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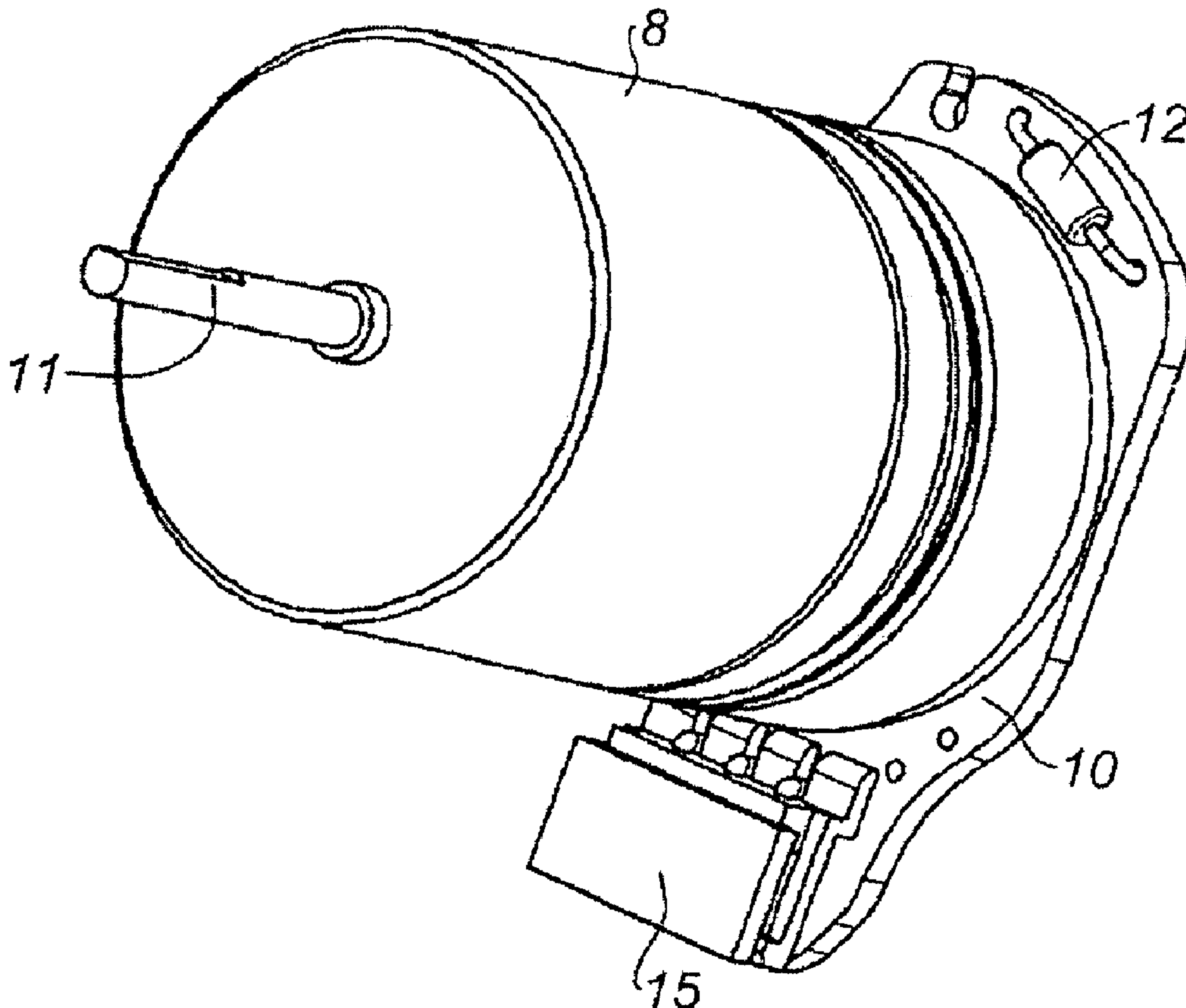
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(54) Titre : DISPOSITIF DE FIXATION A MOTEUR A COMBUSTION INTERNE EQUIPE D'UNE THERMISTANCE
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(54) Title: FIXING APPLIANCE WITH INTERNAL COMBUSTION ENGINE WITH REGULATING THERMISTOR



