



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



Publication number: **0 562 536 A1**

**EUROPEAN PATENT APPLICATION**

Application number: **93104720.3**

Int. Cl.<sup>5</sup>: **F02M 37/10**

Date of filing: **23.03.93**

Priority: **27.03.92 IT TO920281**

Applicant: **SICEB S.p.A.**  
**Via Rio Galletto 1**  
**I-17045 Legino (Savona)(IT)**

Date of publication of application:  
**29.09.93 Bulletin 93/39**

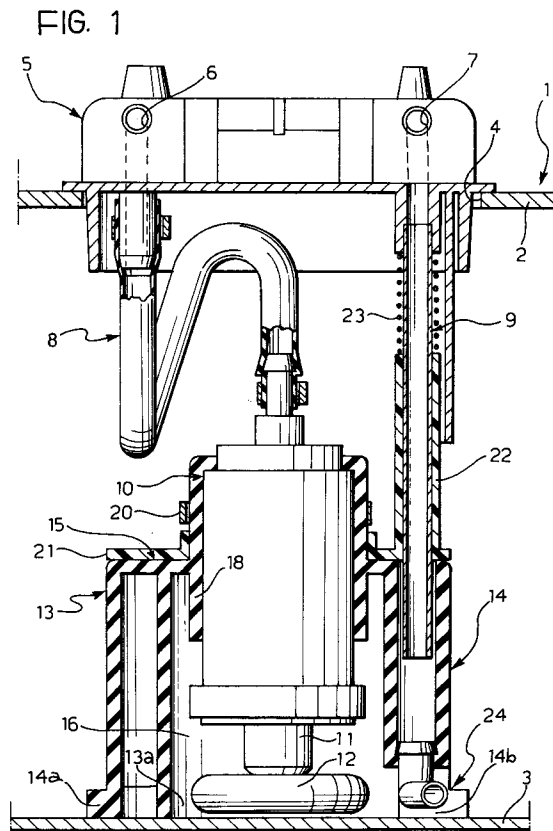
Inventor: **Bianco, Giovanni, c/o SICEB S.p.A.**  
**Via Rio Galletto 1**  
**I-17045 Legino (Savona)(IT)**

Designated Contracting States:  
**AT BE CH DE DK ES FR GB GR IE IT LI LU MC**  
**NL PT SE**

Representative: **Gerbino, Angelo et al**  
**c/o JACOBACCI-CASETTA & PERANI S.p.A.**  
**Via Alfieri 17**  
**I-10121 Torino (IT)**

**A support for the intake pipe of a fuel-supply pump, particularly for an internal combustion engine.**

A support for the intake pipe of a fuel-supply pump, particularly for an internal combustion engine comprises a body (13) which is intended to be housed in a fuel tank (1) bearing on the bottom wall (3) thereof, the body defining a chamber (16), which is substantially isolated from the tank (1) and communicates therewith through an inlet duct (14b), into which an end of the intake pipe (11) opens. The body (13) has an opening (13a) facing the bottom (3) of the tank (1) and the intake pipe (11) is disposed with its end in the opening (13a), at the bottom (3) of the tank (1).



**EP 0 562 536 A1**

The present invention relates to a support for the intake pipe of a fuel-supply pump, particularly for an internal combustion engine, comprising a body which is intended to be housed in a fuel tank bearing on the bottom wall thereof, the body defining a chamber, which is substantially isolated from the tank and communicates therewith through an inlet duct, into which an end of the intake pipe opens.

Supports of the aforesaid type are known, in which the body is generally constituted by a plurality of elements which are connected to each other so as to define a chamber having a base which is intended to bear on the internal surface of the bottom wall of the fuel tank, and above which the end of the intake pipe, which is furthest from the pump, is disposed.

