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(54) Fuel injection nozzle.

(57) A petrol injection system for a spark ignition engine includes a plurality of injectors which are mounted on the air inlet manifold of the engine. The injectors have housings (19) of hollow rectangular shape which accommodate electrical connections (18) for the control windings. Plugs (22) forming part of a wiring harness are engaged within the housings and the plugs are moulded integrally with a cover (24) which serves to locate the injectors in the correct angular relationship.

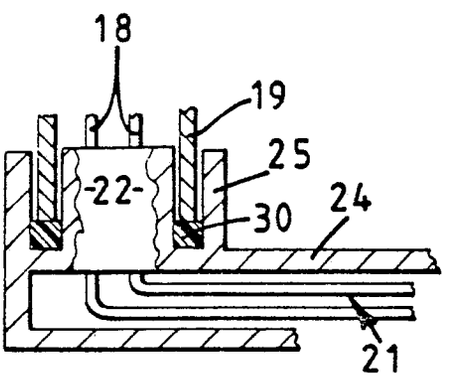

FIG 4

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"FUEL INJECTION SYSTEM"

This invention relates to a fuel injection system for a spark ignition internal combustion engine and of the kind comprising a plurality of electromagnetically operated fuel injectors which in use are mounted on the air inlet manifold of the associated engine so as to direct fuel into the air inlet ducts of the engine, each injector being of generally cylindrical form having a fuel inlet at one end and an outlet at the other end, each injector also having a housing which accommodates at least one electrical contact and the housing being disposed at a position offset from the longitudinal axis of the injector.

With engines having a single air inlet valve per engine cylinder it is usual for each injector to have a single outlet orifice which is disposed to direct fuel along the longitudinal axis of the injector. With such an arrangement therefore it is not necessary to provide for precise angular location of the injectors. However, in some systems the orifice is offset from the longitudinal axis of the injector and in other systems the injectors are provided with two orifices such injectors being used where the engine has two air inlet valves per engine cylinder. With these systems the injectors have to be precisely located and it is known from United States specification 4515129 to provide the injector with a locating peg which in use is received in a locating hole formed in the air inlet manifold. The provision of the peg and the locating hole adds to the cost of the installation.

The object of the present invention is to provide a fuel injection system in a simple and convenient form.

According to the invention in a fuel injection system of the kind specified is characterised in that the system further includes a wiring harness including plugs engageable in said housings respectively to effect electrical connection with the contacts and a cover for said harness and connectors, said cover being of a semi-rigid nature and defining hollow portions for engagement about said housings respectively of the injectors, the cover serving to locate the injectors about their longitudinal axes.

In the accompanying drawings:-

Figure 1 is a sectional side elevation of an example of a fuel injector,

Figures 2 and 3 are diagrammatic plan views showing the disposition of four of the injectors shown in Figure 1 together with the electrical connections thereto, and

Figures 4 and 5 show in greater detail portions of the connectors of Figures 2 and 3 respectively.

Referring to Figure 1 of the drawings each injector comprises a generally cylindrical body 10 at one end of which there is located an axially disposed fuel inlet 11 and at the opposite end thereof there is formed an outlet 12 within which two streams of fuel can flow from appropriately positioned outlet orifices 13 formed in an orifice plate 14 carried within the body. The injector also includes a valve member 15 which is biased to the closed position by a spring 16 and which is lifted to its open position against the action of the spring, when a solenoid winding 17 is energised.

The ends of the winding 17 are connected to a pair of electrical contacts 18 only one of which is seen, which are carried in a non-circular insulating housing 19 carried by the body but offset from the longitudinal axis thereof.

Such an injector is intended for supplying fuel to one cylinder of an engine which is provided with two inlet valves and therefore there will be as many injectors as there are engine cylinders. The outlet orifices 13 in the orifice plate 14 are very precisely formed and it is essential that the jets of fuel follow a particular path and that therefore the body of the injector is located at a precise angular location.

Turning now to Figures 2 and 4 four injectors 20 are illustrated for supplying fuel to a four cylinder engine. The injectors are constructed in an identical manner so far as the relationship between the spray orifices 13 and the relative positions about the longitudinal axis of the housings 19 are concerned. As seen in Figure 2, a wiring harness 21 is provided which includes pairs of electrical connectors for connection with the pairs of electrical contacts 18 of the individual injectors. Conveniently the connectors are retained in plugs 22 which extend into the recess 23 seen in Figure 1 about the contacts 18. As more clearly shown in Figure 4, it is convenient to mould the plugs 22 into an elongated cover 24 which also defines hollow portions 25 which locate about the housings 19. The cover and the plugs are formed from a semi-rigid material which will allow the plugs to be assembled to the contacts of the injectors in turn but at the same time is sufficiently rigid to provide angular location of the injectors. A sealing member 30 is provided to engage with the edge of the housing 19 to provide a moisture proof seal.