(57) Abrégé/Abstract:

The appliance comprises a piston mounted in a cylinder of an internal combustion engine and forming, with a cylinder head, a combustion chamber in which there is disposed a mixing, emptying and cooling fan associated with an electric drive motor (8)

(57) **Abrégé(suite)/Abstract(continued):**

connected to an electronic management module and to a supply battery. It also comprises, close to the fan motor (8), a thermistor (12) sensitive to the temperature provided for transmitting the temperature information to the management module.

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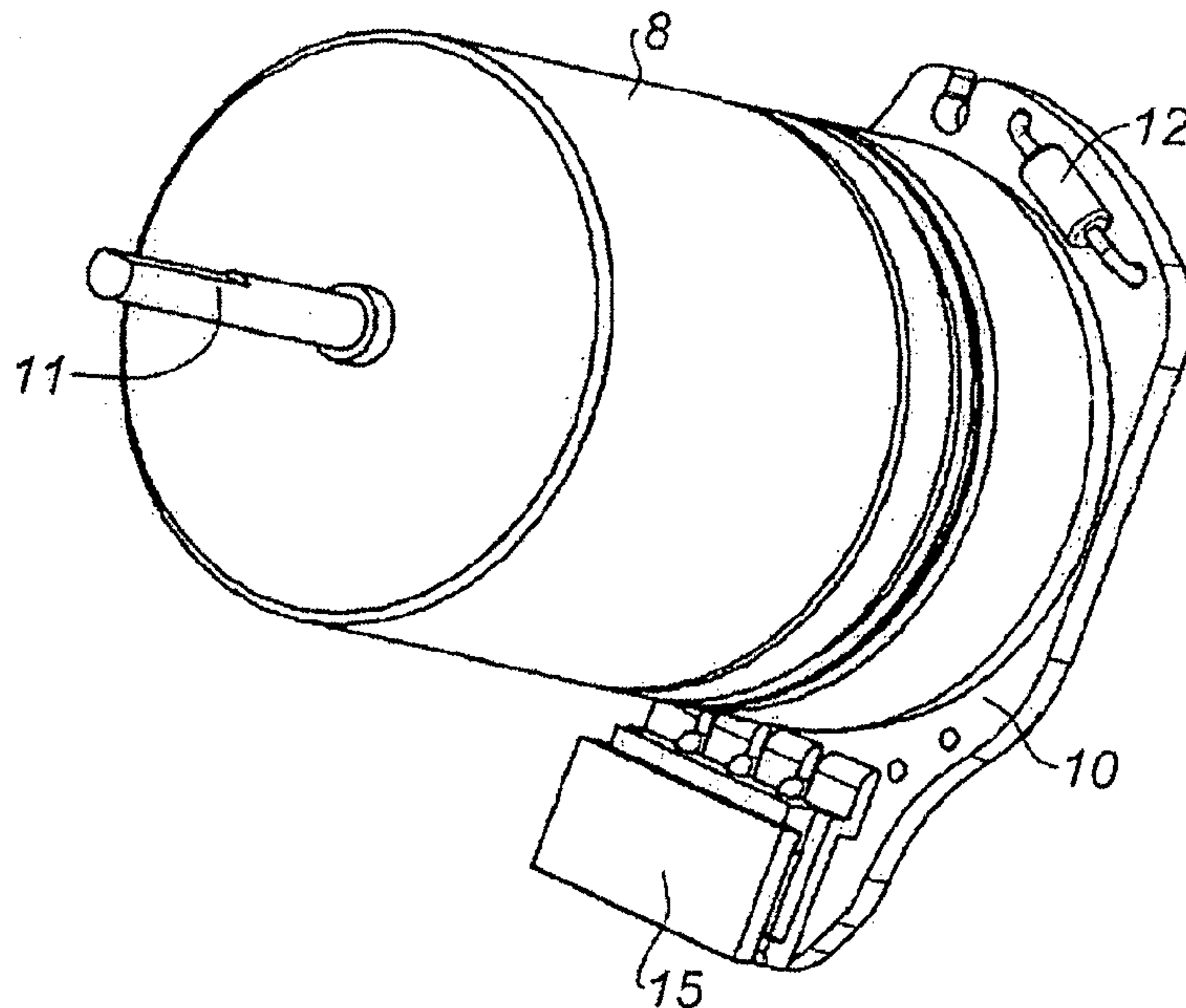
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[Continued on next page]