These known supports are complex because they are composed of fairly large numbers of parts and, moreover, the fact that the support has a base means that the intake pipe cannot take in all the fuel present in the tank since the thickness of the base prevents the intake pipe from taking in the thin layer of fuel at the bottom of the tank which, for a tank of average dimensions, may correspond to a volume of about 5 or 6 litres of fuel which must therefore be considered as an unavailable reserve.

The object of the present invention is to propose a support for the intake pipe of a fuel-supply pump which does not have the aforementioned disadvantages of the prior art.

This object is achieved by virtue of the fact that the body has an opening facing the bottom of the tank and that the intake pipe can be disposed with its end in the opening, substantially at the bottom of the tank.

By virtue of this characteristic, the support according to the invention enables the intake pipe of the pump to be located directly in contact with the internal surface of the bottom wall of the tank so that optimal use can be made of the capacity of the tank. By virtue of the presence of the opening facing the bottom of the tank, the support is also formed by a smaller number of elements than that of the prior art, and is thus structurally simpler and cheaper to produce.

Further characteristics and advantages of the present invention will become clear from the detailed description which follows with reference to the appended drawings, provided purely by way of non-limiting example, in which:

Figure 1 is a side elevational view of a first embodiment of the support according to the invention,

Figure 2 is a view similar to Figure 1 of a second embodiment of the invention, and

Figure 3 is a variant of the support shown in Figure 1.

With reference initially to Figure 1, a fuel tank for supplying an internal combustion engine is generally indicated 1. An upper wall of the tank is indicated 2 and the bottom wall of the tank is indicated 3.

The upper wall 2 has a hole 4 in which a head 5 is fitted and anchored to the wall 2, the head having two internal ducts 6 and 7 which are connected to a delivery pipe 8 and to a return pipe 9, respectively, for the fuel.

Below the head 5 is a fuel-supply pump 10 of the suction type, the top of which is connected to the delivery pipe 8 and the bottom of which is connected to an intake pipe 11 having an end disposed near the bottom wall 3 of the tank 1. The intake pipe 11 has a filter 12, in known manner.

The pump 10 is supported below the head 5 by a body 13 of elastomeric material or the like, having a side wall 14 and a top wall 15 which, together with the bottom wall 3 of the tank, define a chamber 16 known as the "stilling basin" into which the end of the intake pipe 11 with the filter 12 opens.

The chamber 16 is substantially isolated from the tank and communicates therewith through a duct 14b in the side wall 14 adjacent the bottom 3 of the tank.

The side wall 14 has an enlarged support base 14a which surrounds a lower opening 13a of the body 13 and acts as a seal between the body 13 and the internal surface of the bottom wall 3 of the tank.

The top wall 15 of the body includes a sleeve 18 which is formed integrally with the wall 15 and is perpendicular thereto, the sleeve partially surrounding the casing of the pump 10 and being clamped to the pump 10 by means of a fixing ring 20. Since the sleeve 18 is made of elastomeric material, it also has the dual function of forming a seal between the body 13 and the pump 10 and of damping and absorbing the vibrations produced by the pump 10 in operation.

On top of the body 13 is a rigid cover 21 the shape of which corresponds to that of the top wall 15 and of the sleeve 18 and which has the function of structurally stiffening the upper portion of the body 13, the cover having a tubular appendage 22 which projects towards the head 5 and in which the return duct 9 is slidably inserted. The return pipe 9 collects the excess fuel which has been sent to the engine supply system and has not been used and conveys it to an ejector device 24 of known type disposed near the bottom wall 3 of the tank near the duct 14b.

The tubular appendage 22 is associated telescopically with the return pipe 9, and a helical

spring 23 interposed between it and the head 5 has the function of keeping the head 5 and the cover 21 apart and consequently keeping the body 13 in contact with the bottom wall 3 of the tank.

Figure 2, in which elements identical or similar to those described above are indicated by the same reference numerals, shows a second embodiment of the support according to the invention.

