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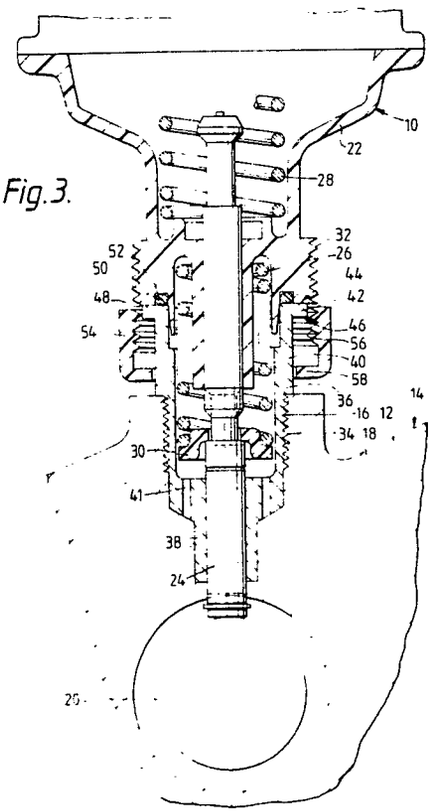
(54) Mounting arrangement.

(57) A mounting arrangement for mounting a fuel pump (10) on an engine (14), the fuel pump comprising a housing (22) and a drive shaft (24) which can pass through an opening (16) in a block (12) of the engine for connecting with, and being actuable by, a rotary part (20) of the engine, the mounting arrangement comprising a cylindrical mounting boss (36) having a guide section (38) for guiding the drive shaft and a mounting section (40) extending away from the block, the outer edge of the mounting section defining an outwardly facing surface (44) for engaging a corresponding first abutment surface (48) on the housing of the fuel pump; a sealing ring (50) positionable between the outwardly facing surface and the first abutment surface; a clamping ring (54) having an internally threaded portion (56) and an annular lip (58); an annular flange (42) defining a second abutment surface (46) engagable by the annular lip; and an externally threaded portion (32) for screw threaded engagement by the internally threaded portion of the clamping ring; the arrangement being such that, on screw threading the internally threaded portion of the clamping ring to the externally threaded portion until the annular lip engages the second abutment surface, the first abutment surface engages the outwardly facing surface with the sealing ring therebetween to form a substantially fluid tight seal therebetween, and the fuel pump is mounted on the engine. This arrangement is easier to assemble with less risk of oil leakage.

Fig.3.



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MOUNTING ARRANGEMENT

This invention relates to a mounting arrangement for mounting a fuel pump or other device on an engine, and in particular a mounting arrangement for mounting a fuel pump having a plastics housing on an internal combustion engine.

The conventional arrangement for mounting a fuel pump on an engine is by passing bolts through apertures in a flange or flanges on the fuel pump housing, and threadingly engaging the bolts in corresponding threaded apertures in the engine block. This conventional arrangement can have the disadvantages that due to extremes of temperature, the housing of the fuel pump can distort between the bolt fixings causing oil leakage; a machined pad with a high degree of flatness and surface finish is required on the engine to prevent oil leakage; and assembling the fuel pump to the engine requires careful torquing up of the bolts otherwise distortion of the flange(s) can occur, resulting in oil leakage. These problems are heightened with the use of a fuel pump having a housing of plastics material.

Other arrangements are also known, such as using an annular member which is bolted to the engine with the body of the fuel pump secured to the annular member by a clamping band, as shown in GB patent application no. 2176238A, and such as using an adjustable clamping ring as shown in GB patent no. 1592355. The arrangement disclosed in GB 2176238A has the disadvantages that it is prone to oil leakage, is expensive, is difficult to service, and is not susceptible to easy assembly. The arrangement shown in GB 1592355 has the disadvantages that it is expensive, complex, and requires a large amount of space.

It is an object of the present invention to provide an improvement to the above mentioned known arrangements.

To this end, a mounting arrangement in accordance with the present invention for mounting a fuel pump or other device on an engine in which the fuel pump or other device comprises a housing and a drive shaft which can pass through an opening in a block of the engine for connecting with, and being actuable by, a rotary part of the engine, comprises a cylindrical mounting boss mountable in the opening and having a guide section for guiding the drive shaft and a mounting section extending away from the block, the outer edge of the mounting section defining an outwardly facing surface for engaging a corresponding first abutment surface on the housing of the fuel pump or other device; a sealing ring positionable between the outwardly facing surface and the first abutment surface; a clamping ring having an internally threaded portion and an annular lip which extends inwardly, the clamping ring being rotatable relative to the cylindrical mounting boss; an annular flange defining a second abutment surface engagable by the annular lip; and an externally threaded portion for screw threaded engagement by the internally threaded portion of the clamping ring; the arrangement being such that, on screw threading the internally threaded portion of the clamping ring to the externally threaded portion until the annular lip engages the second abutment surface, the first abutment surface engages the outwardly facing surface with the sealing ring therebetween to form a substantially fluid tight seal therebetween, and the fuel pump or other device is mounted on the engine.

