



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 1 132 528 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
12.09.2001 Bulletin 2001/37

(51) Int Cl.7: **E03B 7/04**

(21) Application number: **00104894.1**

(22) Date of filing: **08.03.2000**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

(72) Inventor: **Haase, Franz III**
Regina, Saskatchewan S4N 5N1 (CA)

(74) Representative: **Ghioni, Carlo Raoul Maria et al**
c/o BUGNION S.p.A.
Viale Lancetti 17
20158 Milano (IT)

(71) Applicant: **Haase, Franz III**
Regina, Saskatchewan S4N 5N1 (CA)

(54) **Parallel-fed nonstagnant integrated water distribution network for domestic water and fire sprinkler application**

(57) An integrated water distribution network supplies the requirements of both domestic and fire sprinkler water fixtures in a dwelling structure. The network includes a plurality of multiport fittings which are interconnected together with flexible conduits. A conventional fire sprinkler is also coupled to the multiport fittings.

The network is supplied water by a plurality of water supply lines which originate at a manifold. Individual water fixtures are connected to the distribution system through flexible lines. During use of a water fixture, water flow through essentially the entire system is established. The distribution system can thus be characterized as a "non-stagnant" water network.

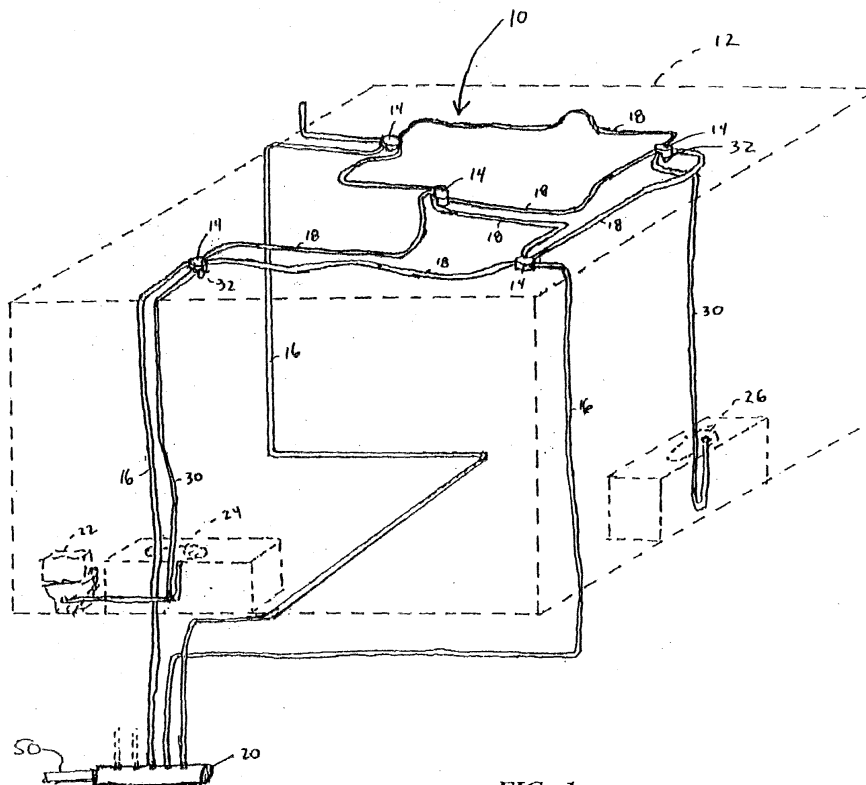


FIG. 1

EP 1 132 528 A1

Description

[0001] This invention generally relates to an integrated domestic water system and interior fire sprinkler system. More particularly it relates to an integrated residential domestic water and fire sprinkler system.

BACKGROUND

[0002] Dedicated sprinkler systems which are connected to large diameter water supply mains are known in the prior art. These water sprinkler systems may be characterized as "stagnant" water systems, in that the water flows within the system only when a sprinkler head is activated.

[0003] Also well known in the art are residential domestic water distribution systems for supplying water to a variety of plumbing fixtures within a dwelling. For a variety of reasons (codes, regulations, etc.) domestic water systems cannot be "stagnant", that is, water contained within the system must be capable of flowing under normal operating conditions. As a result of this requirement for "nonstagnant" flow systems, for typical building applications the fire sprinkler distribution system and the domestic water distribution system are two independent and separate systems. An obvious limitation in having a separate domestic water distribution network and fire sprinkler network is that each system must have their own conduits, supports, fittings, drains, valves, etc. This duplicity of system components is both uneconomical (additional materials, labour, etc.) and environmentally disadvantageous (additional water requirements). To a large extent the expense caused by the duplicity of system components required by separate independent water distribution networks has limited the acceptance of fire sprinkler networks to commercial or multiuse residential applications. A further limitation of present fire sprinkler systems is that they require regular inspections of system operability as it is critical that water under pressure be supplied to the various sprinkler assemblies. Typically this requires that the occupant occasionally inspect and verify valves, gauges, etc. for operability.