(54) Title: FIXING APPLIANCE WITH INTERNAL COMBUSTION ENGINE WITH REGULATING THERMISTOR



(57) Abstract: The appliance comprises a piston mounted in a cylinder of an internal combustion engine and forming, with a cylinder head, a combustion chamber in which there is disposed a mixing, emptying and cooling fan associated with an electric drive motor (8) connected to an electronic management module and to a supply battery. It also comprises, close to the fan motor (8), a thermistor (12) sensitive to the temperature provided for transmitting the temperature information to the management module.

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WO 2005/115697 A1**Declarations under Rule 4.17:**

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GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations*
- *of inventorship (Rule 4.17(iv)) for US only*

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**FIXING APPLIANCE WITH INTERNAL COMBUSTION ENGINE
WITH REGULATING THERMISTOR**

The invention concerns fixing appliances with driving of fixing elements by a piston propelled in a cylinder of an internal combustion engine, forming, with a cylinder head, a combustion chamber in which there is disposed a mixing, emptying and cooling fan. This is because the fan serves first of all to obtain the flammable mixture of gas and air; it also serves to empty the combustion chamber of the combustion residues; finally, the fan also serves to cool all the components which may have heated up during ignition and, in particular, the cylinder, the piston, the cylinder head and the other components constituting the combustion chamber.

Today, the sum of the emptying and cooling periods, after ignition, during which the fan continues to be driven in rotation, is determined as soon as the appliance is designed and fixed in the factory. This is regrettable.

The thermal realities are not taken into account.

The ideal would be to dispose a temperature sensor on the cylinder. This design would be expensive and in any event difficult to implement. As for the solution of providing a sensor on another component of the engine, this also would not be easy to implement.

Wishing then to improve the cooling conditions of the fixing appliances introduced above, the applicant had the idea of wishing to profit from the fact that the fan motor is connected to an electronic management module and to the battery supplying the appliances and thus it proposes its invention.

In a broad aspect, the invention seeks to provide a fixing appliance for driving fixing elements. The appliance comprises a cylinder of an internal combustion engine, a piston moveably mounted in a front part of the cylinder, a cooling fan mounted in a combustion chamber at a rear part of the cylinder, an electric drive motor connected to rotate the fan, and an electronic management module and a supply battery electrically coupled to the motor for controlling and powering operations of the motor, respectively. A thermistor sensitive to temperature is electrically connected to the electronic management module for transmitting temperature information to the electronic management module which is arranged to manage the temperature information supplied by the thermistor, in order to determine an operating period of the fan after ignition according to the temperature information, and wherein the thermistor is positioned rearward of the fan.

In a further aspect, the invention provides an internal-combustion-powered fixing appliance for driving fixing elements. The appliance comprises a cylinder, a piston moveably mounted in a front part of the cylinder, a cooling fan in a combustion chamber at a rear part of the cylinder, an electric drive motor positioned rearward and outside of the combustion chamber, the motor having a motor shaft which extends forward from a front end of the motor and on which the fan is mounted. An electronic management module is coupled to the motor for controlling an operation of the fan. A board is positioned at a rear end of the motor and contains thereon a circuit that electrically couples the motor with the electronic management module. A temperature sensor is mounted directly on the board, sensitive to temperature and electrically connected to the electronic management module via the circuit, for transmitting detected temperature information to the electronic management module which is arranged to control the operation of the fan in accordance with the detected temperature information.

