for attachment to a different type of threaded connection on another type of pop-up stem.

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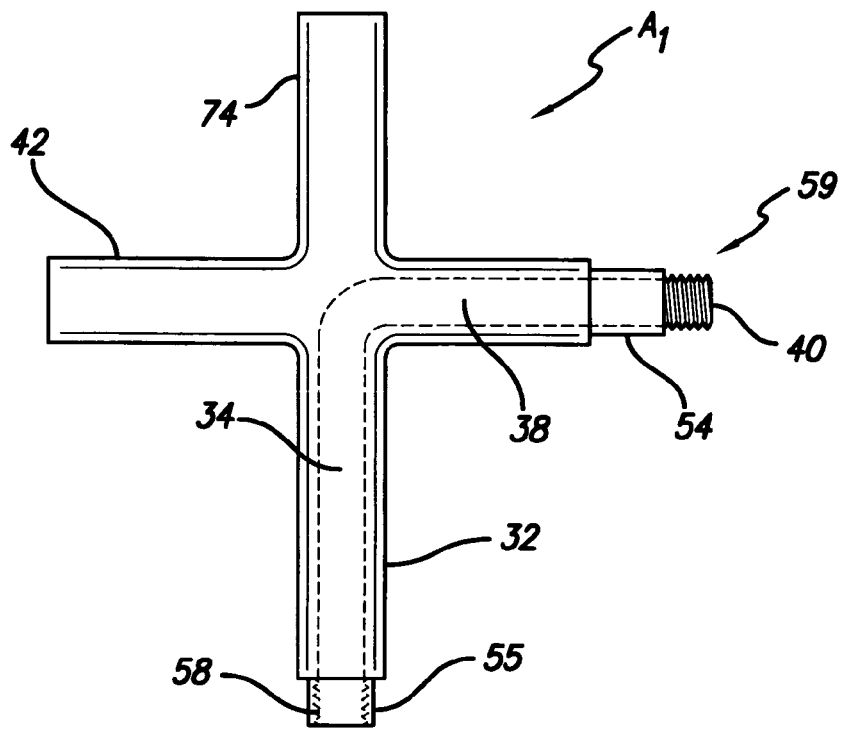