In this embodiment, the fuel-supply pump (not shown in the drawing) is outside the tank 1 and only a fuel intake pipe 8a is therefore present, with its end 11 bearing on the bottom wall 3 of the tank. The top wall 15 of the body 13 has a through-hole 17 in an approximately central position, through which extends a tubular duct 19 formed integrally with the rigid cover 21.

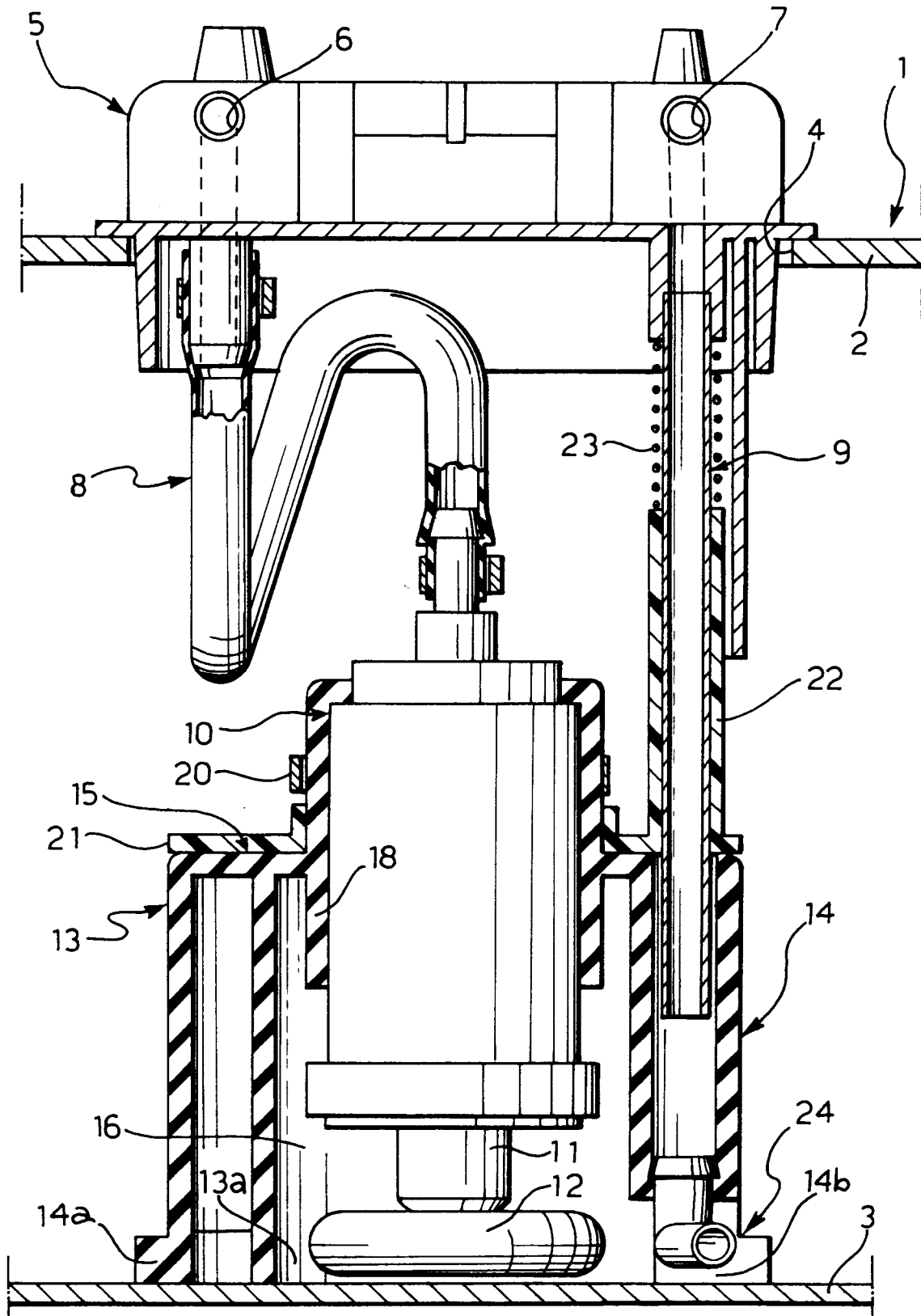
Figure 3 shows a variant of the support of Figure 1. In this variant, the body 13 is formed entirely of rigid material and the upper cover is therefore absent. According to this variant, the appendage 22 is formed integrally with the body 13. In this variant, it is necessary to interpose a sealing ring 25 between the lower end of the side wall 14 and the bottom wall 3 of the tank. A pair of rings 26a and 26b of elastomeric material or the like are also interposed between the sleeve 18 and the pump 10 and their function is both to form seals between the body 13 and the pump 10 and to act as vibration-damping devices for the pump 10 in operation.