In the arrangement shown in Figures 3 and 5 the cover 26 is moulded separately from the plugs 22 which include hollow portions 27 which locate about the housings 19. The cover 26 is however provided with hollow portions 28 which engage about the portions 27 of the plugs.

Claims

1. A fuel injection system for a spark ignition internal combustion engine, the system comprising a plurality of electromagnetically operated fuel injectors (20) which are mounted in use, on the air inlet manifold of the engine to difect fuel into the air inlet ducts of the engine, each injector being of generally cylindrical form having a fuel inlet (11) at one end and an outlet (12) at the other end, each injector also having a housing (19) which accommodates at least one electrical contact (18), and the housing being disposed at a position offset from the longitudinal axis of the injector characterised in that the system further includes a wiring harness (21) including plugs (22) engageable in said housings (19) respectively to effect electrical connection with the contacts (18) therein and a cover (24) for said harness, said cover being of a semi-rigid nature and defining hollow portions (25, 28) which engage about said housing (19) to locate the injectors about their longitudinal axes.

2. An injection system according to Claim 1 characterised in that said plugs (22) are moulded into said cover (24).

3. An injection system according to Claim 1 characterised in that said plugs (22) include hollow portions (27) which engage about the housings (19), said cover (26) defining further hollow portions (28) which engage about the hollow portions (27) of the plugs to provide the desired angular location of the injectors (20).