FIG. 1

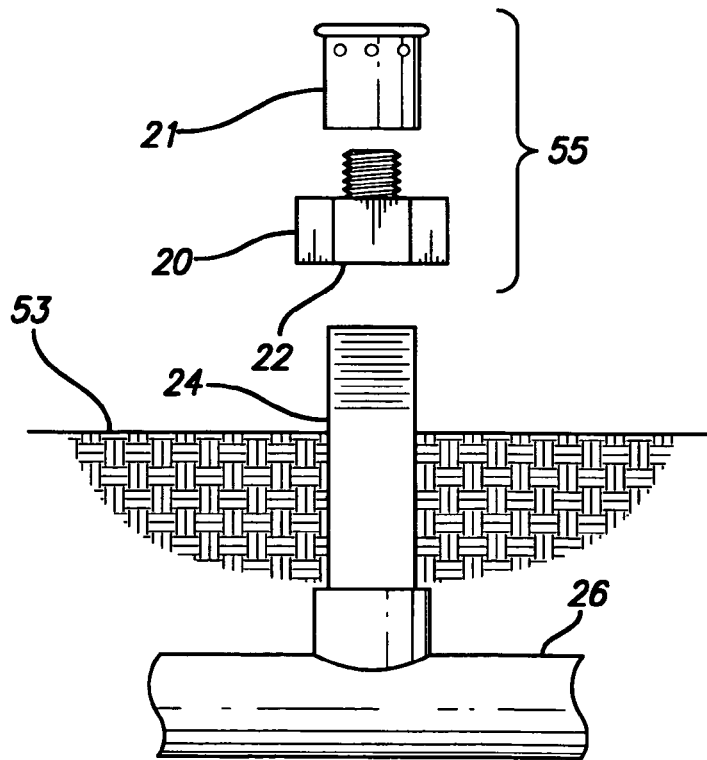


FIG. 2A