Clearly, the fact that the end of the intake pipe 11 of the fuel-supply pump can be disposed adjacent the bottom of the tank is particularly advantageous since, in comparison with the prior art, it enables a considerably more efficient use of the capacity of the tank to be made.

## Claims

1. A support for the intake pipe of a fuel-supply pump, particularly for an internal combustion engine, comprising a body (13) which is intended to be housed in a fuel tank (1), bearing on the bottom wall (3) thereof, the body defining a chamber (16) which is substantially isolated from the tank (1) and communicates therewith through an inlet duct (14b) into which an end of the intake pipe (11) opens, characterised in that the body (13) has an opening (13a) facing the bottom (3) of the tank (1) and in that the intake pipe (11) can be disposed with its end in the opening (13a), substantially at the bottom (3) of the tank (1).
2. A support according to Claim 1, characterised in that it includes face sealing means (14a; 25) between the body (13) and the bottom wall (3) of the tank (1).
3. A support according to Claim 1 or Claim 2, characterised in that the body (13) also supports the fuel-supply pump (10).
4. A support according to Claim 3, characterised in that sealing means (18; 26a, 26b) are interposed between the supply pump (10) and the body (13).
5. A support according to Claim 4, characterised in that the sealing means (18; 26a, 26b) also act as vibration-damping devices for the pump (10).
6. A support according to any one of Claims 1 to 5, characterised in that the body (13) is made entirely of elastomeric material or the like and includes an upper cover (21) of rigid material.
7. A support according to any one of Claims 1 to 5, characterised in that the body (13) is made entirely of rigid material.
8. A support according to any one of Claims 1 to 7, characterised in that the body (13) has a tubular appendage (22) in which the end portion of a return pipe (9) for the excess fuel sent to the supply system of the engine is slidably engaged.