The invention will be better understood by means of the following description of the preferred embodiment of the appliance of the invention, with reference to the accompanying drawing, in which

- Figure 1 is a view in longitudinal section of the appliance:
- Figure 2 is a rear perspective view of the fan motor of the appliance of Figure 1, showing the printed circuit connecting the motor to the electronic management module of the appliance, and
- Figure 3 is a front perspective view of the motor of Figure 2, showing the thermistor mounted on the printed circuit.

The appliance which will now be described, for all that conventional in almost all its elements, is an appliance intended to drive fixing elements by means of a piston 1, to which there is fixed a propulsion rod 21, the piston 1 being mounted in a cylinder 2 of an internal combustion engine 3, the cylinder 2 forming, with a sleeve 4, in which it is slidably mounted, and a cylinder head 5, a combustion chamber 6. A fan 7 is disposed in the chamber 6 in order to fulfil a mixing function and obtain a good flammable mixture, an emptying function for emptying the combustion chamber of the combustion residues and also a function of cooling the components which have heated up during the ignition.

The fan 7, in a manner known per se, is rotated by a motor 8, on the shaft 11 of which it is mounted, the motor being mounted in the cylinder head 5 and being connected to an electronic management module 9 and to the electrical supply battery (not shown) by a printed circuit 10.

On the side of the printed circuit 10 here turned towards the front there is mounted a regulating thermistor 12 whose lugs 16, 17 are respectively connected to an earthing area 13 of the

printed circuit and to a terminal 14 of a connector 15 for connection to the management module 9, therefore providing the connection of the thermistor 12 and management module 9. In this way, and a processor (not shown) being installed in the management module 9, the temperature information supplied by the thermistor 12 can be processed in order to determine the correct duration of functioning of the fan 7 after ignition.

WHAT IS CLAIMED IS:

1. A fixing appliance for driving fixing elements, said appliance comprising:
 - a cylinder of an internal combustion engine;
 - a piston moveably mounted in a front part of the cylinder;
 - a cooling fan mounted in a combustion chamber at a rear part of the cylinder;
 - an electric drive motor connected to rotate said fan;
 - an electronic management module and a supply battery electrically coupled to the motor for controlling and powering operations of the motor, respectively; and
 - a thermistor sensitive to temperature and electrically connected to the electronic management module for transmitting temperature information to the electronic management module which is arranged to manage the temperature information supplied by the thermistor in order to determine an operating period of the fan after ignition according to the temperature information;
 - wherein the thermistor is positioned rearward of said fan.
2. The appliance according to claim 1, wherein the electronic management module comprises a processor to determine the operating period of the fan after ignition according to the temperature information supplied by the thermistor.
3. The appliance according to claim 1, wherein the electric drive motor is connected to the electronic management module by a connecting circuit located at a rear end of said motor and the thermistor is directly mounted on the connecting circuit.
4. The appliance according to claim 1, wherein said fan is disposed in a rear end of the combustion chamber of the cylinder for obtaining a flammable mixture, emptying the combustion chamber and cooling components which have heated up during ignition.
5. An internal-combustion-powered fixing appliance for driving fixing elements, said appliance comprising:
 - a cylinder;

a piston moveably mounted in a front part of the cylinder;
a cooling fan in a combustion chamber at a rear part of the cylinder;
an electric drive motor positioned rearward and outside of said combustion chamber, said motor having a motor shaft which extends forward from a front end of the motor and on which said fan is mounted;
an electronic management module coupled to the motor for controlling an operation of the fan;
a board positioned at a rear end of the motor and containing thereon a circuit that electrically couples the motor with the electronic management module; and
a temperature sensor mounted directly on said board, sensitive to temperature and electrically connected to the electronic management module via said circuit for transmitting detected temperature information to the electronic management module which is arranged to control the operation of the fan in accordance with the detected temperature information.