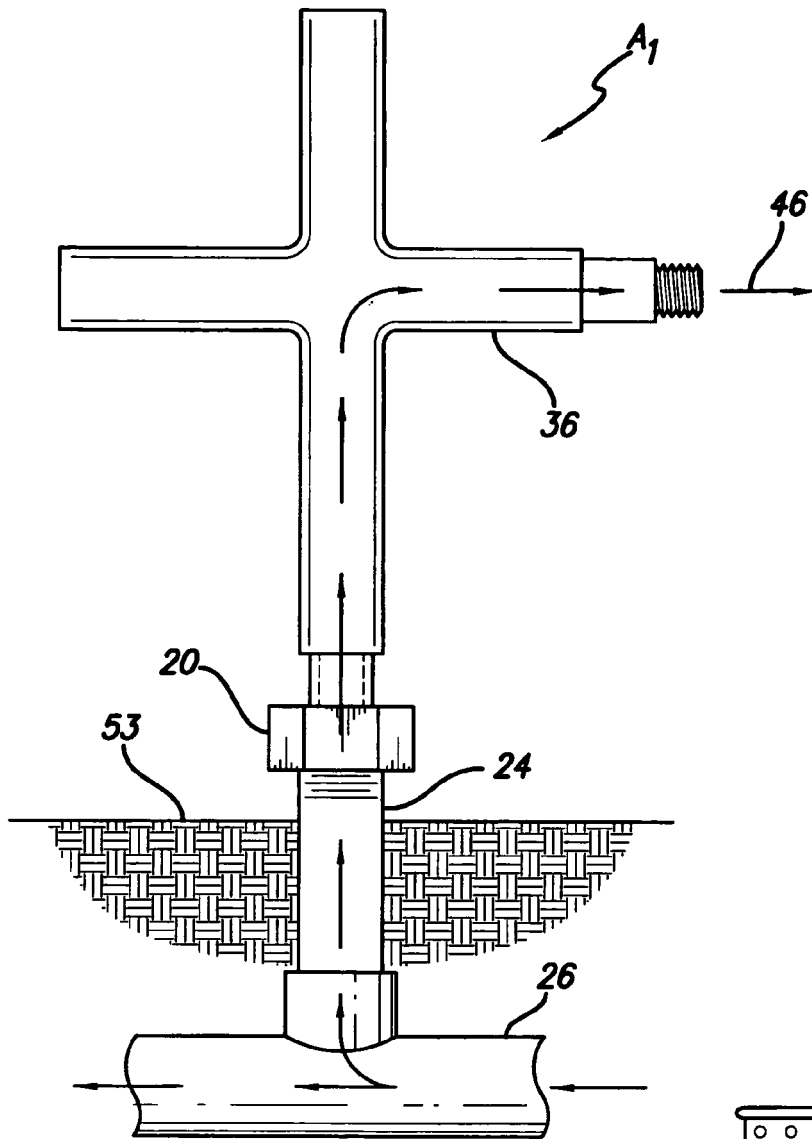


FIG. 2B

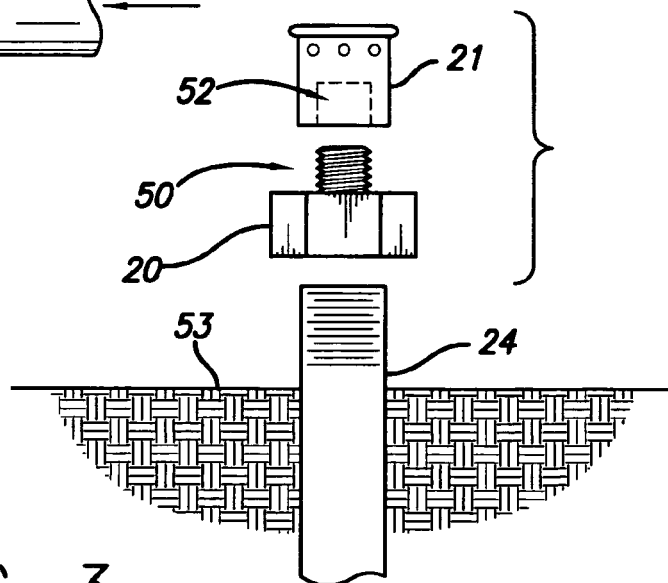
