



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
09.11.2005 Bulletin 2005/45

(51) Int Cl.7: **F02M 63/00**, F02M 61/04,
F02M 61/06, F02M 51/06,
F02M 41/16

(21) Application number: **05076154.3**

(22) Date of filing: **14.08.2003**

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PT RO SE SI SK TR**
Designated Extension States:
AL LV MK

• **Andres Pons, Salvador**
46470 Masanasa (Valencia) (ES)

(72) Inventors:
• **Martinez Casan, José**
46470 Masanasa (Valencia) (ES)
• **Andres Pons, Salvador**
46470 Masanasa (Valencia) (ES)

(62) Document number(s) of the earlier application(s) in
accordance with Art. 76 EPC:
03380193.7 / 1 507 083

(71) Applicants:
• **Martinez Casan, José**
46470 Masanasa (Valencia) (ES)

Remarks:

This application was filed on 18 -05 -2005 as a
divisional application to the application mentioned
under INID code 62.

(54) **Injector of fuel regulated electronically**

(57) An injector for the injection of fuel in diesel motors by means of the system "common-rail" that avoids the possibility of leak of fuel because of the waste, long term, of the seat of the needle of the injector.

The rotary valve of the injector is actuated by a solenoid (1) which is controlled by an Electronic Unit of Control (UEC) (2).

The quantity of fuel that is injected, is regulated by means of the time that the ports (4',4'') of the cylinder distributor (3) are open. Since to open the ports it is only necessary that they coincide, it is avoided this way the necessity of a spring that pushes a needle on a hole to close it, that which causes with the time a defect in the seat and therefore a possible leak of fuel.

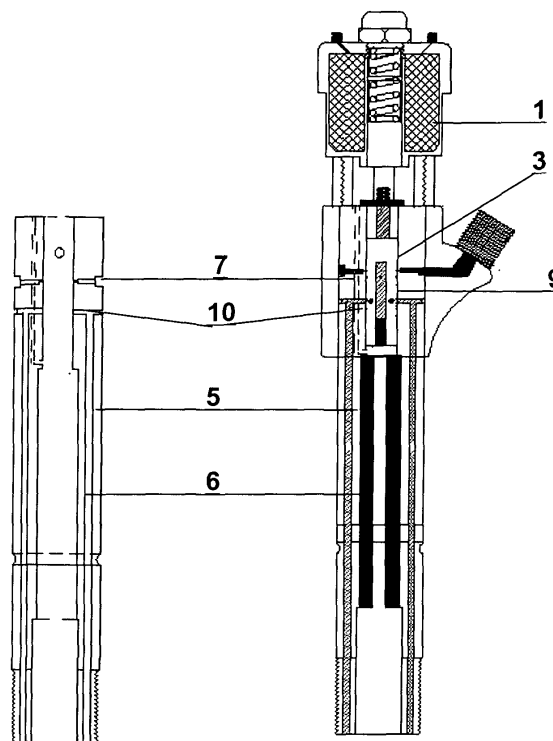


FIG. 2

FIG 3

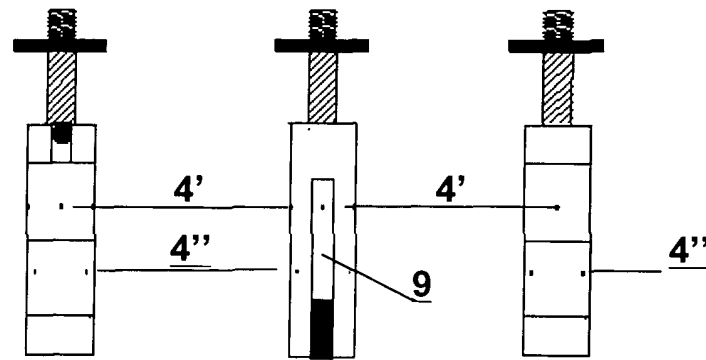


FIG. 8

Description

OBJECT

[0001] The object to which refers the invention that is protected in this Patent, consists on the development of an injector for the injection of fuel in motors diesel by means of the system "common-rail" that avoids the possibility of leak of fuel because of the waste, long term, of the seat of the needle of the injector that opens up and he/she closes the step from the same one to the cylinder.

ANTECEDENTS

[0002] The system of injection of fuel to the cylinders in the motors diesel is compound, in general, for an injector for cylinder that is fed by a derivation peculiar of the general pipe of allotment, with an or two branches (well-known as ramp of injectors or "common-rail") that receives the fuel from a bomb of pistons of high pressure.

