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FUEL PUMP

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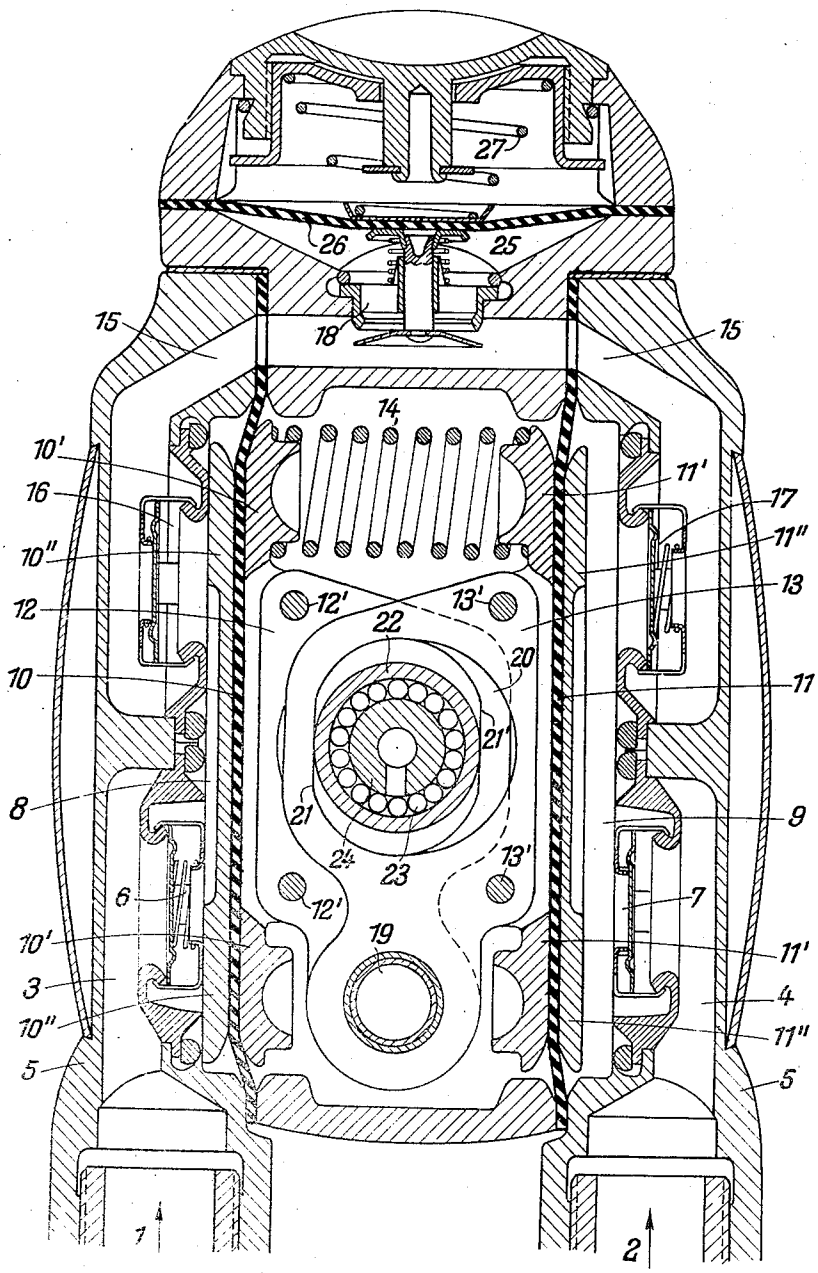

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FUEL PUMP

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This invention relates to fuel pumps, more particularly for aircraft. In all aircraft equipment it is important to keep the weight and the space occupied as small as possible, particularly in the case of reciprocating masses, for such parts can be made lighter, the smaller the moving masses are. This is applicable amongst other things to the fuel pumps employed, which comprise two opposite diaphragms with a drive arranged between them, and a spring pressing the diaphragms asunder, wherein the diaphragms are moved alternately, being moved positively by an eccentric during the suction stroke, and being moved by the spring during the delivery stroke.

Now according to the present invention the eccentric drive for such pumps is effected by means of two transmission members, arranged like scissors and pivotally connected at one end. These transmission members consist of metal sheets surrounding the eccentric. They are arranged in pairs on grounds of symmetry, this arrangement being such that the metal sheets secured to one diaphragm are located directly side by side, while the metal sheets connected with the other diaphragm bear on them laterally, outside. According to a further feature of the invention they may be provided with circular holes for the passage of the eccentric, these holes being narrowed by a chord of a circle at the side remote from the diaphragm.