Preferably, the annular flange is on the cylindrical mounting boss and defines the outwardly facing surface as well as the second abutment surface, and the externally threaded portion is on the housing of the fuel pump or other device adjacent the first abutment surface. Alternatively the annular flange is on the housing of the fuel pump or the other device and defines both the first and the second abutment surfaces, and the externally threaded portion is on the cylindrical mounting boss adjacent the outer edge.

The sealing ring is preferably positioned in a groove in the first abutment surface.

Preferably the cylindrical mounting boss is screw threaded in the opening in the block of the engine. Alternatively, the cylindrical mounting boss is a force fit in the opening in the block.

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

Figure 1 is an exploded view of a first embodiment of a mounting arrangement in accordance with the present invention;

Figure 2 is a partial cross-section of the mounting arrangement shown in Figure 1;

Figure 3 is a larger cross-section of the mounting arrangement shown in Figure 1, showing details of the operation of the fuel pump;

Figure 4 is an exploded view of a second embodiment of a mounting arrangement in accordance with the present invention; and

Figure 5 is a partial cross-section of the mounting arrangement shown in Figure 4.

Referring to Figures 1 to 3, there is shown a fuel pump 10 mounted and located on a block 12 of an engine 14 (Figures 2 and 3). The engine 14 comprises an opening 16 extending from the outer surface 18 of the block 12 to a rotary part 20, such

as a camshaft. The fuel pump 10 comprises a plastics housing 22, a drive shaft 24, springs 26,28, and spring retainer 30. When the fuel pump 10 is mounted in position (Figure 3) the drive shaft 24 passes through the opening 16 and connects with the rotary part 20 for reciprocating movement, thereby actuating the fuel pump. The springs 26,28 and spring retainer 30 act with the reciprocating drive shaft 24 to control the actuation of the fuel pump 10 in the usual manner which is well known in the art. In the arrangement shown in Figures 1 to 3, a part of the lower part of the plastics housing 22 has an externally threaded portion 32, which defines part of the mounting arrangement in accordance with the present invention.

The opening 16 has an internally threaded section 34 adjacent the outer surface 18 of the block 12. A cylindrical mounting boss 36 is threaded into the internally threaded section 34 of the opening 16, and provides a guide section 38 for guiding the drive shaft 24 of the fuel pump 10 and a mounting section 40 extending away from the block 12 of the engine 14. The guide section 38 has oil passages 41 for the passage of oil from the engine 14 to provide lubrication for the drive shaft 24 of the fuel pump 10. The mounting section 40 has an annular flange 42 defining an outwardly facing surface 44 at its outer edge and an inwardly facing surface 46. When the fuel pump 10 is mounted in position, the outwardly facing surface 44 of the annular flange 42 engages a corresponding abutment surface 48 (a first abutment surface) on the plastics housing 22. The externally threaded portion 32 is adjacent the first abutment surface 48. A sealing ring 50 is positioned in a groove 52 in the first abutment surface 48 to provide a substantially fluid tight seal between the fuel pump 10 and the cylindrical mounting boss 36, to substantially prevent leakage of oil.

A clamping ring 54 is positioned to encircle the cylindrical mounting boss 40 and is rotatable relative thereto. The clamping ring 54 has an internally threaded portion 56 and an annular lip 58 which extends inwardly. In use, the internally threaded portion 56 of the clamping ring 54 is screwed on to the externally threaded portion 32 of the fuel pump 10 until the annular lip 58 engages the inwardly facing surface 46 of the annular flange 44, the inwardly facing surface defining a second abutment surface. In this position, the fuel pump 10 is mounted and located on the engine 14 with the first abutment surface 48 engaging the outwardly facing surface 44 in the substantially fluid tight manner.

A second embodiment of a mounting arrangement in accordance with the present invention is shown in Figures 4 and 5. In this second embodiment, parts have been given the same reference numerals as like parts in the first embodiment of Figures 1 to 3.

