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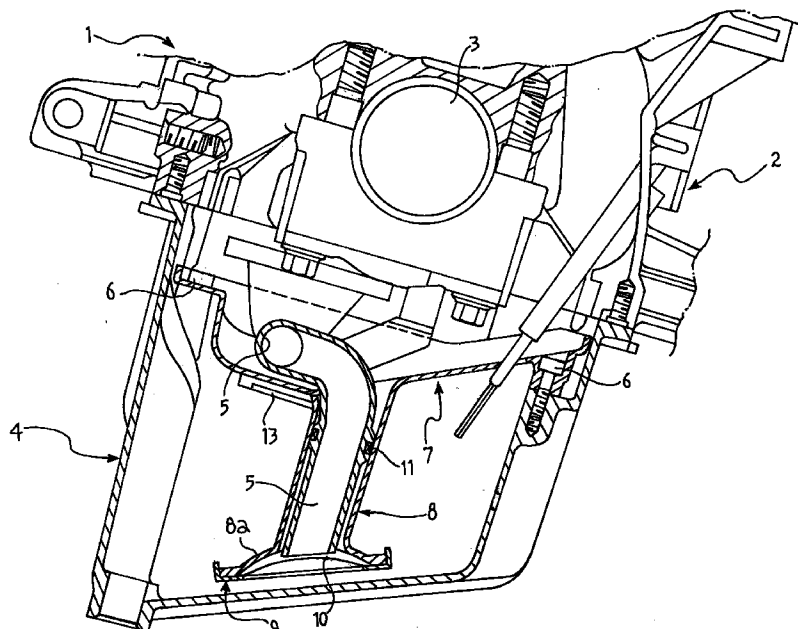
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**(54) A cover for a lubricating-oil sump and an internal-combustion engine comprising the cover**

(57) The cover (7) has, in its central region, a tubular element (8) which can house the intake pipe (5) of the oil-circulation pump and which is of a length such that, in the condition of use, it extends into the sump (4) beyond the end of the intake pipe (5). The lower end

(8a) of the tubular element (8) is provided with a filter (10). The cover (7) also has holes (12) with which shutters (13) are associated for preventing oil from returning from the sump (4) to the block (2) of the engine (1).

**FIG. 1**



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## Description

[0001] The present invention relates to a cover for the lubricating-oil sump of an internal-combustion engine with an associated lubricating-oil circulation pump to which an intake pipe, extending into the sump, is connected.

[0002] The cover according to the invention is characterized in that it has, in its central region, an integral tubular element which can house the intake pipe and which is of a length such that, in the condition of use, it extends into the sump beyond the end of the intake pipe, the lower end of the tubular element being provided with a filter.

[0003] Further characteristics and the advantages of the invention will become clear from the following detailed description given purely by way of non-limiting example with reference to the appended drawings, in which:

Figure 1 is a partial transverse section through an internal combustion engine having an oil-sump cover according to the invention, and

Figure 2 is another sectioned view of the lubricating-oil sump of the engine of Figure 1 and of the associated cover.

[0004] In Figure 1, an internal combustion engine for a motor vehicle is generally indicated 1. The engine comprises a block 2 in which the drive shaft 3, the associated pistons, and other members and devices are mounted in a known arrangement.

[0005] A sump 4 for the lubricating oil is connected to the bottom of the block 2.

[0006] An intake pipe 5 extends into the sump 4 and is connected, known manner, to the intake of a lubricating-oil circulation pump (not shown).

[0007] A cover, generally indicated 7, is fixed to the oil sump 4 by means of screws 6. This cover is advantageously made of moulded plastics material.

[0008] As can be seen in Figure 1, the cover 7 is of a generally dished shape and has, in its central region, an integral tubular element 8 inside which the intake pipe 5 extends. The tubular element 8 is of a length such that it extends beyond the lower end of the intake pipe 5.

[0009] The lower portion 8a of the tubular element 8 is flared like a bell and an annular retaining member 9 snap-engaged thereon clamps and holds a filter element 10 in position.

[0010] The portion of the intake pipe 5 which extends in the tubular element 8 of the cover 7 advantageously carries an external sealing ring 11 which bears on the inner surface of the element, closing the annular space between this element and the intake pipe in a leaktight manner.