[0004] It would be desirable and advantageous to implement a fire sprinkler system which would be cost-effective so as to find acceptance in the residential building industry. It would also be desirable to have such a sprinkler system which would incorporate the domestic water distribution network into the fire sprinkler distribution network. At the same time, and most importantly, the combined system would be a "nonstagnant" system to meet the approval of industry. By incorporating or integrating the sprinkler network with the domestic water network according to the present invention, a water flow is established throughout generally the entire network each time a plumbing fixture is accessed. It would also be desirable that the combined system be "self-checking" to verify fire sprinkler system operability. As a result,

the integrated water distribution system according to the present invention is a "nonstagnant" water flow system which can meet the requirements of various plumbing codes and regulations. The use of the plurality of multiport fitting each having a plurality of external nipples permits the use of small flexible conduit which facilitates assembly and installation.

SUMMARY OF THE INVENTION

[0005] The present invention is directed to an integrated water distribution system for supplying a building's domestic water needs and fire sprinkler systems requirements without the duplicity of having separate water distribution networks. Importantly, a nonstagnant water distribution system can provide water requirements for both domestic use and fire sprinkler use. One aspect of the present invention provides a multiport fitting for overhead securement and for use with a heat sensitive sprinkler head for a fire sprinkler system. Another aspect of the present invention provides a "self-checking" fire sprinkler system with which the occupant can easily verify sprinkler operability by accessing a plumbing fixture for use, as pressurized water at any fixture within the network ensures pressurized water at all the fire sprinklers. Yet another aspect of the present invention provides a mounting assembly for securing the multiport fitting in its overhead position.

[0006] The integrated water distribution network includes a plurality of multiport fittings, each fitting being interconnected using flexible plastic conduit with at least one other fitting. Each fitting has a plurality of water conduits each leading to a plurality of exterior nipples upon which the flexible plastic conduit may be secured. Each water conduit, when connected as described herein, allows fluid communication with integrated network. There is thus a nonstagnant sprinkler water distribution and domestic water distribution integrated network having sprinkler head positions and domestic water plumbing fixture positions as would be provided by a separate and independent sprinkler network and an independent domestic water distribution network.

DESCRIPTION OF THE DRAWINGS:

[0007] While the invention is claimed in the concluding portions hereof, preferred embodiments are provided in the accompanying detailed description which may be best understood in conjunction with the accompanying diagrams where like parts in each of the several diagrams are labeled with like numbers, and where:

FIG. 1 is a perspective view of an integrated water distribution network according to the present invention;

FIG. 2 is a perspective view of the water distribution network under a use condition;

FIG. 3 is another perspective view of the water distribution network under a use condition;

FIG. 4 is yet another perspective view of the water distribution network under a use condition;

FIG. 5 is a top plan view of a multiport fitting according to the present invention; and

FIG. 6 is a cross-sectional view of the multiport fitting of FIG. 5, taken along line 6-6.

DETAILED DESCRIPTION OF THE ILLUSTRATED EMBODIMENTS:

[0008] An integrated water distribution system 10 for a building 12, such as a residential structure, is illustrated in FIGS. 1-4. The system 10 includes a plurality of multiport fittings 14 interconnected with a plurality of flexible plastic conduit 16, 18. The conduits include risers or water supply lines 16 which emanate from a supply manifold 20 which is connected to the house main 50 and runners 18 which traverse between the various multiport fittings 14 and plumbing fixtures 22, 24, 26. Plumbing fixtures 22, 24, 26 are individually served by a routed flexible plastic conduit 30 and may include a water closet 22, tub, vanity sink 24, or kitchen sink 26. Fire sprinkler heads 32 are coupled to each multiport fitting 14. Additional plumbing connections or attachments such as valves, piping, expansion tanks, pipe fittings (elbows, tees, etc.) are all well known in the art of plumbing. Likewise, unidirectional flow valves and temperature activated sprinkler heads are also well known in the art of sprinkler system design and installation. These additional components, which may be needed to fully implement a functional water distribution system according to the present invention, are well known to those skilled in the art and are not shown in the exemplary environment of FIGS. 1-4.

[0009] The construction of one embodiment of the multiport fitting 14 will be described with reference to FIGS. 5 and 6. Multiport sprinkler fitting 14 includes a body 34 having an interior cavity 36 and a plurality of through-bores or ports 38. The interior cavity 36 includes a threaded surface 39 for threadedly receiving and securing a conventional sprinkler head 32. In this manner, sprinkler heads 32 may be occasionally removed for maintenance or service. It is intended that a variety of different sprinkler heads 32 may be used to implement the system 10 of the present invention. Selection of the specific sprinkler head 32 will be apparent to one skilled in the art. Each multiport fitting 14 includes a plurality of ports 38, each port 38 having an external nipple portion 40. Nipple portions 40 are relatively smooth bored and include an external profile (ribbing) 42 for engaging the flexible conduit 16, 18 as will be described hereinafter. Each multiport fitting 14 is provided a support or hanging device 44 for attaching the multi-

port fitting 14 to a support member within the ceiling (or walls) of the structure 12 in which the system 10 is used. The support device 44 may include a flange 46 having apertures 48 through which fasteners 50 are used to secure the multiport fitting 14 to the structure 12. The multiport fitting 14 may include a hexagonal-shaped body 34 having a plurality of radiating nipple portions 40 which are offset to one side of the body 34. A flange 46 may be used to secure the multiport fitting 14 to a structural member (joist, wall, etc.) of the building 12 as illustrated in FIG. 5.

