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

(11) EP 1 030 088 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
23.08.2000 Bulletin 2000/34

(51) Int. Cl.[7]: **F16K 24/04**

(21) Application number: **00301123.6**

(22) Date of filing: **14.02.2000**

(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

(30) Priority: **19.02.1999 GB 9903682**
27.03.1999 GB 9917436

(71) Applicant: **Angelo, Patric**
London N3 1JB (GB)

(72) Inventor: **Angelo, Patric**
London N3 1JB (GB)

(74) Representative:
Hughes, Brian Patrick
Brian Hughes & Co.
Letterbox Cottage
Friezley Lane
Cranbrook, Kent TN17 2LL (GB)

(54) Bleed valve

(57) A bleed valve comprises a valve body (10) and a bleed screw (12) that can be screwed into and out of the body, a primary valve (20,22) between the bleed screw and the body which is closed when the bleed screw is fully screwed into the body (10), and a secondary valve (30,34) between the bleed screw (12) and the body (10) which is closed when the bleed screw (12) is unscrewed to restrict the flow of liquid through the valve.

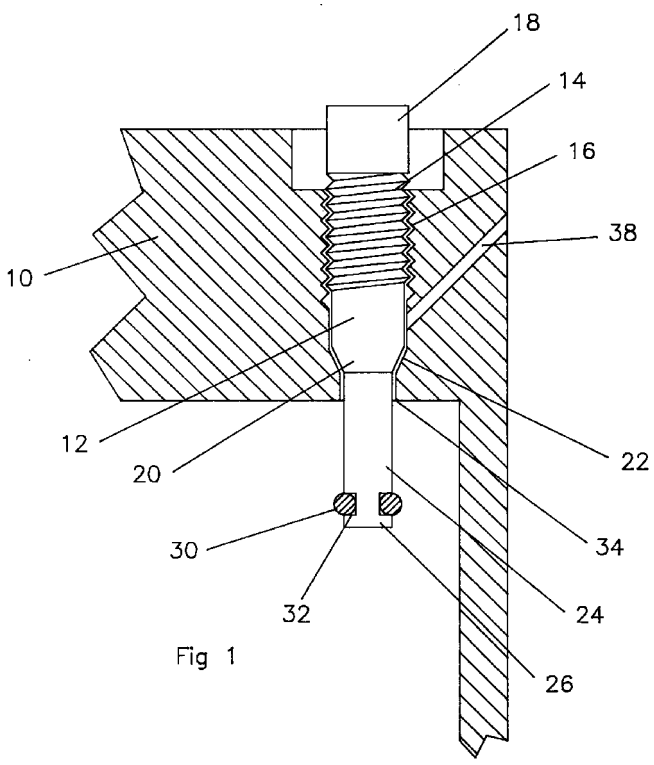

Fig 1

EP 1 030 088 A1

Description

[0001] This invention is concerned with a bleed valve and in particular with a bleed valve for a radiator.

[0002] In colder countries central heating systems commonly consist of a number of radiators filled with water and connected by flow and return pipes to a water heater, a circulating pump normally being included. It is quite usual for pockets of gas, air or gas produced by the formation of iron oxide, to form at the top of at least one radiator in a system, making that radiator noisy and inefficient, and impairing the circulation of water. To obviate this problem radiators are provided at their top with a bleed valve sometimes known as a manual air venting valve.

[0003] Bleed valves typically comprise a valve body having an internal passage comprising in sequence a small orifice, a conical valve seat, a plain passage and an internally threaded hole in which is located a square headed, air bleed screw having a conical valve head for engagement with the conical valve seat.

[0004] To release air from a radiator, a special key with a square hole matching the square head of the air bleed screw is used to engage and unscrew the air bleed screw and move the valve head off the valve seat. The gas in the gas pocket is forced out giving a hissing noise, and when all the gas has been expelled water is ejected, and the air bleed screw is then screwed back in to close the valve head onto its seat and prevent the further release of water.