[0011] During assembly, the cover 7 is fixed to the sump 4 and the sump is then coupled and fixed to the

block 2 in which the lubricating-oil circulation pump is already mounted. During the coupling of the sump to the block, the end portion of the lubricating-oil intake pipe 5 is introduced into the tubular element 8 of the cover 7 on the end portion of which the filter 10 is already mounted.

[0012] The base of the cover 7 advantageously has a plurality of holes 12 of which one is visible in Figure 2 in which the sump 4 is shown sectioned in a plane disposed behind the plane of the section shown in Figure 1. The holes 12 in question are advantageously located in relative positions corresponding to those of the cylinders of the engine.

[0013] As can be seen in Figure 2, a respective shutter 13, advantageously also made of a moulded plastics material, is associated with each hole 12 of the cover. In the embodiment shown, each shutter 13 is substantially in the form of a door articulated like a rocker to the face of the cover facing the sump 4, about an axis or fulcrum 14.

[0014] The shutters 13 are formed and connected to the cover 7 in a manner such that they can be arranged by gravity in a rest position, shown in broken outline in Figure 2, in which they leave the associated holes 12 clear. In this condition, lubricating oil can descend from the block 2 to the sump 4 in operation.

[0015] However, the arrangement of the shutters 13 is such that they can be urged dynamically to a working position shown in continuous outline in the drawings, as a result of movements of the oil in the sump 4 back towards the cover 7. In this condition, the lubricating oil is prevented from returning from the sump 4 towards the engine block 2 so that the intake pipe 5 of the oil pump safely continues to be "dipped" in the oil held in the sump.

[0016] This prevents the lubricating-oil circulation pump from taking in oil mixed with air as a result of jolting or surging of the oil in the sump 4, for example, when the motor vehicle takes a bend or accelerates or decelerates.

[0017] According to the prior art, the filter 10 is preassembled directly on the end of the intake pipe 5 connected to the oil-circulation pump. This means that, in sump-covers according to the prior art, it is necessary to provide a large hole through which the intake pipe and the associated filter can pass when the sump-and-cover unit is coupled and fixed to the engine block. Upon completion of the assembly, the edge of this large hole and the intake pipe define an annular duct through which a considerable amount of oil can return from the sump to the region above the cover as a result of jolting, with the danger that the circulation pump may take in oil mixed with air.

[0018] With the solution according to the invention, this disadvantage of the prior art is effectively prevented.

[0019] Naturally, the principle of the invention remaining the same, the forms of embodiment and details of

construction may be varied widely with respect to those described and illustrated purely by way of non-limiting example, without thereby departing from the scope of the invention as defined in the appended claims.

### Claims

1. A cover (7) for the lubricating-oil sump (4) of an internal combustion engine (1) with an associated lubricating-oil circulation pump to which an intake pipe (5) extending into the sump (4) is connected, the cover (7) being characterized in that it has, in its central region, a tubular element (8) which can house the intake pipe (5) and which is of a length such that, in the condition of use, it extends into the sump (4) beyond the end of the intake pipe (5), the lower end (8a) of the tubular element (8) being provided with a filter (10). 15
2. A cover according to Claim 1, characterized in that the lower end (8a) of the tubular element (8) is flared like a bell and an annular member (9) for retaining the filter (10) is snap-engaged thereon. 20
3. A cover according to any one of the preceding claims, characterized in that the tubular element (8) is formed integrally therewith. 25
4. A cover according to any one of the preceding claims, having a plurality of holes (12) for allowing lubricating oil to descend from the region disposed above the cover (7) to the underlying sump (4) in use, the cover being characterized in that respective shutters (13) are associated with the holes (12) and can adopt a rest position in which they leave the associated holes (12) clear and from which they can be urged dynamically to a working position in which they close the holes (12) as a result of movements of the oil back from the sump (4) towards the cover (7). 30 35 40
5. A cover according to Claim 4, characterized in that the shutters (13) are articulated like rockers to the face of the cover (7) which is intended to face towards the oil sump (4). 45
6. A cover according to Claim 4 or Claim 5, characterized in that the shutters (13) are formed and connected to the cover (7) in a manner such that they can be arranged in the rest position by gravity. 50
7. A cover according to any one of the preceding claims, characterized in that it is made of a moulded plastics material. 55
8. A cover according to any one of Claims 4 to 7, characterized in that the shutters (13) are made of a moulded plastics material.
9. An internal combustion engine (1) particularly for motor vehicles, comprising a cover (7) according to one or more of the preceding claims.
10. An engine according to Claim 9, characterized in that a sealing ring (11) is interposed between a portion of the intake pipe (5) of the oil pump and the tubular element (8) of the cover (7).
11. An engine according to Claim 10, characterized in that the sealing ring (11) is disposed in a seat formed in the outer surface of the intake pipe (5).