[0003] One of the inconveniences that present the current injectors consists on the waste, long term, of the seat of the needle of the injector that opens up and he/she closes the step from the fuel to the cylinder; this waste facilitates that the fuel can penetrate in the cylinder in moments that it doesn't correspond to inject fuel.

DESCRIPTION OF THE INVENTION

[0004] The purpose of the invention that constitutes the object of this Patent, consists on the reduction of the inconveniences characteristic of the well-known system of injection of fuel in the motors diesel that have been described above, having been conceived and designed in its several aspects, with this high-priority objective.

[0005] The qualification of "electronic" that is attributed to the injection system that constitutes the object of this Patent, it obeys the existence in their structure and to the intervention in their operation, of an Electronic Unit of Control (U.E.C.) that, acting on the mobile organs of the injectors, it regulates their performance automatically in time (I begin and end of the injection) and in quantity (dosage of the fuel).

[0006] The described performance of the U.E.C. it contributes to the system two important functional advantages:

[0007] The reduction of the time of injection

[0008] The precise regulation of the consumption of fuel, to any working regime of the motor.

[0009] In turn, these advantageous characteristics contribute and they condition other equally favourable ones as:

[0010] Smaller consumption of fuel, to equality of benefits of the motor.

[0011] Bigger compression pressure and for it, adult even motor and more power.

[0012] On the other hand, the claimed injection system has a device anti-drip that makes the cut of the injection automatically if the injector doesn't pulverize, impeding this way the spill of fuel inside the cylinder.

[0013] Each injector is formed by the following structural elements:

[0014] Cylinder distributor: worked by a solenoid and located in the superior part of the injector.

[0015] Ports of the cylinder: three of entrance superiors and three of inferior exit.

[0016] Cane of the injector: with three longitudinal channels, separated 120° that receive the fuel from the inferior ports, to each other which reaches a conventional nozzle and he/she lifts their needle to be pulverized inside the cylinder.

[0017] With the claimed injection system they are carried out the following operations, described in the same sequential order with which you happens in the practice:

[0018] Entrance of fuel to the injector: Feeding from the bomb of High Pressure, entering the fuel for the outlying channel of the cane of the injector that has three grooves, separated to 120°, of equals dimensions that the ports of entrance of the cylinder distributor, the six ports of the cylinder distributor communicated to each other being, inwardly, for the axial channel of feeding.

[0019] Step of the fuel to the cylinder distributor: When the solenoid lifts the cylinder distributor they face in positional coincidence the grooves of the outlying channel of the cane of the injector, with the ports of entrance of the cylinder distributor, settling down the communication between this ports and the axial channel of feeding.

[0020] Exit of fuel of the cylinder distributor: The fuel that arrives to the axial channel of feeding of the cylinder distributor, descends for him until reaching the exit ports, which face, when the solenoid lifts the cylinder distributor, in positional coincidence with grooves of equals dimensions, in a second outlying channel of the cane of the injector, collector of the fuel, which descends for three longitudinal channels that are in permanent communication with this collector, until reaching the nozzle, getting up with suppression the needle and pulverizing the fuel inside the cylinder.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] To supplement the description of the invention and to facilitate the interpretation of the formal, structural and functional characteristics of their object, they accompany drawings in those that different aspects of a preferable realization of the "INJECTOR REGULATED ELECTRONICALLY" are represented schematically that it constitutes the object of this Patent. In this drawings:

The Figure 1 represent in longitudinal section, the cylinder distributor with the solenoid responsible for their rising

The Figure 2 represent in longitudinal section, the cane of the injector.

The Figure 3 represent in longitudinal section an injector with all their elements, except the nozzle.

The Figure 4 sample in longitudinal section, the feeding head that you fits in the superior end of the cane of the injector; the Figure 5 are a view in plant superior of the same element; the Figure 6 are the same view, showing the cylinder placed distributor; and the Figure 7 are a view in traverse section of the inferior end of the cane of the injector, showing the longitudinal channels of the same one.

The figure 8 sample different longitudinal sections of the cylinder distributor.

The Figure 9 is a conventional perspective of the cylinder distributor.

The Figure 10 is a longitudinal section of the nozzle and a raised lateral of the needle of the same one.

The Figure 11 sample different perspectives where the relative position of the different elements of the injector is shown.

The figure 12 is a general outline that shows the relative disposition of the different components of the injection system.