[0005] However it is too easy for the air bleed screw to be totally unscrewed and then forced completely out of the valve body. As a result, many accidents occur as the bleed screw is ejected and, even if it is not dropped and lost, it is difficult to re-engage the bleed screw in the body in the face of hot water coming out of the hole. Bearing in mind that the water is black because of iron oxide sludge it can be seen that considerable damage to carpets, furnishings and any room below can result. A captive bleed screw, i.e. one that cannot be fully ejected from the valve body helps, but is not a complete answer as the water temperature can still make it difficult to relocate the bleed screw.

[0006] It is an object of the present invention to obviate or mitigate these difficulties.

[0007] The present invention is a bleed valve comprising a valve body and a bleed screw that can be screwed into and out of the body, a primary valve between the bleed screw and the body which is closed when the bleed screw is fully screwed into the body, and a secondary valve between the bleed screw and the body which is closed when the bleed screw is unscrewed to restrict the flow of liquid.

[0008] The secondary valve may comprise a valve seat on the valve body and a valve head at the inner end of the bleed screw.

[0009] The bleed valve may be a radiator bleed valve.

[0010] Embodiments of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:-

Fig. 1 is a cross section through a first embodiment of a bleed valve according to the present invention for use on a central heating radiator; and

Fig. 2 is a cross section through a further embodiment of a bleed valve according to the present invention.

[0011] Referring now to Fig. 1, a bleed valve comprises a body 10 having a passage therethrough in which is located a bleed screw 12. The bleed screw has an external thread 14 engaging an internal thread 16 in the passage, the bleed screw being screwed into and out of the body 10 by a tool adapted to engage a head 18 forming the outer extremity of the bleed screw. The bleed screw 12 has a conical valve head 20 which cooperates with a conical valve seat 22 in the passage through the valve body to form a primary valve which is closed when the bleed screw 12 is fully screwed into the valve body 10. The bleed screw 12 has a valve stem 24 projecting inwardly from the valve head 20 and at its inner end 26 is provided a secondary valve head comprising an elastic o-ring 30 located in an annular groove 32. At the inner end of the passage through the valve body 10 is a circular edge 34 which functions as a seat for the secondary valve head 30 and forms with it a secondary valve. In this embodiment the valve body 10 has a vent passage 38 connecting the outside of the radiator with the main passage at a point outside the primary valve seat 22.

[0012] In use, the bleed screw 12 is normally fully screwed into the body 10 thus seating the primary valve head 20 on the primary valve seat 22 to prevent the escape of gas or water from the radiator. To bleed the radiator, the bleed screw is unscrewed slightly to open the primary valve and allow gas to escape past the primary valve and through the vent passage 38 to the exterior of the radiator. When the gas has escaped and water begins to come out the vent passage 38, the bleed screw is screwed back into the body to close the primary valve. If the bleed screw is unscrewed too far and the threads 14 and 16 become disengaged, the pressure in the radiator forces the bleed screw outwardly until the secondary valve head, the o-ring 30, engages the secondary valve seat 34 to close the secondary valve and at least severely restrict the flow of water to the outside of the radiator, thus obviating external damage and making it easy to screw the bleed screw back into the body. The secondary valve head also serves to retain the bleed screw captive in the body 10 as the pressure in the radiator is insufficient to force the o-ring 30 out past the edge 34.

[0013] As the o-ring 30 is elastic, the assembly of the valve is simple, the bleed screw being merely pushed through the main passage in the body causing

the o-ring to be compressed by the primary valve seat 22 to allow the o-ring to pass into the passage through the valve body 10. The bleed valve shown in Fig. 1 is integral with the radiator, but could equally be a separate unit, the body 10 then having an external thread engaging a tapped hole in the body of the radiator.

[0014] Referring now to Fig. 2, the valve stem 24 of this embodiment is extended by about 10% as compared with the valve stem of Fig. 1, and consists of three distinct sections 48, 50 and 52, a secondary valve head 54 being provided at its inner end

[0015] The first section 48 has a diameter about 40% of the diameter of the orifice 46 at the inner end of the passage through the body of the valve. As the bleed screw is unscrewed, the section 48 permits the escape of gas past the now open primary valve and through the vent passage 38 to atmosphere.

