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Krainski et al.

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[54] **INJECTION PUMP**

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[51] **Int. Cl.**..... **F16j 15/32;** F04b 27/00

[58] **Field of Search** 417/494, 500, 496, 559, 417/269, 539; 277/32, 29, 59, 17–21, 15, 3, 70, 71, 72, 79

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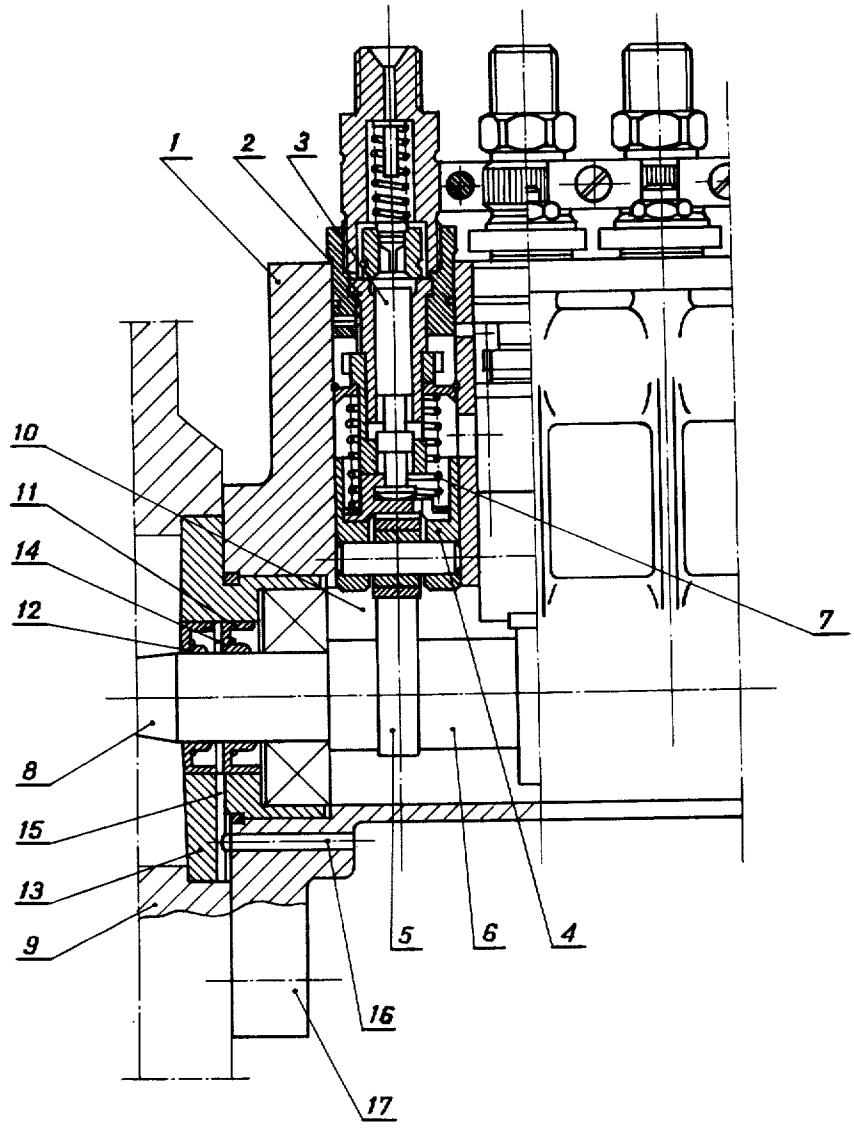
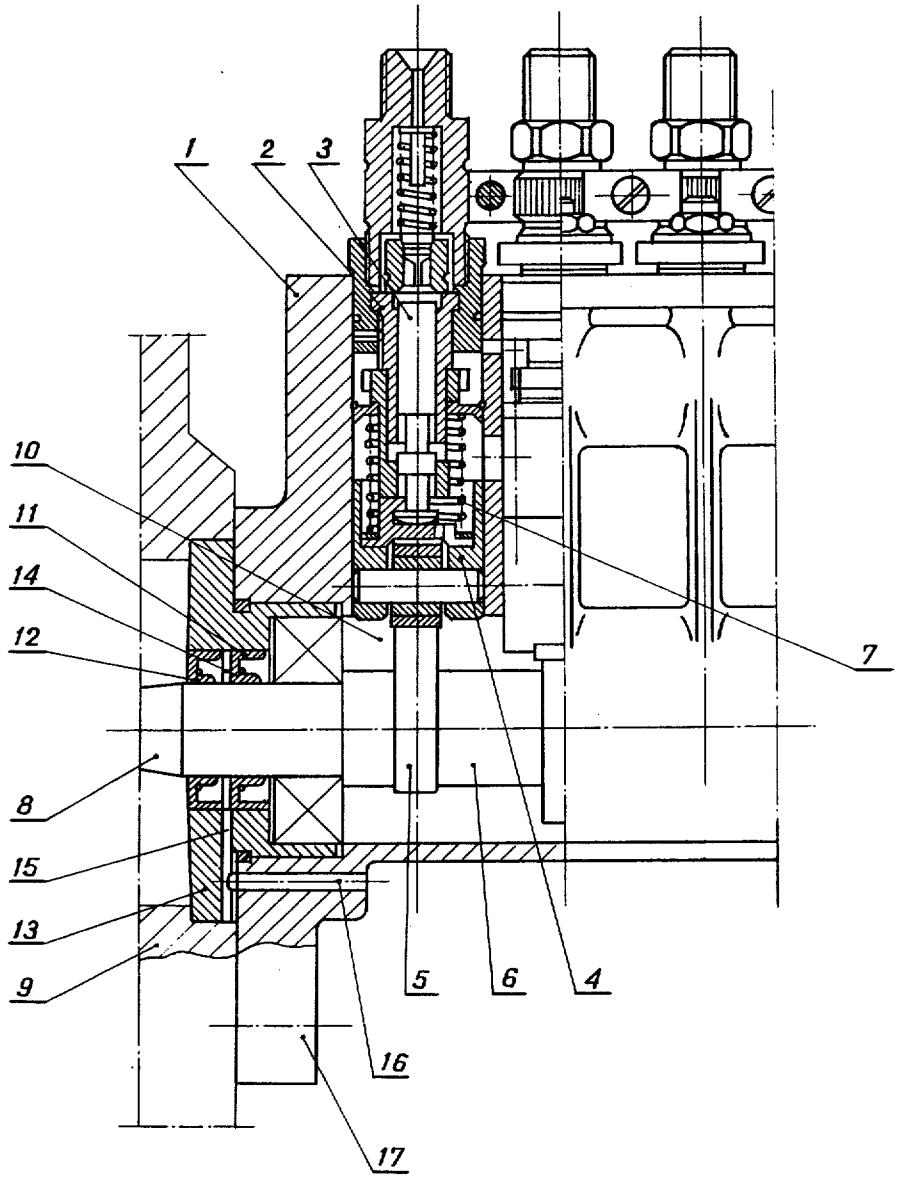
Primary Examiner—Robert I. Smith