The eccentric, as it rotates, bears against this plane chord surface of one pair of members, and draws the latter, together with the diaphragm, to one side, for instance to the left. When the eccentric leaves the plane surface on the left hand side, and draws the left hand diaphragm towards the right by pressing upon the other pair of transmission members, the right hand diaphragm is then also pressed towards the right, because the two diaphragms are connected by means of the pivotal connection and the compression spring. The same series of operations is now continuously repeated.

Since the entire transmission appliance oscillates together, no inertia or accelerating influences occur in the movement of the spring, for the spring only has to execute a relative movement.

The transmission appliance thus pivotally constructed normally participates merely in the reciprocating movement of the diaphragms. It permits of central driving with free suspension of the power transmission members from the diaphragm, only requires one spring, and yields a compact construction of the pump, in which there is a saving of space and weight, and also in cost of manufacture.

Owing to the fact that with this apparatus the inertia forces are very small, there is the possibility of quickly obtaining a great excess of pressure in the pump casing, which is very important in certain flying positions.

One embodiment of the invention is illustrated in section in the accompanying drawing.

In this drawing, pipe unions 1 and 2 form the inlet for the fuel into spaces 3 and 4 in a pump casing 5. Inlet valves 6 and 7 shut off the spaces 3 and 4 from the spaces 8 and 9. The spaces 8 and 9 are bounded by diaphragms 10 and 11, to which two power transmission members 12 and two power transmission members 13 respectively are secured by means of plates or discs 10' or 11' and 10'', 11'' by pins 12' and 13' respectively. Between the plates 10' and 11' there is a spring 14, which is engaged by cams on the plates. The spaces 8 and 9 are shut off from a common delivery space 15 by outlet valves 16 and 17 respectively. A regulating valve 18 forms an outlet for the fuel from the delivery space 15 into an outflow space 25, provided with a discharge pipe. It is connected with a diaphragm 26, which forms a boundary of the outflow space and determines the magnitude thereof, and which is loaded by a spring 27, which is adjustable from the outside.

The internally located transmission members 12, and the transmission members 13 bearing on them laterally at the outside, are pivotally connected with one another by bolts 19, and have apertures 20 in the middle, which are circular except for the plane surfaces 21 and 21'. Against these portions bears a ring 22, which runs upon an eccentric shaft 24 through the medium of a needle bearing 23.

This pump operates in the following manner: In the position illustrated, the eccentric ring 22 presses against the plane surface 21 of the externally located lateral transmission members 13, and thereby draws towards the left the diaphragm 11 secured thereto. Fuel is thereby drawn by suction from the inlet 2 through the valve 7 into the space 9. Upon further rotation of the eccentric the latter presses against the portion 21' of the central transmission members 12 and draws them over towards the right, fuel being now drawn by suction in a similar manner into the space 8. Owing to the pressure upon the spring 14 and upon the bolt 19 the diaphragm 11 is now likewise pushed towards

the right, the fuel passing out of the space 9 through the valve 17 into the common delivery space 15. These operations are continuously repeated on both sides.

What I claim is:—

1. A fuel pump comprising two opposite diaphragms each forming the wall of a pump compartment having an inlet communicating with the fuel supply and an outlet communicating with a fuel delivery space, two transmission members, arranged like scissors and pivotally connected at one end, for transmitting the drive from the eccentric to the diaphragms, the said eccentric, through the medium of the transmission members, positively moving the diaphragms alternately for the suction stroke when oil is drawn into the compartments alternately through the inlets thereof, and a spring, pressing the diaphragms asunder, and returning the diaphragms for the delivery stroke when oil is forced from the compartments alternately through the outlets thereof into the fuel delivery space.

2. A fuel pump comprising two opposite diaphragms each forming the wall of a pump compartment having an inlet communicating with the fuel supply and an outlet communicating with a fuel delivery space, a driving eccentric arranged between the diaphragms, two transmission members, arranged like scissors and pivotally connected at one end, for transmitting the drive from the eccentric to the diaphragms, the transmission members being formed with holes through which the eccentric passes, these holes being circular except at the side remote from the diaphragm in each case, where the boundary of the hole follows a chord instead of an arc, the said eccentric, through the medium of the transmission members, positively moving the diaphragms alternately for the suction stroke when oil is drawn into the compartments alternately through the inlets thereof, and a spring, pressing the diaphragm asunder, and returning the diaphragms for the delivery stroke when oil is forced from the compartments alternately through the outlets thereof into the fuel delivery space.

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