In this second embodiment, the fuel pump 10′ has an annular flange 60 which defines the first abutment surface 48 of the fuel pump and which also defines a second abutment surface 62 on the opposite side of the annular flange 60 to the first abutment surface 48. The mounting section 40′ of the cylindrical mounting boss 36′ has an outer edge 64 defining the outwardly facing surface 44 and an externally threaded portion 66 adjacent the outer edge. The cylindrical mounting boss 36′ is a force fit in the opening 16.

In this arrangement, the clamping ring 54 is rotatably mounted on the fuel pump 10′. In use, the internally threaded portion 56 of the clamping ring 54 is screw fastened to the externally threaded portion 66 of the cylindrical mounting boss 36′ until the annular lip 58 of the clamping ring 54 engages the second abutment surface 62 on the annular flange 60. In this position, the fuel pump 10′ is mounted and located on the engine 14 with the sealing ring 50 forming a substantially fluid tight seal between the outwardly facing surface 44 and the first abutment surface 48.

In both of the above mounting arrangements in accordance with the present invention, the use of a single clamping ring removes the need for a machined pad on the engine block, and also removes the need for careful torquing of the attachment bolts. The risk of distortion of the housing is also substantially removed. The present invention therefore provides a mounting arrangement which substantially removes the risk of oil leakage, and which can be assembled more quickly than previously known arrangements. The present invention also provides a mounting arrangement which is more suitable for fuel pumps having a plastics housing, and which overcomes the disadvantages associated with the arrangements shown in GB 2176238A and GB 1592355.

Claims

1. A mounting arrangement for mounting a fuel pump or other device on an engine, the fuel pump or other device comprising a housing and a drive shaft which can pass through an opening in a block of the engine for connecting with, and being actuable by, a rotary part of the engine, the mounting arrangement being characterised by a cylindrical mounting boss mountable in the opening and having a guide section for guiding the drive shaft and a mounting section extending away from the block, the outer edge of the mounting section defining an outwardly facing surface for engaging a corresponding first abutment surface on the housing of the fuel pump or other device; a sealing ring

positionable between the outwardly facing surface and the first abutment surface; a clamping ring having an internally threaded portion and an annular lip which extends inwardly, the clamping ring being rotatable relative to the cylindrical mounting boss; an annular flange defining a second abutment surface engagable by the annular lip; and an externally threaded portion for screw threaded engagement by the internally threaded portion of the clamping ring; the arrangement being such that, on screw threading the internally threaded portion of the clamping ring to the externally threaded portion until the annular lip engages the second abutment surface, the first abutment surface engages the outwardly facing surface with the sealing ring therebetween to form a substantially fluid tight seal therebetween, and the fuel pump or other device is mounted on the engine.

2. A mounting arrangement as claimed in Claim 1, wherein the annular flange is on the cylindrical mounting boss and defines the outwardly facing surface as well as the second abutment surface, and the externally threaded portion is on the housing of the fuel pump or other device adjacent the first abutment surface.

3. A mounting arrangement as claimed in Claim 1, wherein the annular flange is on the housing of the fuel pump or other device and defines both the first and the second abutment surfaces, and the externally threaded portion is on the cylindrical mounting boss adjacent the outer edge.

4. A mounting arrangement as claimed in any one of the preceding Claims, wherein the sealing ring is positioned in a groove in the first abutment surface.

5. A mounting arrangement as claimed in any one of the preceding Claims, wherein the cylindrical mounting boss is screw threaded in the opening in the block of the engine.

6. A mounting arrangement as claimed in any one of Claims 1 to 4, wherein the cylindrical mounting boss is a force fit in the opening in the block of the engine.

Fig.1.