[57] **ABSTRACT**

The invention relates to an injection pump for internal combustion engines, especially a multi-sectional series pump, which driving gears are lubricated with fuel. In the pump according to the invention, shown in the accompanying drawing, the cam-shaft (6) is sealed against the inner of the engine by means of two sealing rings (11 and 12) mounted in the bearing cover (13) of the pump, whereby the chamber (14) between said sealing rings is connected with the environment through a hole (15) made in the bearing cover (13) in such way that probable leakages through the sealing ring (11) nearer to the drive chamber (10) of the pump will flow to the outside of the engine body.

1 Claim, 1 Drawing Figure

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INJECTION PUMP

The invention relates to an injection pump for internal combustion engines, especially to multi-section series pump, the driving gears of which are lubricated with fuel.

There are known injection pumps in which the excess of fuel being supplied by the pump to the channel and the supplying space of the pumping sets is drained back to the fuel tank not immediately from the supplying space but through the drive chamber containing particularly the cam-shaft, the followers, and the return springs of pistons. The fuel flowing continuously through the drive chamber of the pump lubricates and cools its driving gears. The conduit taking off the fuel from the drive chamber to the tank is connected to the chamber over an overflow valve. Said valve maintains a low pressure in the drive chamber, necessary for to avoid aerating of the injection system. Owing to said pressure maintained within the drive chamber, the last must be suitably tight. Especially the cam-shaft of the pump must be reliably sealed, as the end of which comes into the casing of the gear which couples the cam-shaft with the crank-shaft of the engine. In case of leakages through the seal of the cam-shaft, the fuel will dilute the oil in the lubrication system of the engine, what can cause a seizing of the engine.

The seal of the cam-shaft by means of an selg-sealing ring, employed in known pump designs, is not sufficient, as the ring gets worn after some operation time of the pump, and the fuel can penetrate inside the engine. Leakages through small leaks, which do not still cause a drop of the pressure inside the pump, are particularly dangerous, as then the fuel can imperceptibly flow over a longer time into the inner of the engine.

The object of the invention is to seal the cam-shaft of the pump in a way that eliminates the possibility of penetrating the fuel into the inner of the engine.

Said object has been achieved by sealing the output of the cam-shaft against the inner of the engine by means of two sealing rings arranged in the bearing cover of the pump in such a way that probable leakages through the sealing nearer to the inner of the pump will flow beyond the engine, playing thus part of an easily perceptible signal of wearing of the sealing.

The subject of the invention will be hereinbelow specified in particulars by way on an exemplary embodiment with reference to the accompanying drawing which shows a side view with partial sectional view of the pump.

In the pump casing **1** the pumping assemblies are mounted, composed of cylinders **2** and pistons **3**. The

pistons **3** are driven by means of roll followers **4** actuated by cams **5** of the cam-shaft **6** of the pump. The return springs **7** withdraw the pistons **3** from the cylinders **2** as the cams **5** retire. The end **8** of the cam-shaft **6** of the pump comes inside the casing **9** of the gear coupling said cam-shaft with the crankshaft of the engine. The inner of the pump, comprising said gears, is called drive chamber **10.** With the uppermost portion of the drive chamber **10,** being termed supply space of pumping assemblies, there is connected a conduit not shown in the drawing, which feeds the fuel supplied by the feeding pump to the supply space. The excess of fuel fed to the supply space of the injection pump flows down to the bottom of the drive chamber **10** and then to the gear chamber of the controller, not shown in the drawing, wherefrom it is taken off through the overflow valve back to the fuel tank. With respect to the pressure in the drive chamber **10,** maintained by the overflow valve, said chamber must be appropriately sealed.

The sealing of the output of the cam-shaft **6** consists of the sealing rings **11** and **12** mounted in the bearing cover **13** of the pump. The space **14** between said sealing rings is, through the hole **15** made in the bearing cover **13** of the pump, connected with the environment, by means of an additional hole **16** in the mounting flange **17** of the pump. The sealing ring **11** nearer to the inner **10** of the pump is submitted to the pressure of the fuel inside the pump, thus being worn more intensively than the sealing ring **12** from the engine side. Such sealing eliminates completely the possiblity of penetration of the fuel from inside **10** the pump into the engine, since probable leakages through the sealing ring **11** located nearer to the inner **10** of the pump flow out of the space between the sealing rings **14** beyond the engine. Said leakages are easily perceptible signals of waring of the sealing ring.

What is claimed is:

1. An injection pump for internal combustion engines, particularly a multi-section series pump having driving gears lubricated with fuel, comprising in combination a cam shaft; a bearing cover with an opening; two sealing rings mounted in said bearing cover for sealing said cam shaft against the interior of said engine, the space between said sealing rings forming a chamber communicating with the outside environment through said opening in said bearing cover, one of said sealing rings being closer to the drive chamber of said pump, whereby leakage through said one sealing ring closer to the drive chamber flows to the outside of the engine body.

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