6. The appliance according to claim 5, wherein said temperature sensor is positioned on a front side of the board that faces the fan.

7. The appliance according to claim 6, wherein said circuit is a printed circuit printed on a rear side of the board.

8. The appliance according to claim 7, wherein said temperature sensor is a thermistor having two lugs that extend through the board from the front side to the rear side and are electrically coupled to the circuit at the rear side of the board.

9. The appliance according to claim 6, wherein said temperature sensor is a thermistor and said electronic management module comprises a processor to determine an operating period of the fan after ignition according to the temperature information supplied by the thermistor.

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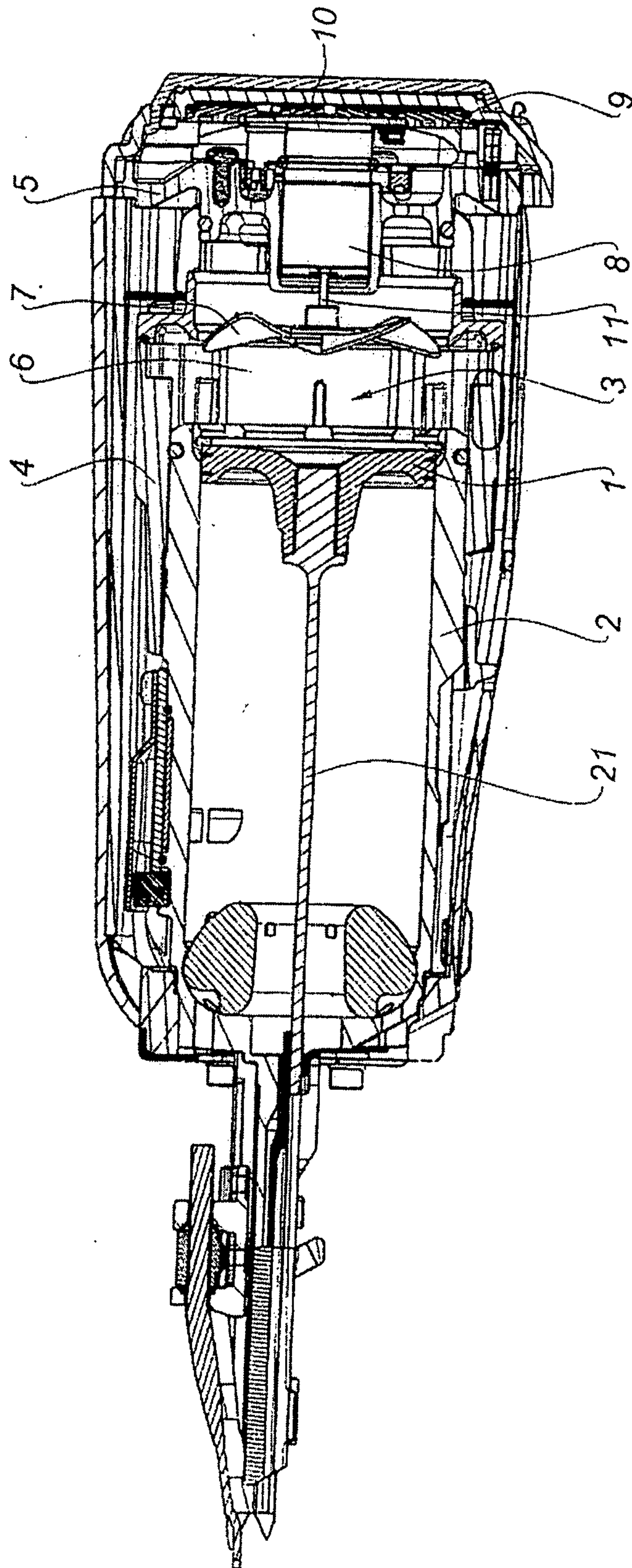