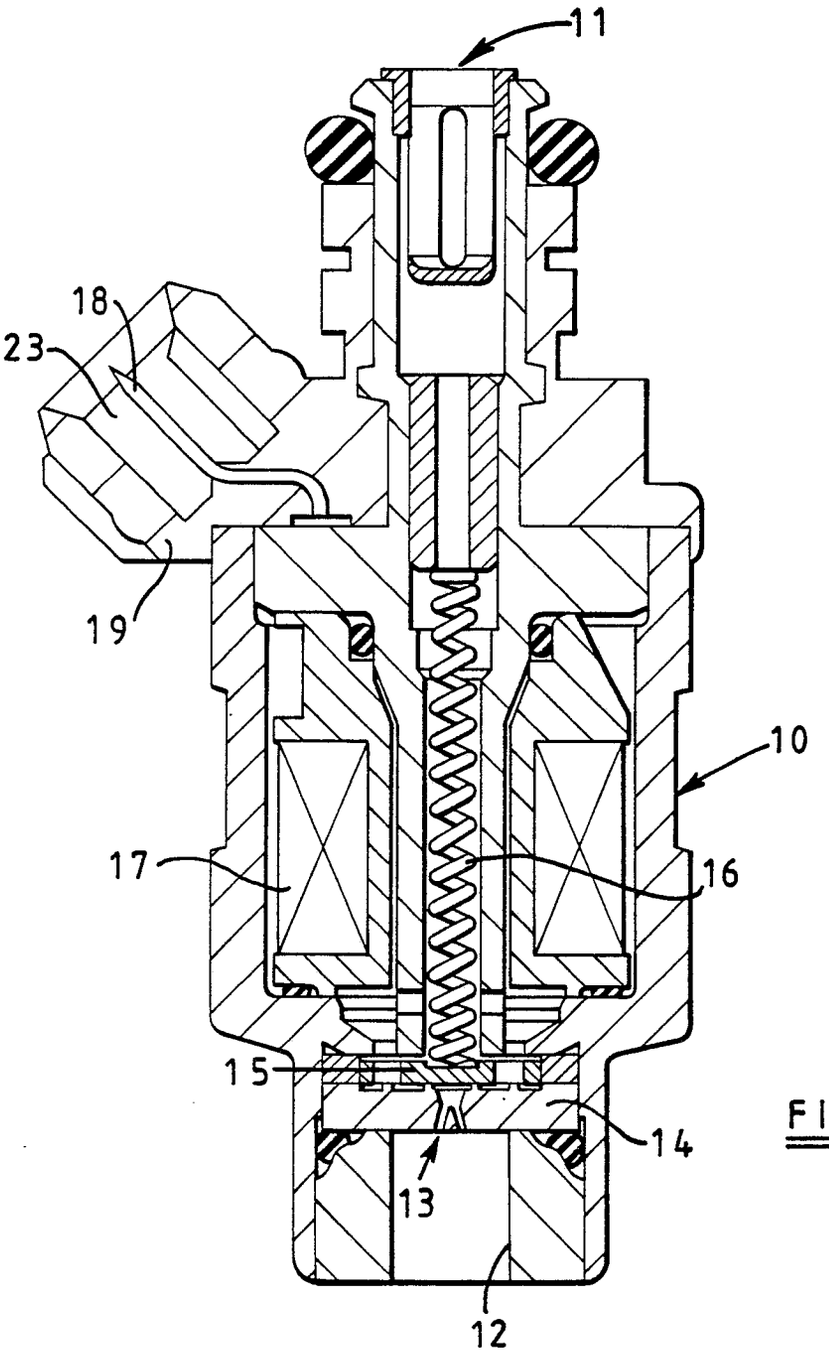

FIG 1

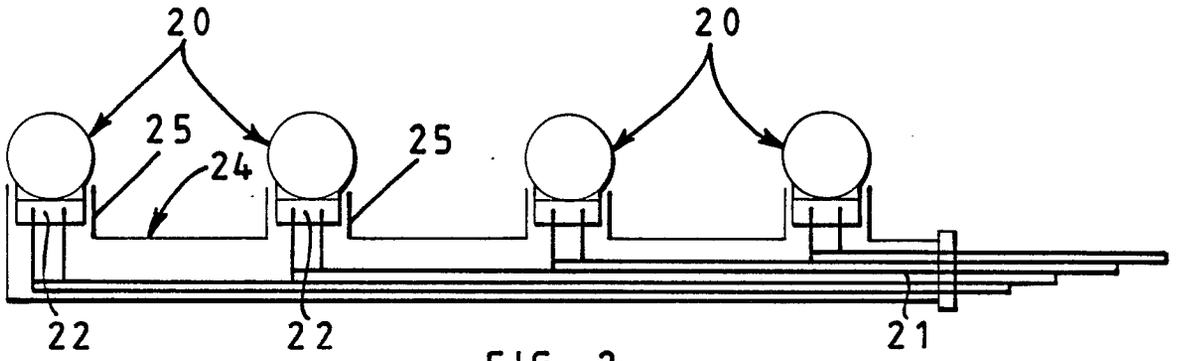

FIG 2

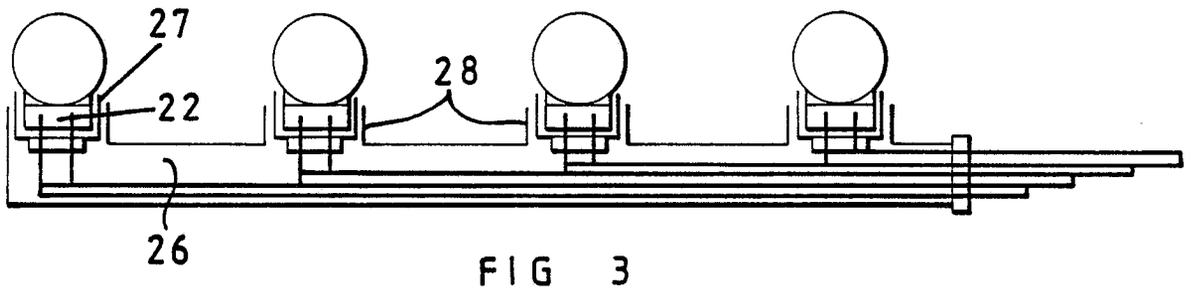

FIG 3

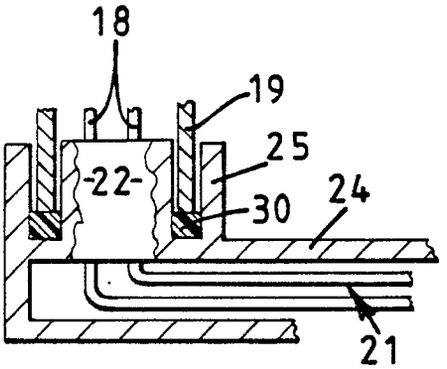

FIG 4

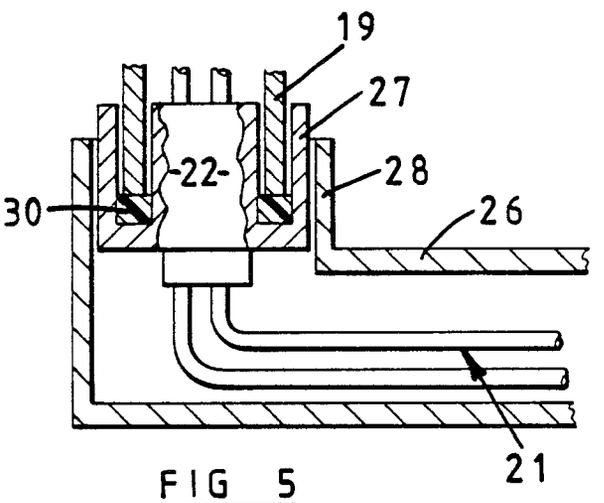

FIG 5