[0010] Referring again to FIG. 1, the integrated water distribution system 10 includes a plurality of interconnected multiport fittings 14. Each multiport fitting 14 is secured by an installer adjacent the ceiling with the support device 18. The multiport fittings 14 are interconnected through flexible conduits 16, 18 which may be cut to length at the site during the installation process and which are flexible so as to allow the conduits 16, 18 to be manipulated by the installer around obstacles, etc. The connection between the multiport fitting 14 and the conduits 16, 18 are press-type or "slip" connections, where the conduits 16, 18 are expanded by manually pressing the conduits 16, 18 onto the nipples 40 of the multiport fitting 14. This connection approach of the flexible conduits 16, 18 with the multiport fittings 14 is inherently more time efficient than many other mechanical connections, especially those of rigid pipings. A securement ring (not shown) may be utilized to secure the conduit 16, 18 to the nipple 40 of the multiport fitting 14.

The network 10 includes a plurality of feeder lines or water supply lines 16 which originate from a supply manifold 20, which is shown beneath the structure 12, though only for illustrative purposes. The manifold 20 in turn is connected to the house main 50 in conventional manner. The number of feeder lines 16 is determined through analysis of the water flow and pressure requirements of the system 10 as is appreciated by one skilled in the art. The feeder lines 16 are illustrated as being directly connected to the multiport fittings 14. However, the feeder lines 16 may alternatively be connected along the length of a conduit 18 (such as through a tee fitting), if desired. A particularly novel aspect of the present invention is that a plurality of feeder lines 16, each connected to the manifold 20, are used to supply the network of multiport fittings 14. In this manner and as described below in operation, a "nonstagnant" water distribution system 10 is implemented. The plumbing fixtures of the systems are illustrated as a water closet 22, a vanity sink 24, and a kitchen sink 26.

[0011] Operation of the system 10 according to the present invention may now be described with reference to FIGS. 2-4, where a system 10 providing a distribution network for the domestic water needs and fire sprinkler requirements is illustrated. This system 10 provides a nonstagnant water distribution system for supplying requirements for both the domestic and fire sprinkler water fixture by establishing water flow within essentially the

entire system 10 during occupant use of a plumbing fixture 22,24,26. Referring particularly to FIG. 2, the integrated water distribution network 10 illustrates the system flow during use of the kitchen sink 26. Water requirements for the sink 26 are provided by the entire network 10 through its associated multiport fittings 14, as illustrated by the flow arrows. In this manner, the water within the system 10 and between the multiport fittings 14 is in motion. While the flow rates of individual conduits 16, 18 may not be equal (and may be in directions other than as illustrated) there is some flow of water in the conduits 16, 18 between all of the multiport fittings during sink 26 use.

[0012] Furthermore, it is appreciated that water flows through each feeder conduit 16 from the manifold 20 during sink use (though the flow rates may not be equal). As a result, a nonstagnant flow system 10 is established.

[0013] Similarly, FIG. 3 illustrates the system 10 during occupant use of the water closet 22. The flow arrows again depict the direction of water flow within the conduits 18 between the multiport fitting 14 and in the supply lines 16. The exact flow rate and direction of flow within a particular conduit 16, 18 may be determined with additional information, if necessary. Importantly, FIG. 3 again illustrates that the water within the conduits 16,18 is nonstagnant (in motion) during use of the Water closet 22.

[0014] FIG. 4 illustrates an additional benefit of invention according to the present invention. A water sprinkler 32 is illustrated as having been activated. Water flow requirements for the sprinkler 32 are provided by the plurality of conduits 18 leading to the associated multiport fitting 14. In this manner, rather than a single large diameter conduit supplying water, a plurality of small diameter conduits 18 together supply the sprinkler 32. The water supply for the fire sprinklers 32, which typically is plumbed using a single large diameter piping, is now provided by a plurality of smaller flexible conduits 16,18.

[0015] An important benefit provided by the present invention is a "self-checking" fire sprinkler system 10 which allows the occupant to verify the fire sprinkler system 10 operability by simply using one of the variety of plumbing fixtures 22,24,26. In this regard, the occupant is ensured that pressurized water is available to the various fire sprinklers 32 if water is output from any plumbing fixture 22,26,28 upon occupant demand.

[0016] The present invention and many of its attendant advantages will be understood from the foregoing description and it will be apparent that various changes may be made in the form, construction and arrangement of the parts thereof including the network design without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred or exemplary embodiment thereof.

Claims

1. An integrated water distribution system for supplying both domestic water and fire sprinkler water requirements of a structure, said system comprising:

a plurality of multiport fittings being adapted to be secured within the structure, each of said plurality of multiport fittings having a plurality of ports, each of said plurality of multiport fittings capable of being fluidly coupled to a fire sprinkler assembly;

a plurality of flexible conduit interconnecting said plurality of multiport fittings through said plurality of ports, said plurality of flexible conduit establishing a network, and each of said plurality of flexible conduit within said network being capable of carrying a water flow;

a plurality of plumbing fixtures, each being fluidly connected to the network through a fixture conduit, wherein upon occupant use of any one or more of said plumbing fixtures, said water flow through each of said flexible conduits interconnecting said plurality of multiport fittings is substantially non-stagnant; and

a water supply line, fluidly coupled to the network, for supplying the system with water relating to the occupant use.