[0016] The second section 50 is a conical section of increasing diameter and leads into the third section 52 which has a constant diameter of about 98% of the diameter of the orifice 46. The secondary, conical valve head 54 is formed at the inner end of the section 52 to cooperate with the secondary valve seat, i.e. the rim of the orifice 46. To form the valve head, the bleed screw is screwed fully into the valve body and the head is then formed, in this embodiment, by cold pressing.

[0017] When the threads 14 and 16 are on the point of being disengaged, the section 52 is located within the orifice 46 and severely restricts the flow of gas or water through the orifice. The length of the valve stem 24 is such that the threads 14 and 16 can be completely disengaged before the secondary valve head engages its seat, the distance between the valve heads 20 and 54 being about 20% greater than the maximum engaged length of the threads 14 and 16.

Claims

1. A bleed valve comprising a valve body and a bleed screw that can be screwed into and out of the body, a primary valve between the bleed screw and the body which is closed when the bleed screw is fully screwed into the body, and a secondary valve between the bleed screw and the body which is closed when the bleed screw is unscrewed to restrict the flow of liquid.

2. A bleed valve as claimed in claim 1, in which the bleed valve is a radiator bleed valve.

3. A bleed valve as claimed in claim 1 or claim 2, in which the secondary valve comprises a valve seat on the valve body and a valve head at the inner end of the bleed screw.

4. A bleed valve as claimed in claim 3, in which the body has a passage therethrough and the secondary valve seat is the rim of the passage at its inner end.

5. A bleed valve as claimed in claim 3 or claim 4, in which the secondary valve head is an o-ring.

6. A bleed valve as claimed in claim 3 or claim 4, in which the secondary valve head is cold formed at the end of the bleed screw.

7. A bleed valve as claimed in any preceding claim, including means for controlling the escape of air through the valve by varying the aperture between the bleed screw and the valve body.

8. A bleed valve as claimed in claim 7, in which said means comprises an enlargement of the bleed screw adjacent the secondary valve head.