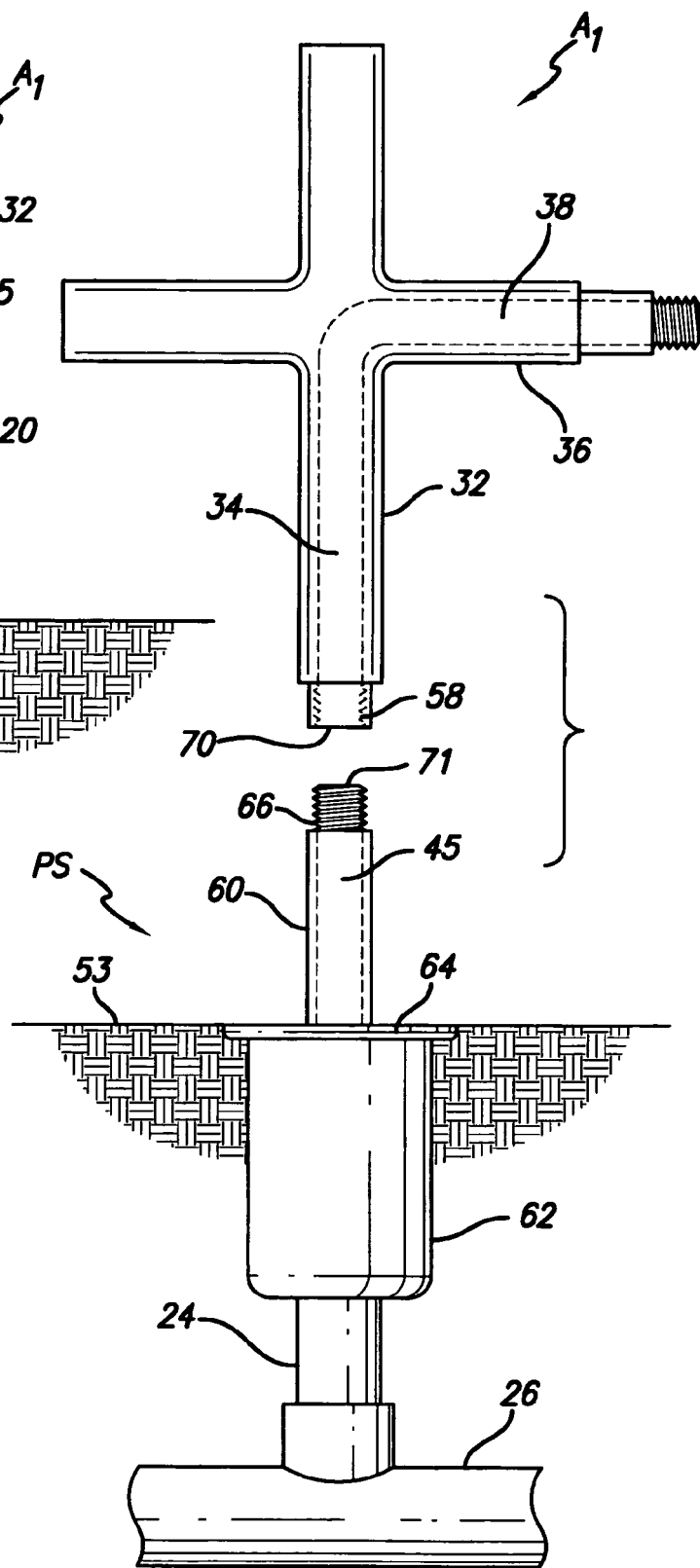
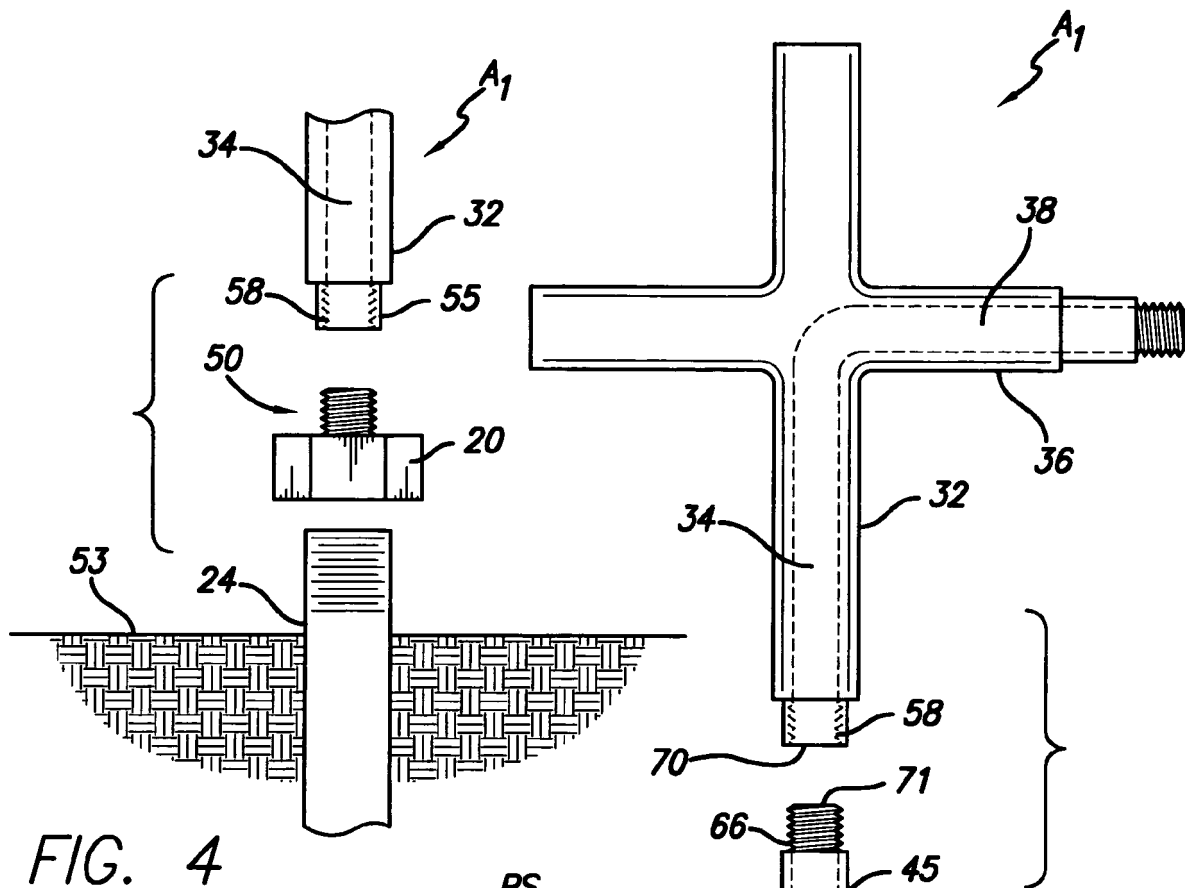