Fig. 1

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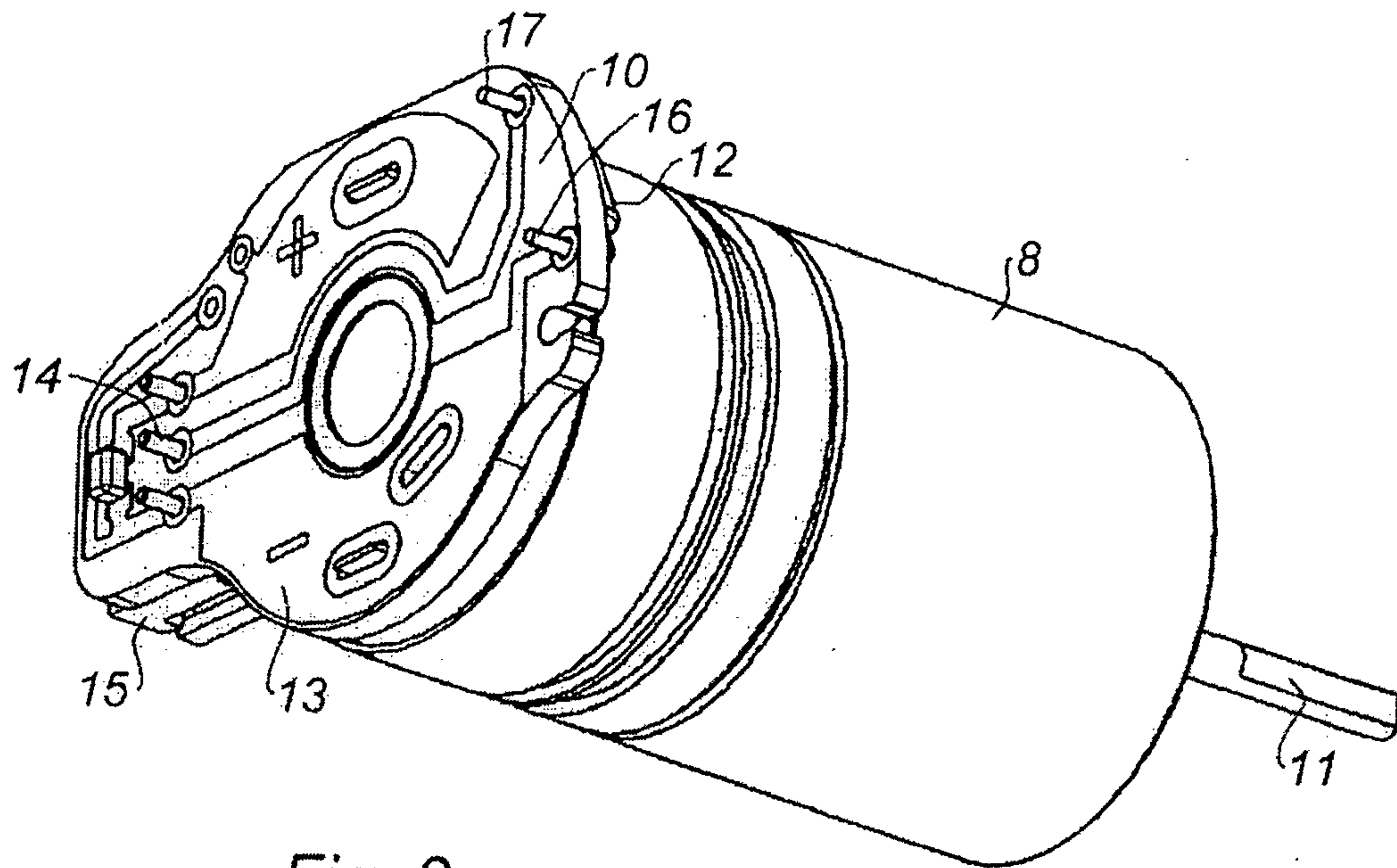