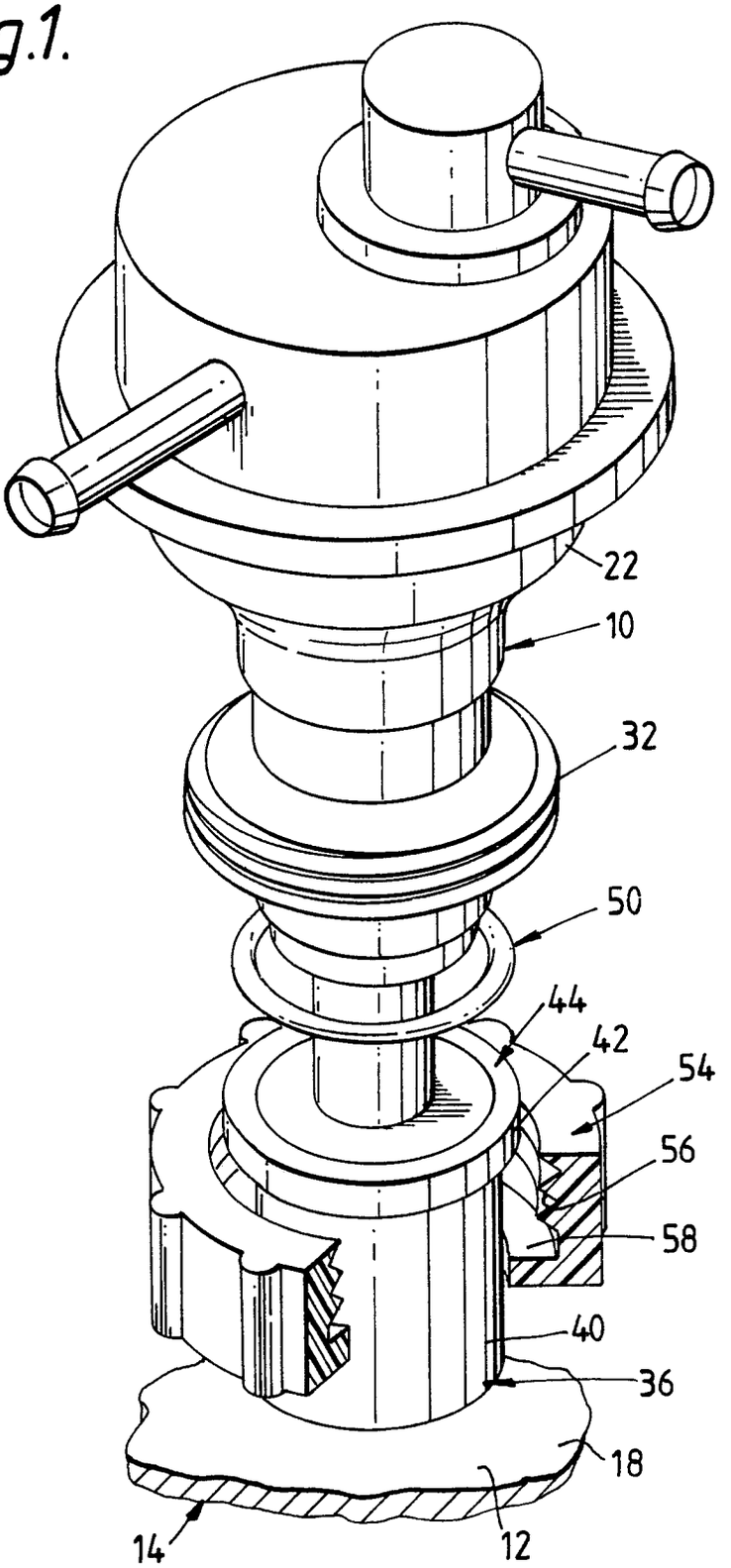

Fig.2.

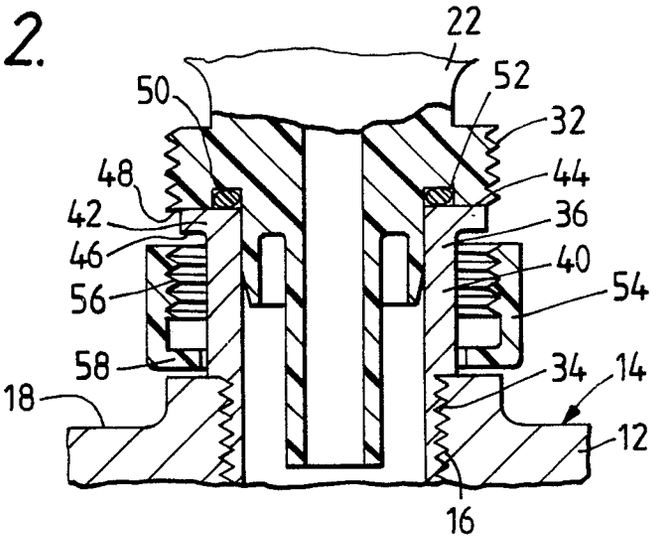
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Fig.5.