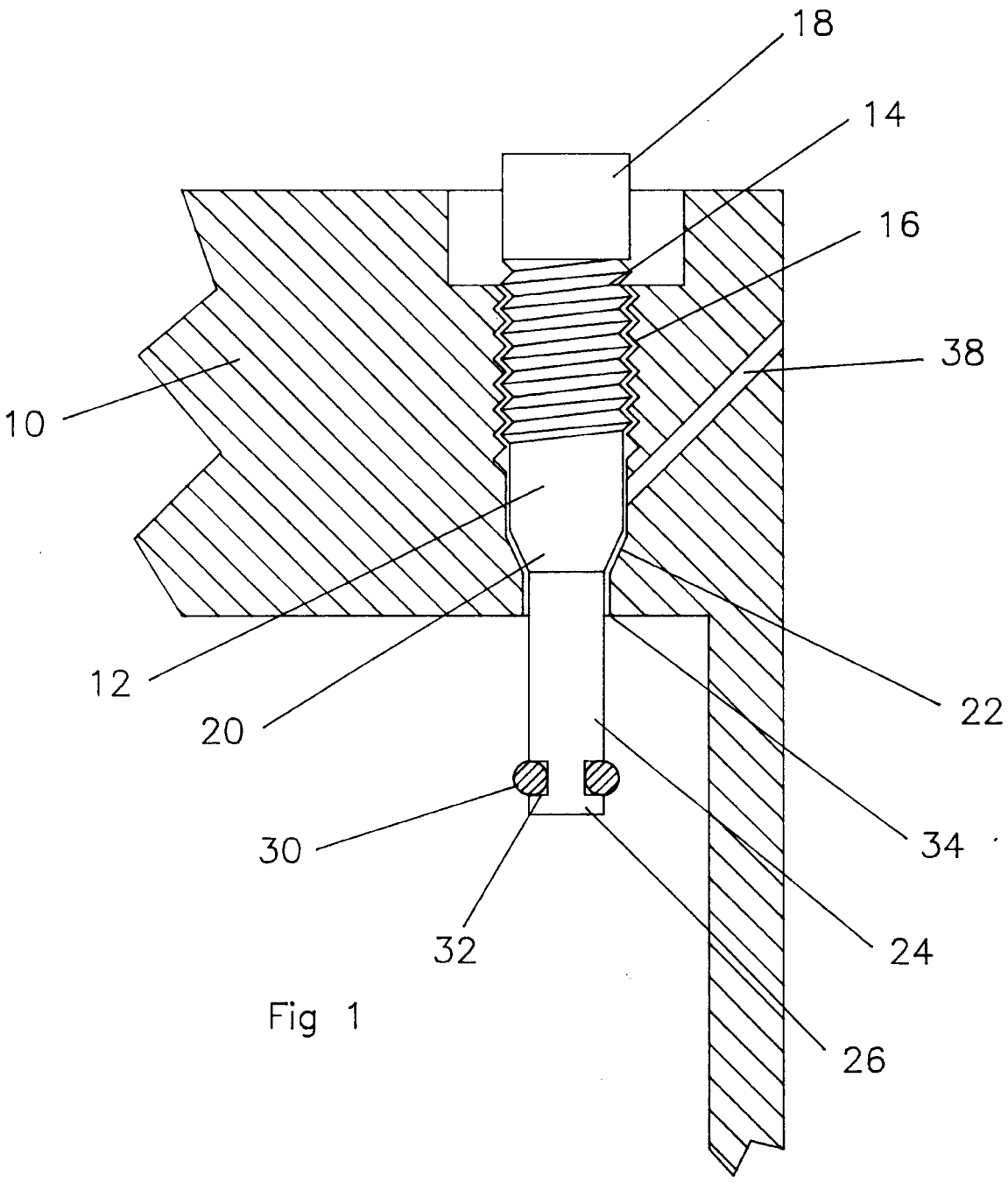

Fig 1

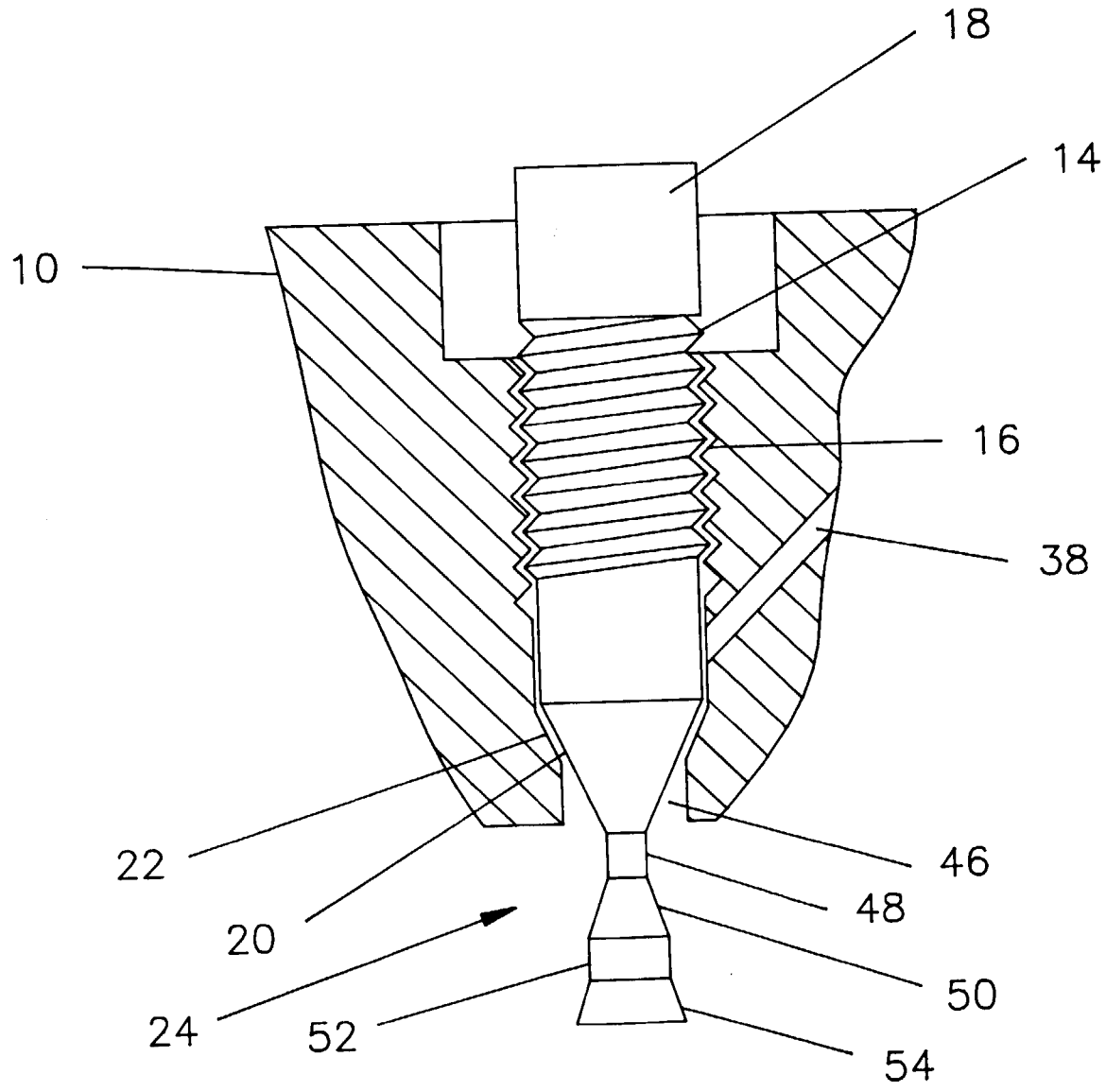

Fig 2

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 30 1123

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)
X	EP 0 153 999 A (HUMMEL METALLWARENFAB A) 11 September 1985 (1985-09-11)	1-4	F16K24/04
A	* the whole document *	5-8	
X	FR 2 394 003 A (LARGA SPA) 5 January 1979 (1979-01-05)	1	
A	* the whole document *	2-8	
Y	GB 2 231 389 A (BAILEY ROBERT JOHN;TRANTER KEVIN JOHN) 14 November 1990 (1990-11-14)	1,2	
A	* page 2, paragraph 2 - page 3, paragraph 4 *	3,4	
Y	EP 0 062 841 A (HUMMEL METALLWARENFAB A) 20 October 1982 (1982-10-20)	1	
A	* abstract; figure 1 *	2-8	
Y	CH 641 885 A (KELLER ROLF) 15 March 1984 (1984-03-15)	1	
A	* the whole document *	2-8	
Y	DE 39 36 771 A (BOEHNISCH SIEGFRIED) 8 May 1991 (1991-05-08)	1	TECHNICAL FIELDS SEARCHED (Int.Cl.7)
A	* column 2, line 34 - column 3, line 5; figure 2 *	2-8	F16K
Y	DE 22 12 112 A (SCHMITZ KUEHLER BAIERBRUNN) 20 September 1973 (1973-09-20)	1	
A	* page 4, paragraph 4 - page 6, paragraph 3 *	2-8	