2. An integrated water distribution system according to claim 1, further comprising a plurality of water supply lines, and a water supply manifold, wherein the plurality of water supply lines originate at said water supply manifold.
3. An integrated water distribution system according to claim 1, further comprising one said fire sprinkler assembly threadedly secured to an associated multiport fitting.
4. An integrated water distribution system according to claim 1, wherein at least one of the plurality of multiport fittings includes at least three ports.
5. An integrated water distribution system according to claim 4, wherein at least one of the plurality of multiport fitting includes four ports.
6. An integrated water distribution system for both domestic water and fire sprinkler water requirements of a structure, said system comprising:

a plurality of multiport fittings being adapted to be secured within the structure, each of said plurality of multiport fittings having at least three

ports, each of said plurality of multiport fittings being fluidly coupled to an associated fire sprinkler assembly;

a plurality of water-carrying conduit fluidly inter-
connecting said plurality of multiport fittings; 5

a plumbing fixture conduit fluidly coupled to the system, wherein upon occupant use of a plumbing fixture associated with said plumbing fixture conduit an amount of water flows through substantially each of said plurality of water-carrying conduits; and 10

a water supply line for supplying the system with water relating to the occupant use 15

of the plumbing fixture.

7. An integrated water distribution system according to claim 6, wherein each multiport fitting is provided an attachment device for securing an associated multiport fitting upon the structure. 20

8. An integrated water distribution system according to claim 7, wherein the attachment devices include an offset flange having an aperture. 25

9. An integrated water distribution system according to claim 6, further comprising a plurality of the water supply lines for supplying the system with water. 30

10. An integrated water distribution system according to claim 9, further comprising a water supply manifold, and the plurality of the water supply lines originates from said water supply manifold. 35

11. An integrated water distribution system according to claim 6, wherein the plurality of water-carrying conduit is plastic conduit. 40

12. An integrated water distribution system according to claim 6, wherein at least one of the fire sprinkler assemblies is threadedly secured to an associated multiport fitting. 45

13. An integrated water distribution system according to claim 12, wherein the associated multiport fitting includes four ports. 50

14. An integrated water distribution system according to claim 6, wherein the plumbing fixture conduit is fluidly coupled to the system through one of the ports of one of the multiport fittings. 55

15. An integrated water distribution system according to claim 6, wherein the water supply line is fluidly coupled to the system through one of the ports of

one of the multiport fittings.

16. An integrated water distribution system for both domestic water and fire sprinkler water requirements of a structure, said system comprising:

a plurality of multiport fittings being adapted to be secured within the structure, each multiport fitting being fluidly coupled to a fire sprinkler assembly;

a plurality of water-carrying conduit fluidly inter-connecting said plurality of multiport fittings through at least two ports of each multiport fitting;

a plumbing fixture conduit fluidly coupled to the system, wherein upon occupant use of a plumbing fixture associated with said plumbing fixture conduit an amount of water flows through substantially each of said plurality of water-carrying conduits; and

a water supply line for supplying the system with an amount of water related to the occupant use of the plumbing fixture.

17. An integrated water distribution system according to claim 16, wherein the water supply line is fluidly coupled to the system at one of the ports of one of the multiport fittings.

18. An integrated water distribution system according to claim 16, further comprising a plurality of water supply lines for supplying the system with the amount of water related to the occupant use of the plumbing fixture.

19. An integrated water distribution system according to claim 16, wherein the plumbing fixture conduit is coupled to the system at one of the ports of one of the multiport fittings.

20. An integrated water distribution system according to claim 16, wherein each multiport fitting is provided an attachment device for securing an associated multiport fitting upon the structure.

21. An integrated water distribution system according to claim 20, wherein the attachment device includes an offset flange having an aperture through which a fastener may be used to secure the multiport fitting upon the structure.

