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OIL BURNERS

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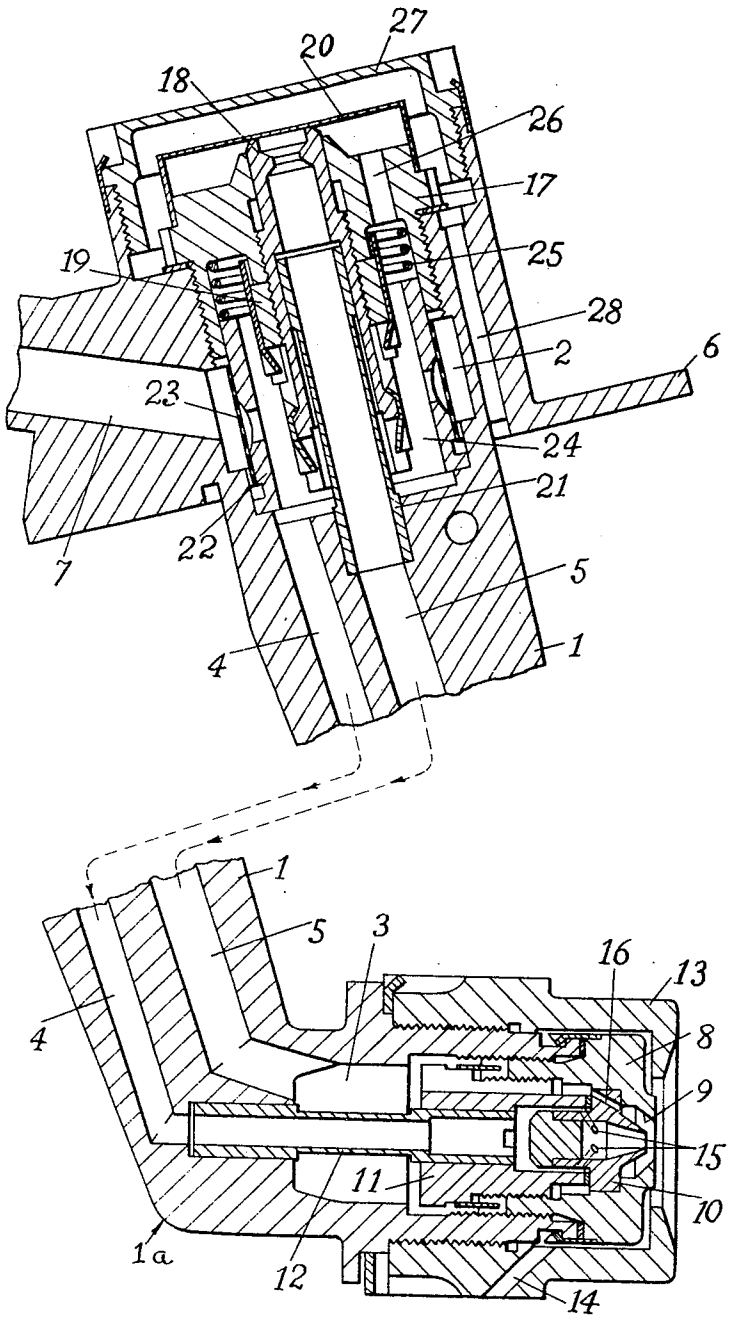

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OIL BURNERS

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This invention relates to oil burners, more particularly but not exclusively for use with gas turbine engines, and of the kind incorporating two feed systems one of which is controlled by valve means so arranged as to be opened automatically when the pressure of fuel within the burner exceeds a predetermined value.

The object of the invention is to provide such a burner in an improved form.

According to the invention in a burner of the kind specified the closure member of the valve means comprises a resilient diaphragm.

According to a further feature of the invention the diaphragm is so arranged that when the burner is operatively associated with a combustion chamber one side of the diaphragm will be subjected to the pressure of fuel within the burner, whilst the other will be subjected to the pressure of fluid in the combustion chamber.

An example of the invention is illustrated in sectional side elevation in the accompanying drawing wherein the upper and lower halves of the burner have been separated and drawn in offset relationship, the connections between the passages 4, 5 in the two halves of the FIGURE being indicated by dotted lines. Referring to the drawing there is provided a body part 1 having within its opposite ends respectively a pair of substantially cylindrical chambers or outwardly open cavities 2, 3 which are interconnected by a pair of separate passages 4, 5 formed in an intermediate stem of the body part which may be cranked as shown at 1*a*. Near the outer end of the body part is an integral flange 6 whereby the burner can be mounted with its stem and inner chambered end disposed within a combustion chamber, and at the outer side of the flange is an inlet 7 opening into the outer chamber 2 and adapted for connection to the fuel supply system.