Fig. 2

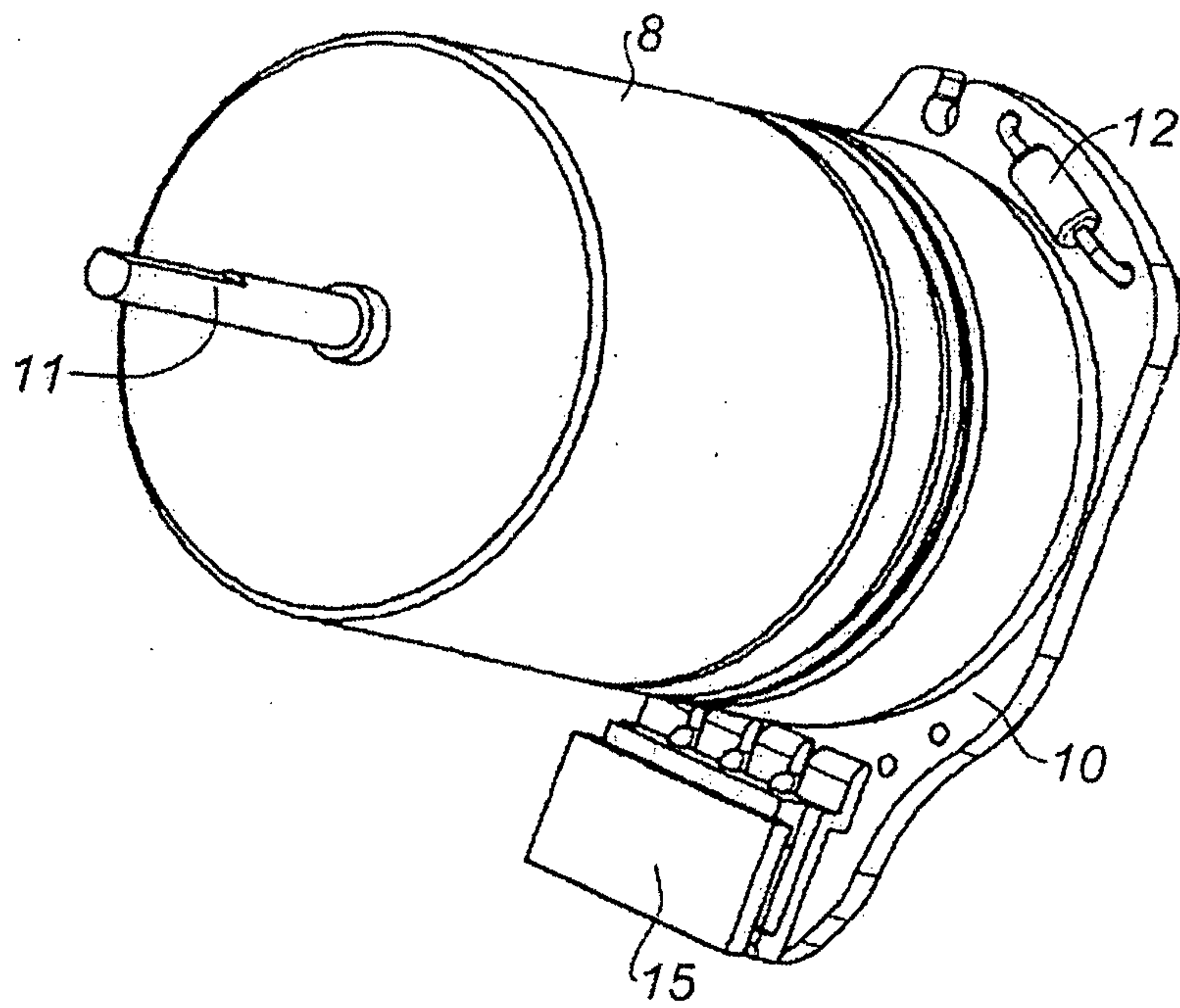


Fig. 3