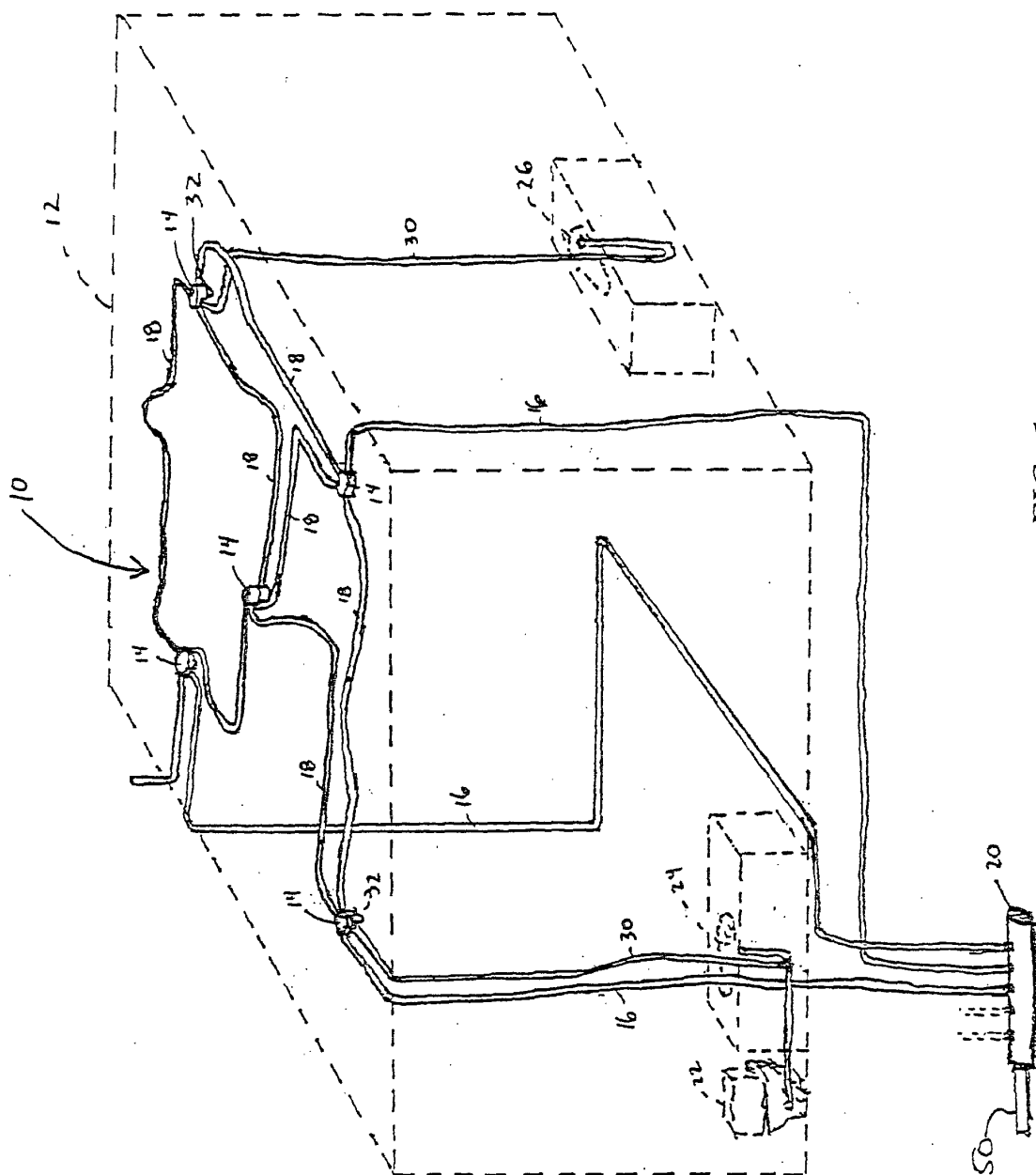


FIG. 1

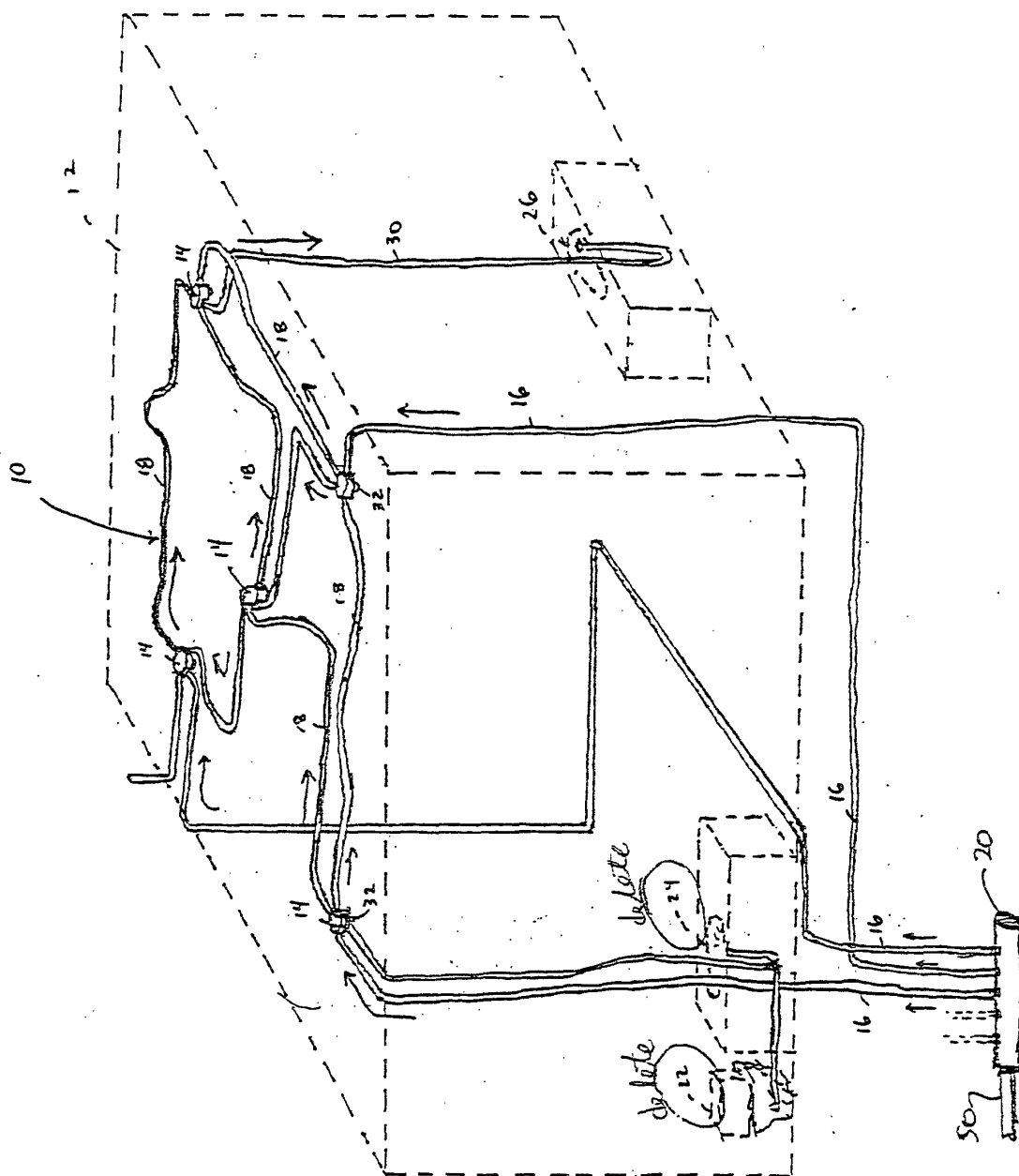


FIG. 2

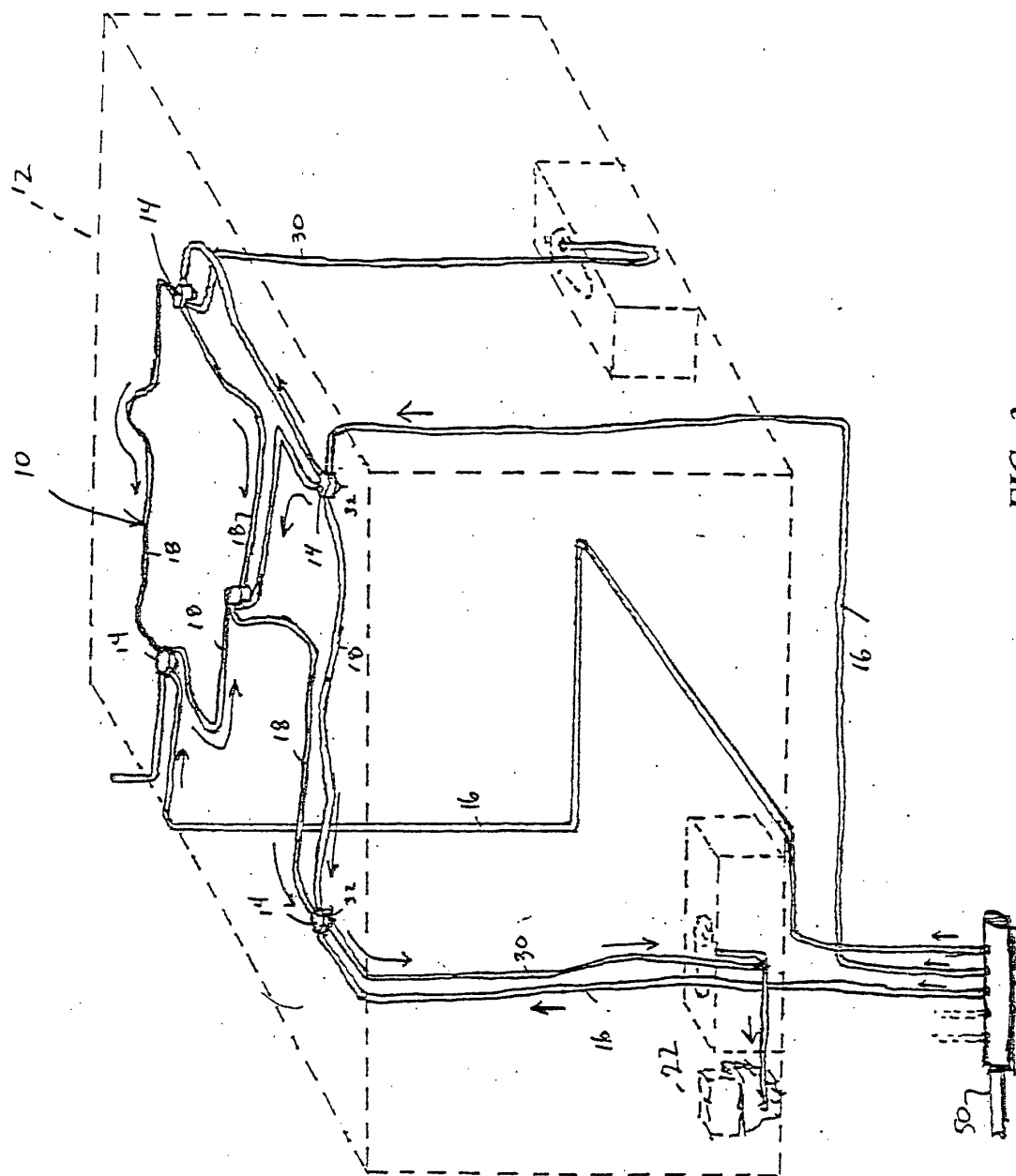


FIG. 3

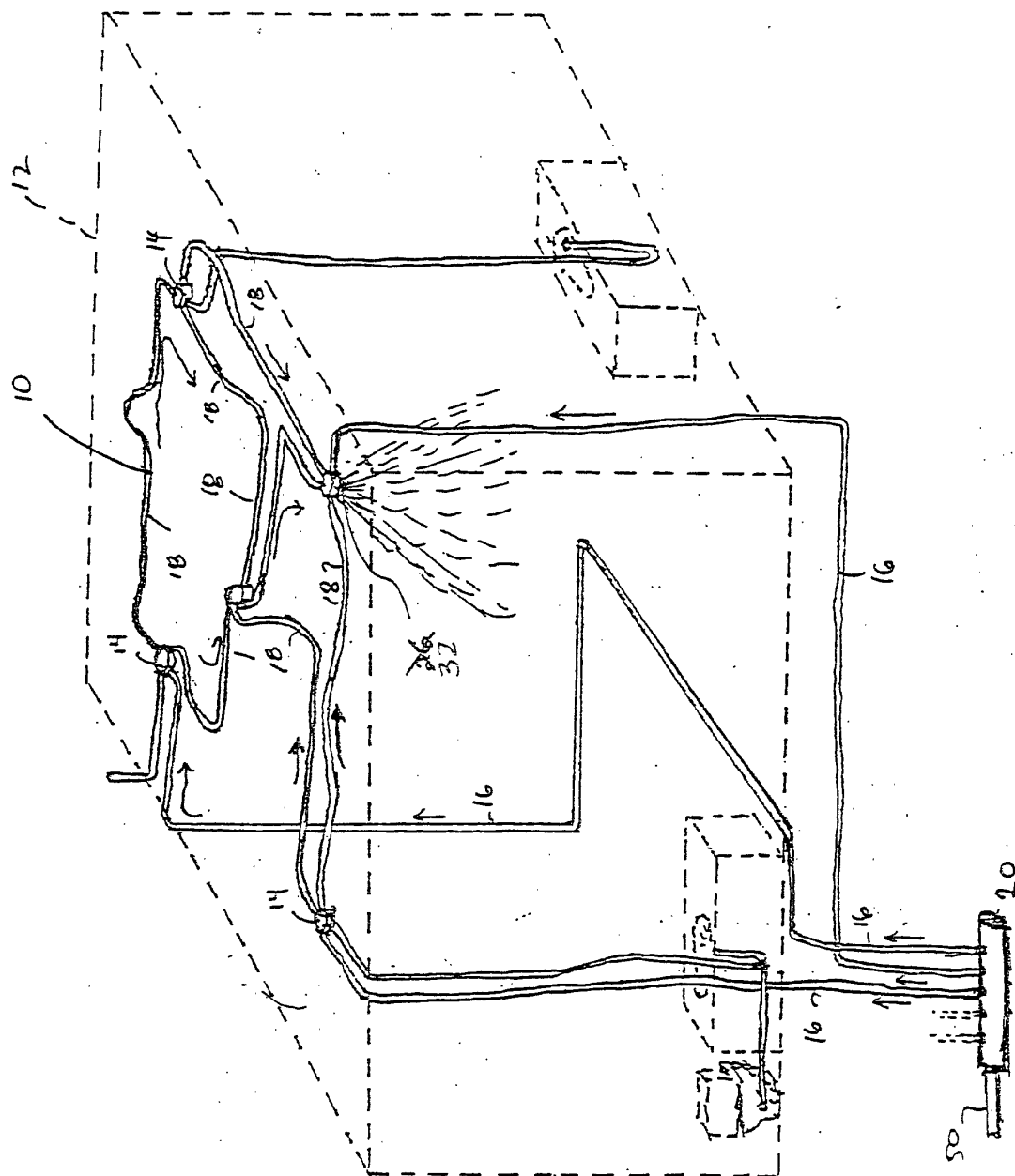
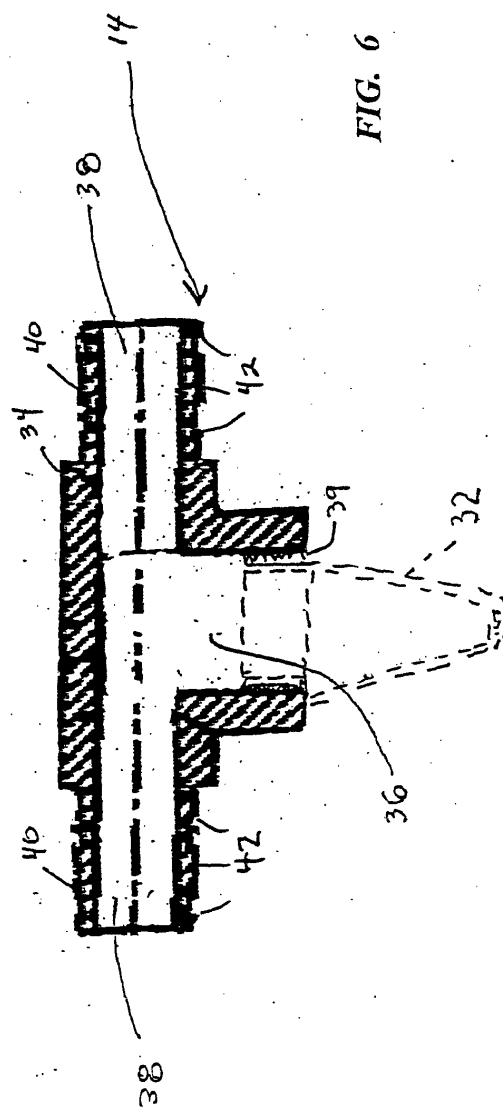
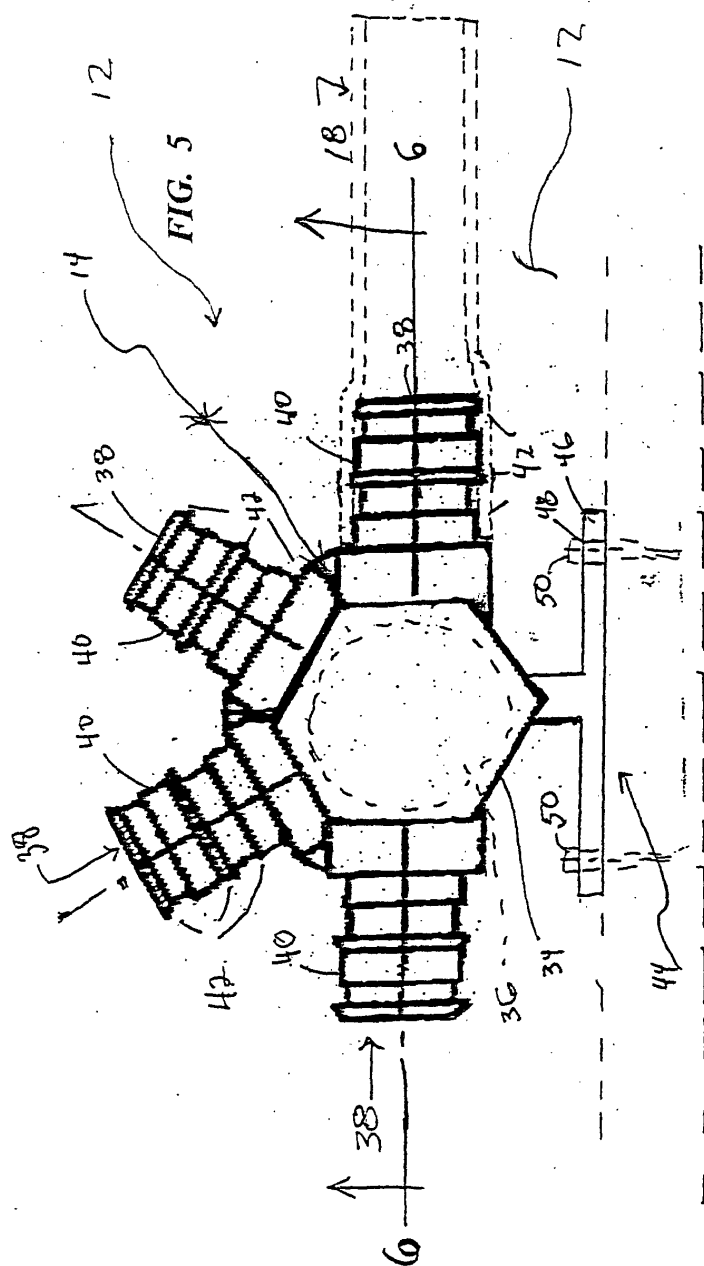


FIG. 4





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 10 4894

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	DE 21 24 720 A (BPA BYGGPRODUKTION AB) 7 December 1972 (1972-12-07) * the whole document *	1,2,4-6,16	E03B7/04
A	DE 21 24 719 A (BPA BYGGPRODUKTION AB) 7 December 1972 (1972-12-07) * the whole document *	1,2,4-6,16	
A	EP 0 454 062 A (HATTORI TAKAMASA) 30 October 1991 (1991-10-30) * the whole document *	1,4-6,16	
A	US 2 017 841 A (COLEMAN) * the whole document *	1,6,16	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			E03B E03C A62C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 22 August 2000	Examiner De Coene, P
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			

EPO FORM 1503 03/82 (P04/C01)

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

EP 00 10 4894

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

22-08-2000

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
DE 2124720	A	07-12-1972	NONE	
DE 2124719	A	07-12-1972	NONE	
EP 0454062	A	30-10-1991	JP 4005971 A	09-01-1992
			JP 7114819 B	13-12-1995
			CA 2040829 A,C	24-10-1991
			DE 69116206 D	22-02-1996
			DE 69116206 T	23-05-1996
			KR 9409689 B	15-10-1994
			US 5327976 A	12-07-1994
US 2017841	A		NONE	