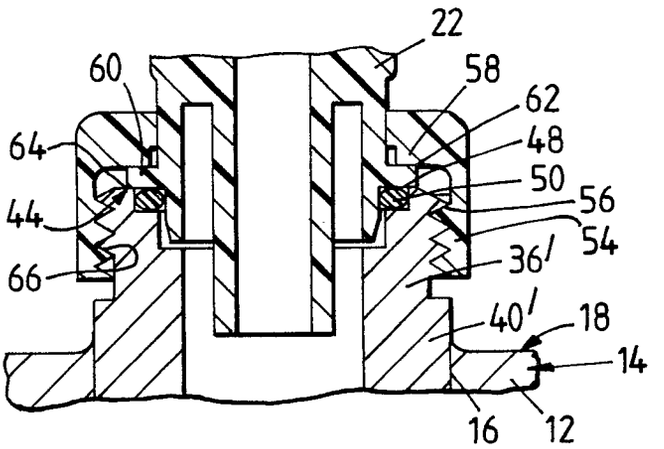
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Fig.3.

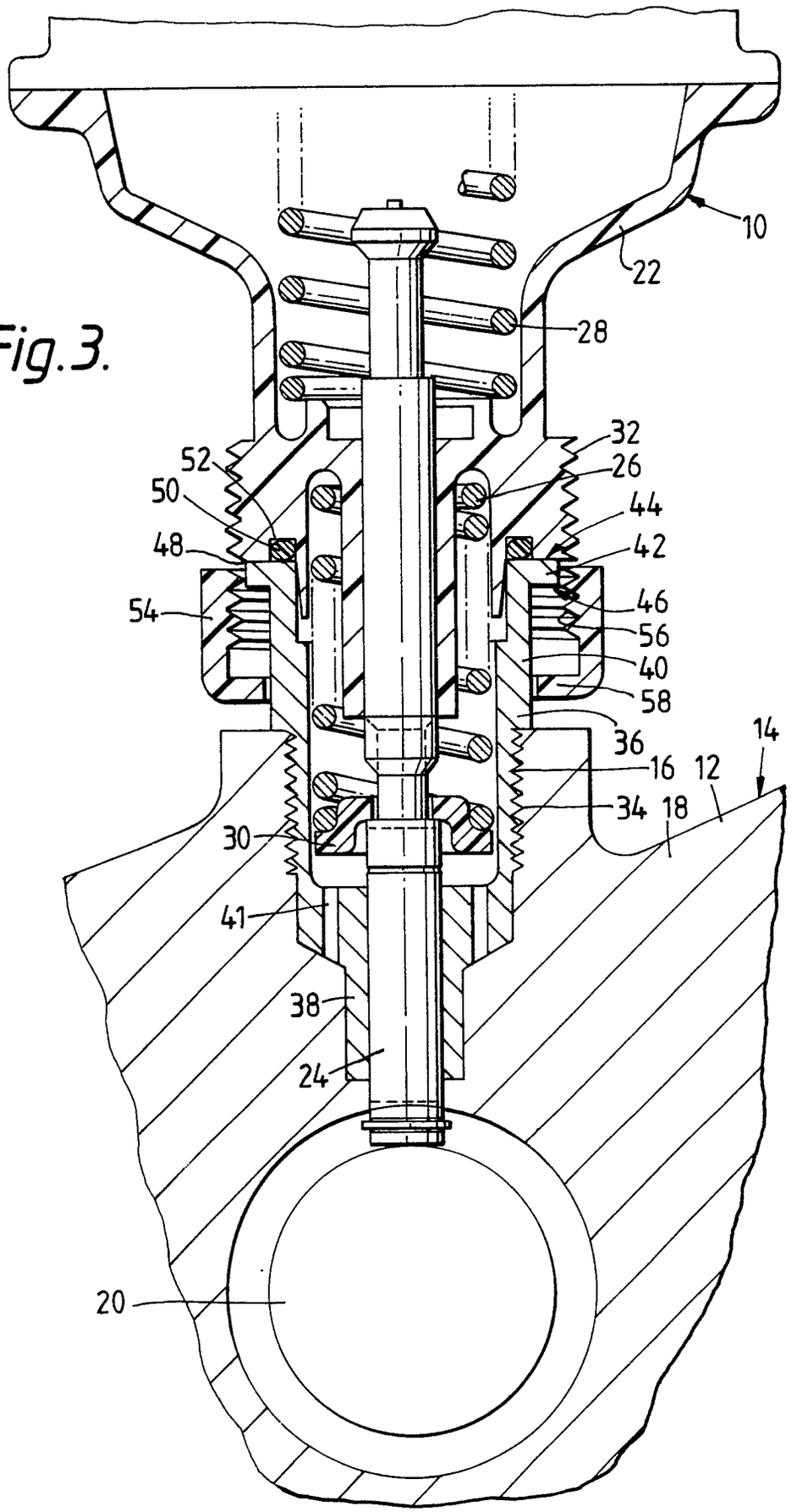
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Fig.4.