FIG. 3



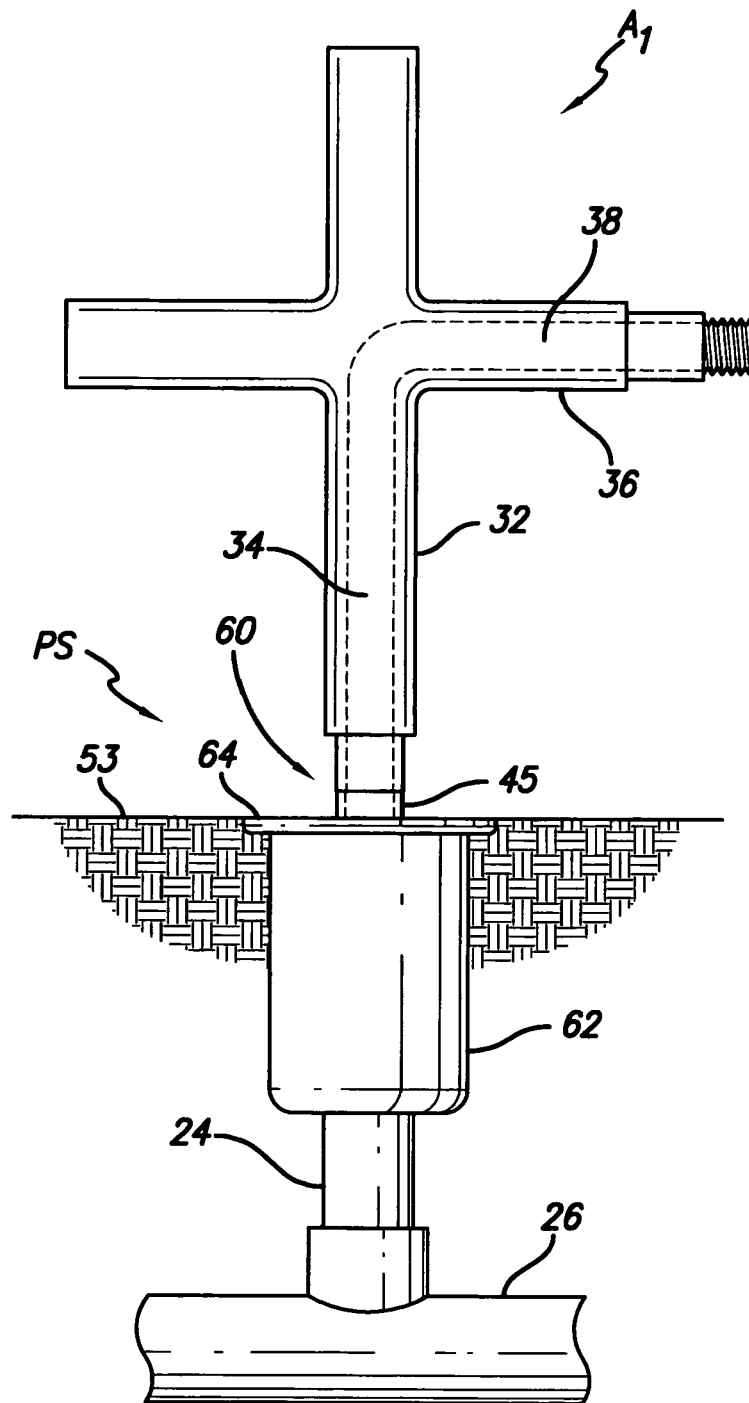


FIG. 6

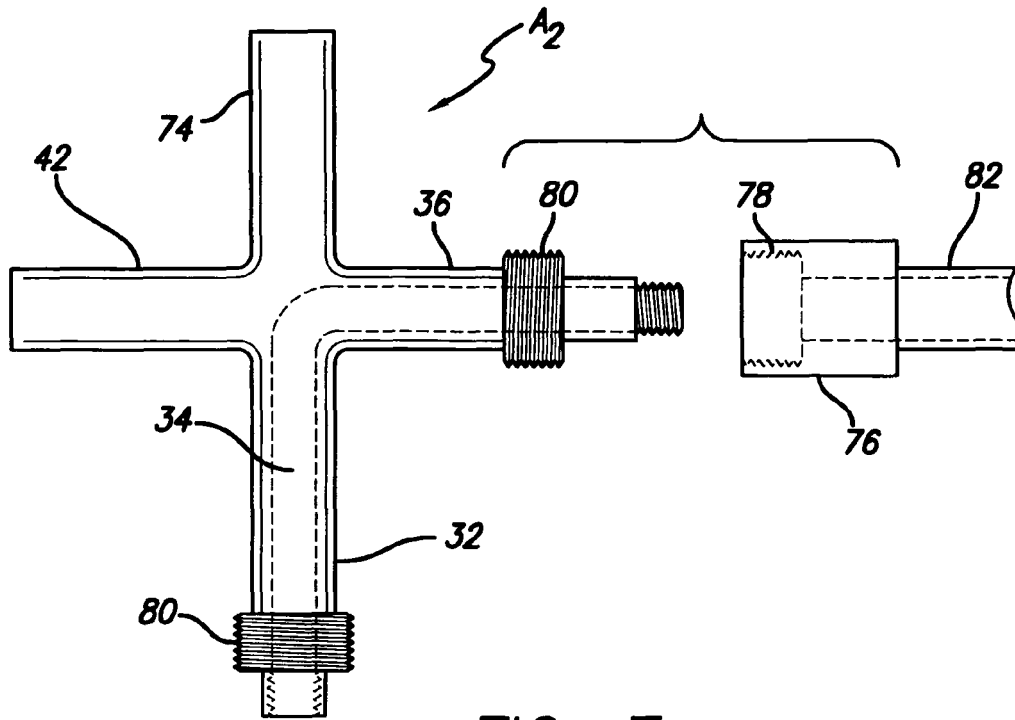


FIG. 7

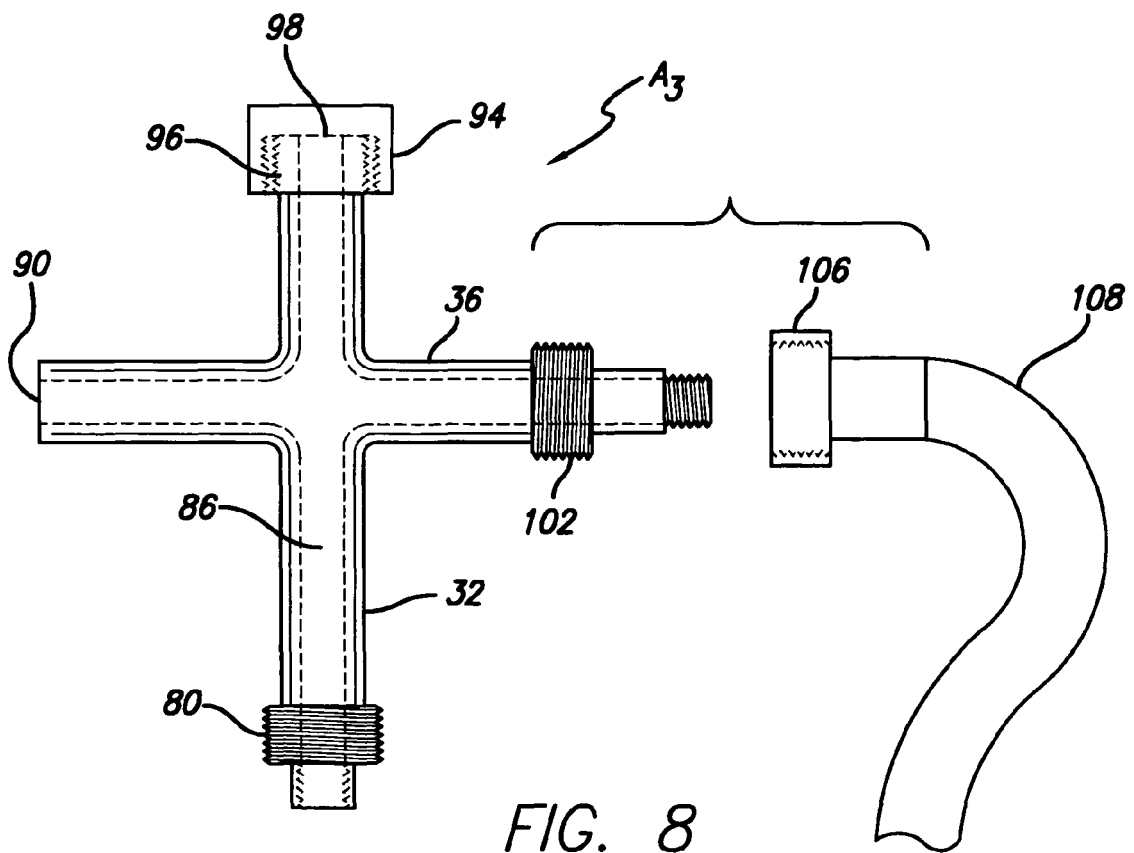


FIG. 8

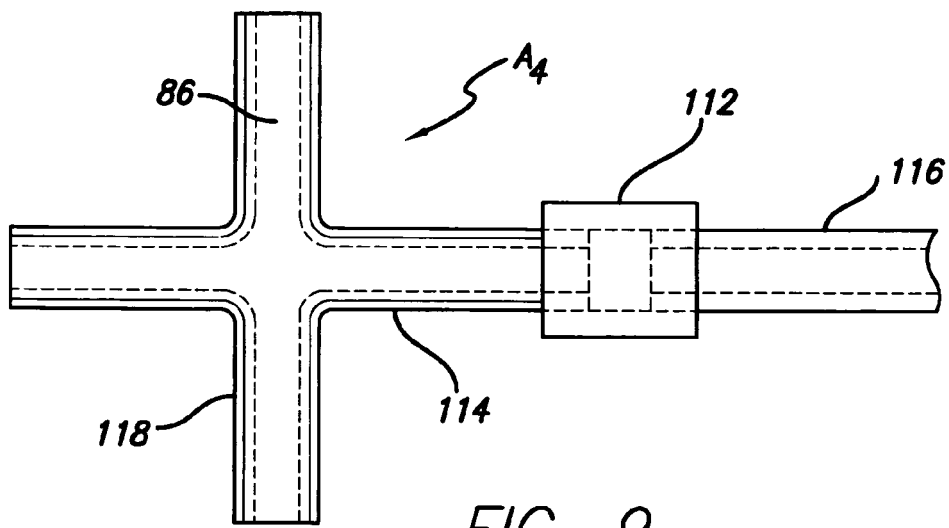


FIG. 9

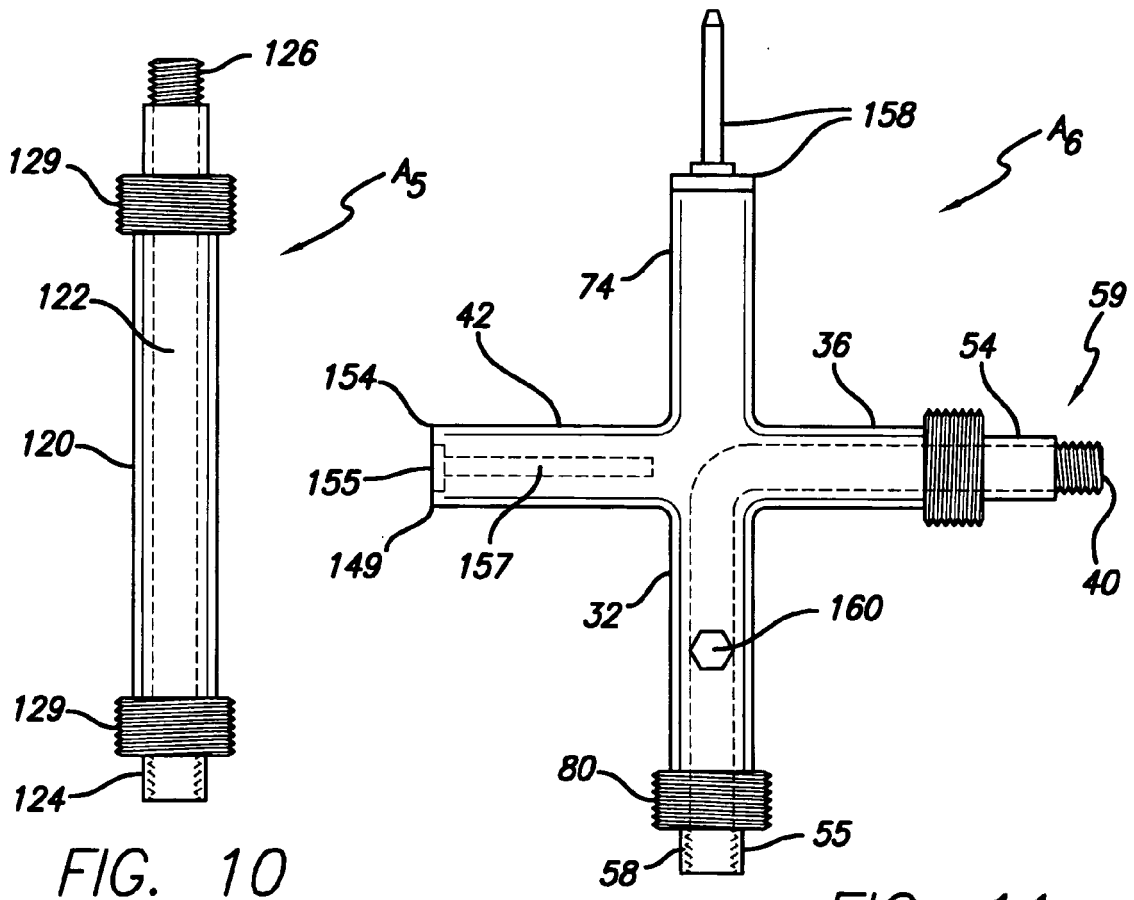


FIG. 10

FIG. 11



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 04 02 3678

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	US 6 318 383 B1 (WOOD CHARLES L) 20 November 2001 (2001-11-20) * the whole document * -----	1,5	B05B15/02
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			B05B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 12 November 2004	Examiner Eberwein, M
<p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>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</p>			

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EPO FORM 1503 03.82 (F04C01)

12-11-2004

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6318383	B1	20-11-2001	NONE

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