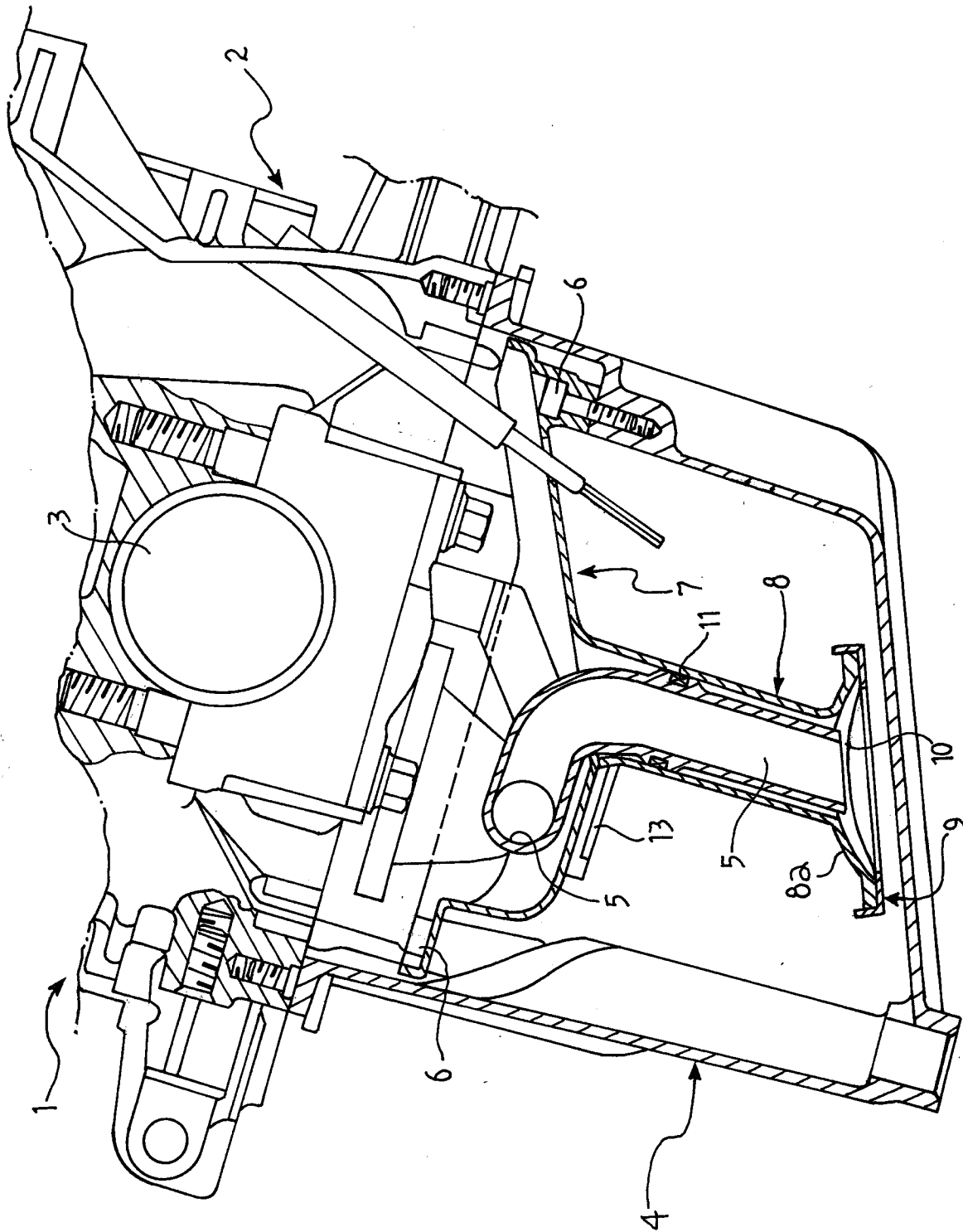
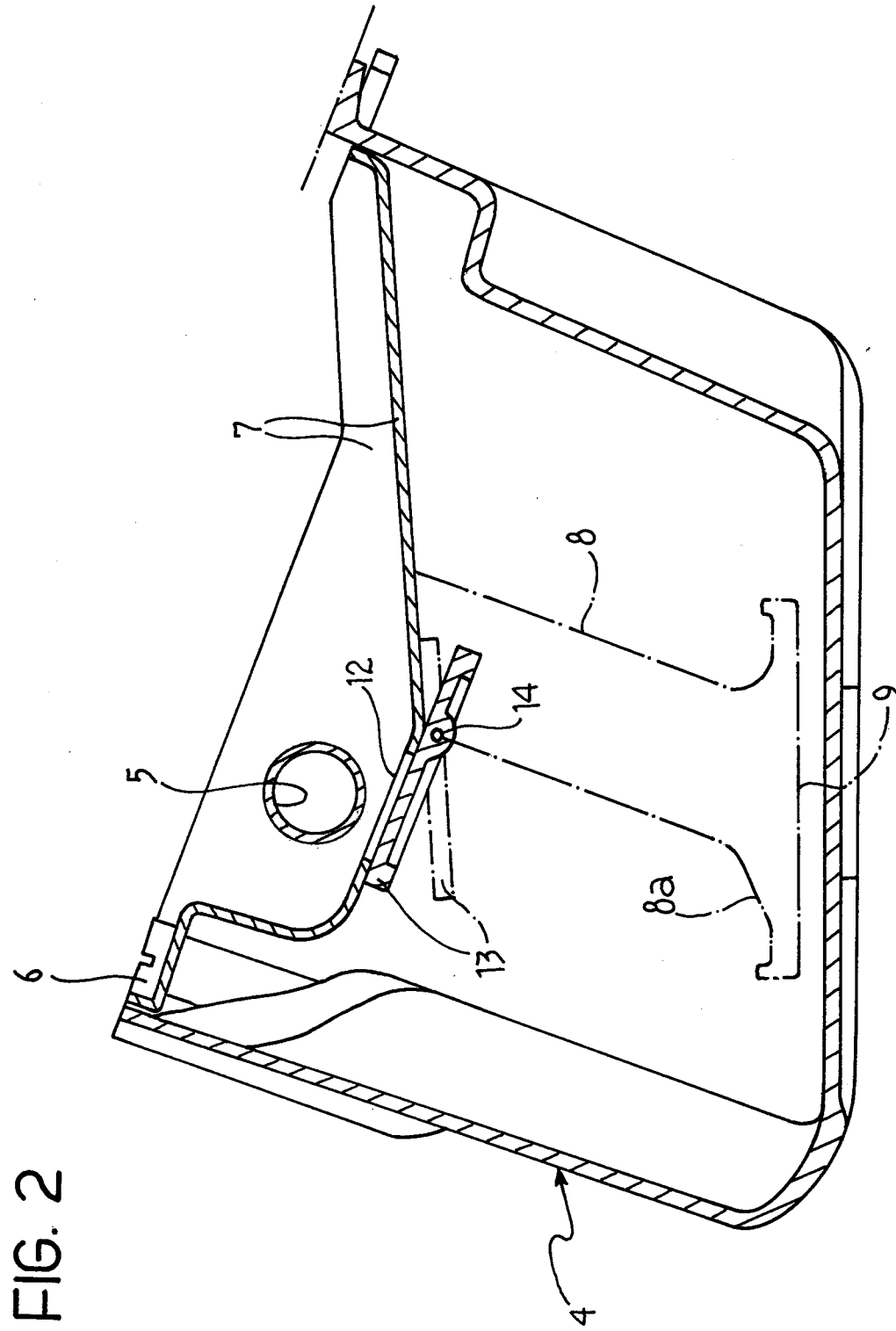


FIG. 1





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# EUROPEAN SEARCH REPORT

Application Number  
EP 98 12 3723

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			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		17 March 1999	Mouton, J
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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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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  
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