DESCRIPTION OF A PREFERABLE REALIZATION

[0022] To show with clarity the nature and the reach of the advantageous application of the "INJECTOR REGULATED ELECTRONICALLY" that it constitutes the object of the claimed invention, the operations that compose the procedure, attributed to each one of the constituent organs from the injector to which affect the introduced innovations are described subsequently and that for they form it part of the device for the setting in practice of this procedure, making reference to the drawings that, to represent a preferable realization of this object, with informative character, they should be considered in their wider sense and I don't eat constraints of the application and the content of the claimed invention.

[0023] A basic idea for the development of the invention has been the one of avoiding the waste, long term, that takes place in the seat of the needle of the injector that opens up and he/she closes the step from the fuel to the cylinder, avoiding in this way that there are escapes of fuel.

[0024] According to the invention, the mobile organs of the injectors are worked by a solenoid (1) that, in turn, he/she moves for the received impulses from the Electronic Unit of Control (UEC) (2)

[0025] Each injector is formed by the following structural elements:

[0026] Cylinder distributor (3): worked by a solenoid (1) and located in the superior part of the injector.

[0027] Ports (4) of the cylinder: three of entrance superiors (4') and three of inferior exit (4'').

[0028] Cane (5) of the injector: with three longitudinal channels (6), separated 120° that you/they receive the fuel from the inferior ports to each other (4''), which reaches a conventional nozzle and he/she lifts their needle to be pulverized inside the cylinder.

[0029] With the claimed injection system they are carried out the following operations, described in the same sequential order with which you happens in the practice:

Entrance of fuel to the injector: Feeding from the bomb of High Pressure, entering the fuel for the outlying channel (7) of the cane of the injector that has three grooves (8) separated to 120°, of equals dimensions that the entrance ports (4') of the cylinder distributor (3), the six ports of the rotor communicated to each other being, inwardly, for the axial channel of feeding (9).

Step of fuel to the cylinder distributor (3): When the solenoid lifts the cylinder distributor they face in positional coincidence the grooves (8) of the outlying channel of the cane of the injector, with the ports (4') of entrance of the cylinder distributor, settling down the communication between this ports and the axial channel of feeding (9).

[0030] Exit of fuel of the rotor (3): The fuel that arrives to the axial channel of feeding (9) of the cylinder distributor, it descends for him until reaching the exit ports (4''), which face lifting the solenoid (1) the cylinder distributor, in positional coincidence with grooves of equals dimensions, in a second outlying channel (10) of the cane of the injector, collector of the fuel, which descends for the three longitudinal channels (6) that are in permanent communication with this collector (10), until reaching the nozzle (11), getting up with their pressure the needle (12) and pulverizing the fuel inside the cylinder.

Claims

1. a - Procedure of electronic administration of the injection for distribution, for motors diesel, and device for their setting in practice, **characterized** because, the mobile organs of the injectors are worked by a solenoid (1) that, in turn, he/she moves for received impulses from the Electronic Unit of Control (UEC) (2)
2. a.- Procedure of electronic administration of the injection for distribution, for motors diesel, according to the Recovery 1^a, **characterized** because to

make the injection they are carried out the following operations, described in the same sequential order with which you happens in the practice:

Entrance of fuel to the injector: Feeding from the bomb of High Pressure, entering the fuel for the outlying channel of the cane of the injector that has three grooves, separated to 120° , of equals dimensions that the ports of entrance of the cylinder distributor, the six ports of the cylinder distributor communicated to each other being, inwardly, for the axial channel of feeding. 5 10

Step of the fuel to the cylinder distributor: When the solenoid lifts the cylinder distributor they face in positional coincidence the grooves of the outlying channel of the cane of the injector, with the ports of entrance of the cylinder distributor, settling down the communication between this ports and the axial channel of feeding. 15

Exit of fuel of the cylinder distributor: The fuel that arrives to the axial channel of feeding of the cylinder distributor, descends for him until reaching the exit ports, which face, when the solenoid lifts the cylinder distributor, in positional coincidence with grooves of equals dimensions, in a second outlying channel of the cane of the injector, collector of the fuel, which descends for three longitudinal channels that are in permanent communication with this collector, until reaching the nozzle, getting up with suppression the needle and pulverizing the fuel inside the cylinder. 20 25 30