FIG. 1



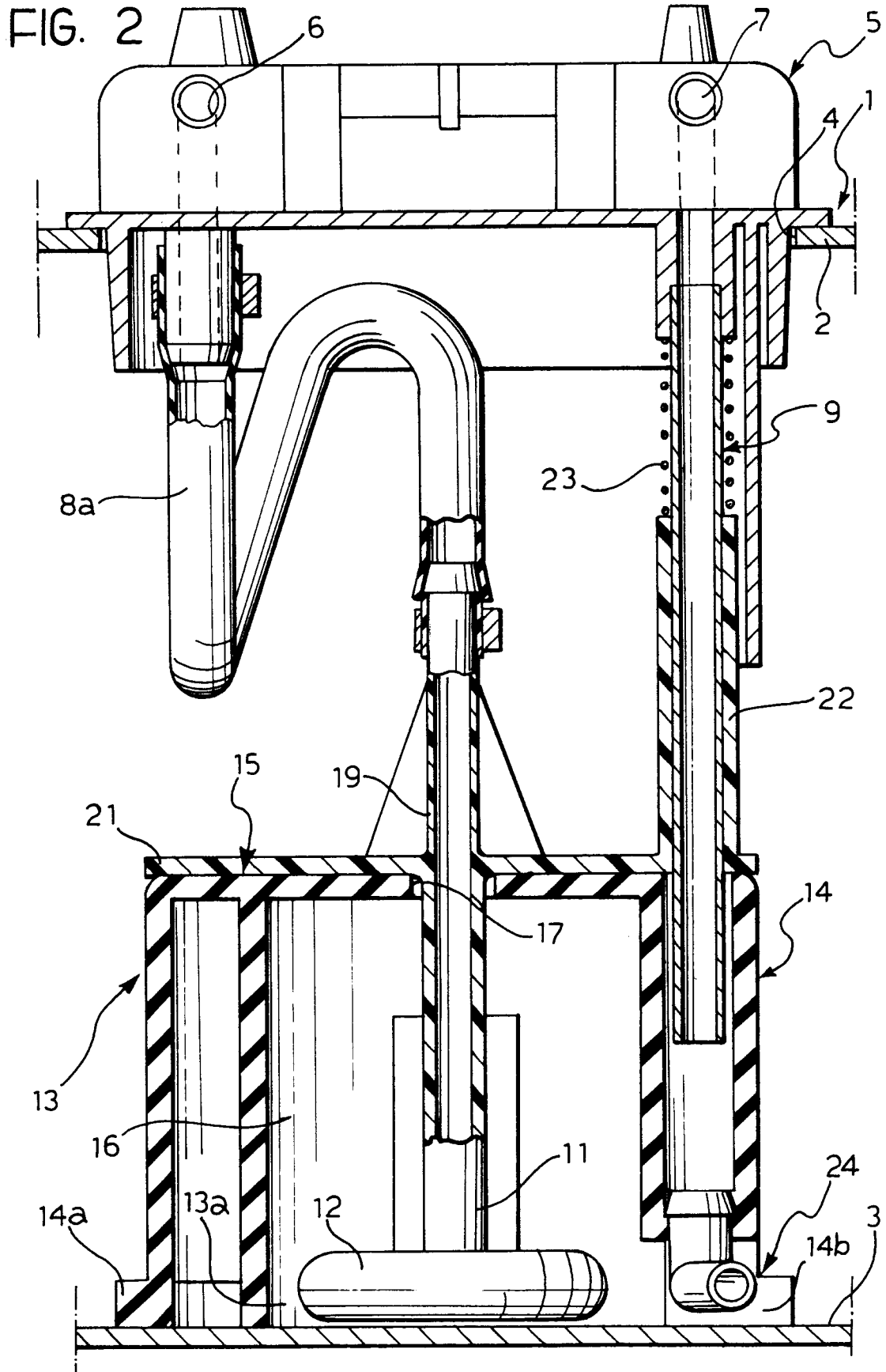
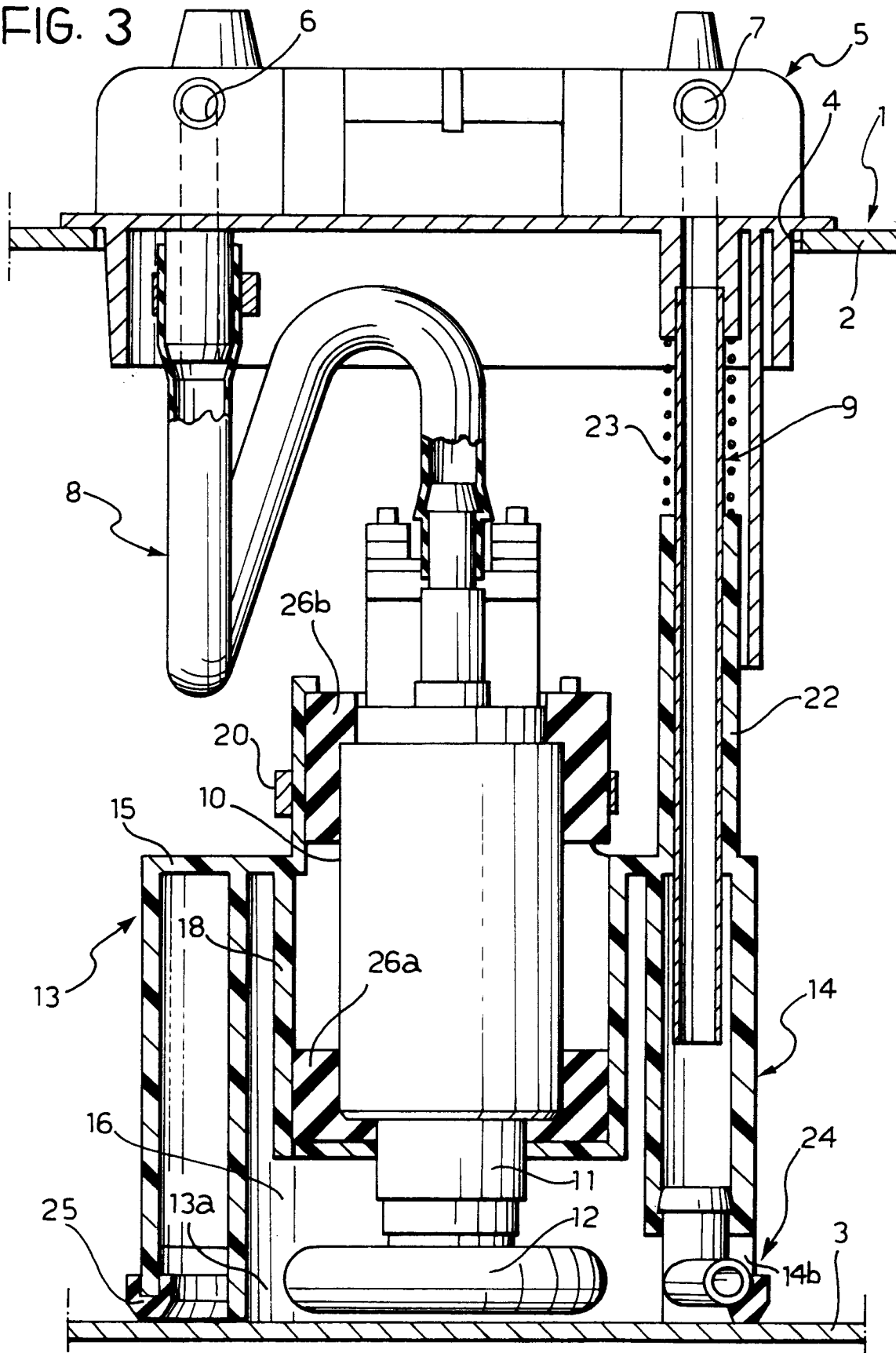


FIG. 3





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.5)
X	US-A-4 309 155 (HEINZ ET AL.) * column 3, line 21 - column 4, line 8; figure 3 *	1-5,7,8	F02M37/10
Y	---	6	
X	DE-A-3 914 081 (ROBERT BOSCH GMBH) * column 2, line 22 - line 25; figures 1,2 *	1-5,7	
Y	---	6	
A	PATENT ABSTRACTS OF JAPAN vol. 9, no. 22 (M-354)(1745) 30 January 1985 & JP-A-59 168 256 ( NISSAN JIDOSHA K.K. ) 21 September 1984 * abstract *	6	
A	EP-A-0 379 631 (VDO ADOLF SCHINDLING AG) * column 3, line 25 - line 40; figures 1,3 *	1	
A	EP-A-0 314 068 (NIPPONDENSO CO. LTD.) * figures *	1	TECHNICAL FIELDS SEARCHED (Int. Cl.5)
A	EP-A-0 378 796 (NISSAN MOTOR CO. LTD.) * figures *	1	F02M
-----			
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 18 JUNE 1993	Examiner ALCONCHEL Y UNGRIA J
CATEGORY OF CITED DOCUMENTS		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	
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			