In the inner chamber 3 is mounted an atomiser unit. The latter includes a cap 8 which is externally screw-threaded to engage with a complementary screw-thread within the chamber 3 and has a central conical opening 9. Within the cap is a hollow nozzle 10 having a conical nose which is retained in concentric spaced relationship within the opening 9 in the cap by means of an externally screw-threaded sleeve 11 engaging internal screw threads on the cap and serving to clamp a flange on the nozzle 10 against a shoulder in the cap. In engagement with the sleeve is one end of a tube 12, the opposite end of which fits within the end of passage 4 in the body part which serves as a pilot fuel passage. Moreover in screw-threaded engagement with the inner end of the body part is a surrounding shroud 13 which is spaced from the cap and is provided with passages 14 (one only of which is seen in the drawing) through which gases can enter to be entrained with fuel issuing from the nozzle 10.

The passage 4 enters the inner chamber 3 concentrically, and fuel from this passage can flow through the tube 12 into the sleeve 11, and thence through tangentially arranged ports 15 in the nozzle to the interior of the latter. Fuel from the other passage 5 which serves as the main fuel passage can flow to the annular space around the tube 12 and thence through longitudinal grooves in the sleeve 11 to tangential ports 16 in the flange of the nozzle 10. From the ports 16 the fuel can issue into the annular space defined between the conical nose of the nozzle and the interior of the opening 9 in the cap.

The passage 5 enters the outer chamber 2 centrally whilst the passage 4 enters it eccentrically. Within the chamber 2 is mounted a valve unit which includes an externally screw-threaded plug 17 engaged with the outer end of the chamber with a flange seating against a shoulder therein. The plug has a screw-threaded bore in which is engaged a screw-threaded sleeve 18 which also carries a lock-nut 19 whereby the relative axial adjustment of the plug and sleeve can be retained. The outer end of the sleeve 18 is arranged to extend beyond the plug, and is shaped to serve as a seating for the central portion of a resilient sheet metal diaphragm 20 of dished form secured to the plug at its periphery. Moreover, within the inner end of the sleeve 18 is fitted one end of a tube 21 which at its other end fits within the adjacent end of the passage 5.

Between the inner side of the plug 17 and in the inner end of the chamber 2 is a perforated sleeve 22 carrying a filter 23 through which fuel can flow from the inlet 7 to the annular space 24 defined around the valve unit, the sleeve 22 being held against the inner end of the chamber 2 by a spring 25. Fuel can flow from the space 24 to the passage 4, and also through annularly arranged holes 26 (one only of which is seen in the drawing) in the plug to the interior of the dished diaphragm. When the pressure of fuel in the burner exceeds a predetermined value the diaphragm 20 will be lifted from its seating on the outer end of the sleeve 18 and thus permit fuel to flow to the passage 5.

In screw-threaded engagement with the outer end of the body part 1 is a dished cover 27 between which and the diaphragm is defined a cavity which, in use, is open to the combustion chamber through a passage 28 formed in the body part. As a result the pressure of fluid in the combustion chamber acts on the outer side of the diaphragm in a direction to hold it against its seating, whilst the pressure of fuel in the burner acts on the interior of the diaphragm to open the valve. Thus, since the pressure of fuel in the burner is dependent both on the rate of delivery of the pump supplying fuel to the burner and the pressure of fluid in the combustion chamber, the force acting to open the valve will be directly proportional to the rate of delivery of the pump.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. An oil burner for feeding fuel to a combustion chamber comprising a body member, an outwardly open cavity formed in one end of the body member, a detachable plug closing the open end of the cavity and provided with a bore extending therethrough inwardly toward the cavity and a raised portion about the outer end of the bore to form a seat portion, a resilient diaphragm of substantially dished form supported on the seat with its periphery secured to the plug, a passageway formed in the plug leading to the cavity from the spaced formed between the seat portion and the periphery of the diaphragm, a fuel inlet connection in said body member leading into the cavity, a second outwardly open cavity formed in the other end of the body member, a first passageway formed in the body member and having one end opening into the second cavity, a duct connecting the inner end of the bore in the plug to the other end of the passageway, a second passageway formed in the body member having one end opening into the first cavity, a nozzle in the second cavity having its inlet connected to the other end of the second passageway and its outlet facing the open end of the second cavity and spaced from the side wall thereof, and means forming a further chamber about the outer surface of the diaphragm in communication with the combustion chamber to subject the outer surface of the dia-

phragm to the pressure in the combustion chamber while its inner surface is subjected to the pressure of the fuel.

2. An oil burner according to claim 1 in which the bore in the plug is provided by an axially adjustable sleeve therein, the outer end of the sleeve forming the raised seating portion.

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