Y	DE 195 00 062 A (SCHERER NORBERT) 11 July 1996 (1996-07-11)	1	
A	* column 1, line 55 - column 4, line 4 *	2-8	
Y	DE 297 15 018 U (VOGT KLEMENS) 30 October 1997 (1997-10-30)	1,2	
A	* the whole document *	3-8	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	24 May 2000	Staengl, G

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 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 00 30 1123

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.

24-05-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0153999 A	11-09-1985	DE 3346614 A	04-07-1985
		AT 31444 T	15-01-1988
		DE 3468138 D	28-01-1988
FR 2394003 A	05-01-1979	IT 1083763 B	25-05-1985
		BE 860950 A	16-03-1978
		DE 2751593 A	21-12-1978
		DK 512277 A	09-12-1978
		NL 7712479 A	12-12-1978
GB 2231389 A	14-11-1990	NONE	
EP 0062841 A	20-10-1982	DE 3114609 A	28-10-1982
		AT 9929 T	15-11-1984
		DE 3260992 D	22-11-1984
CH 641885 A	15-03-1984	NONE	
DE 3936771 A	08-05-1991	FR 2654178 A	10-05-1991
DE 2212112 A	20-09-1973	NONE	
DE 19500062 A	11-07-1996	NONE	
DE 29715018 U	30-10-1997	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82