35

40

45

50

55

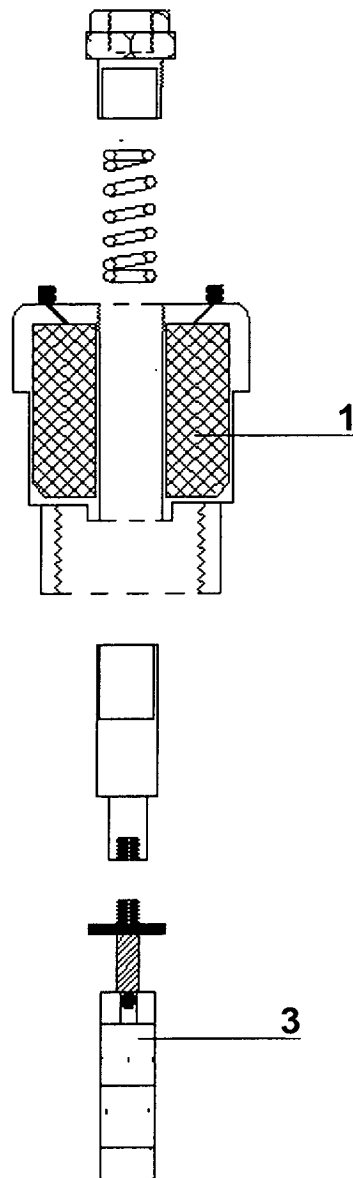


FIG. 1

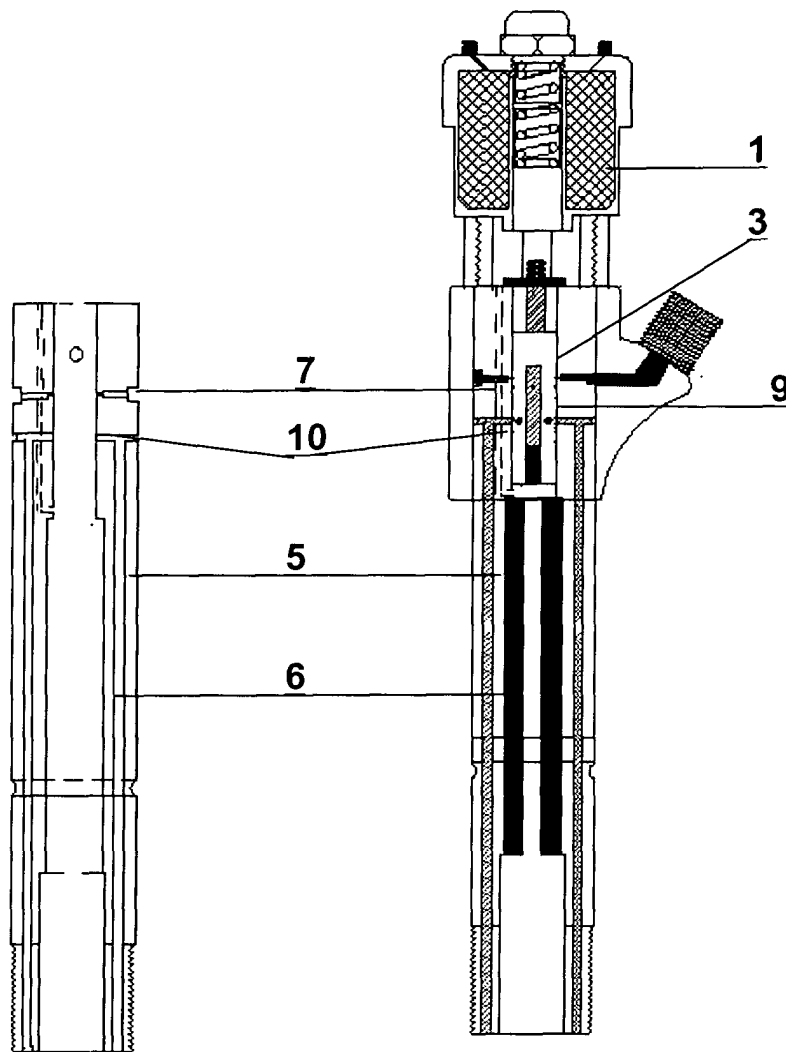


FIG. 2

FIG 3

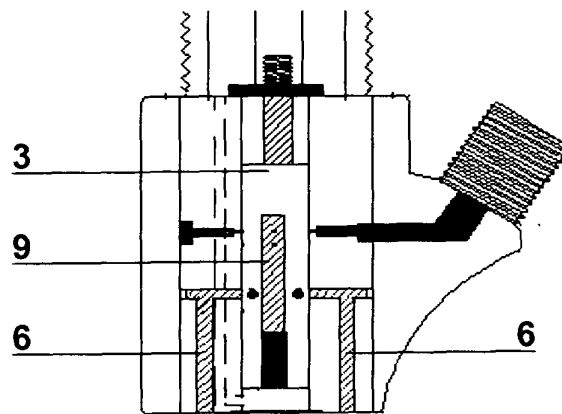


FIG. 4

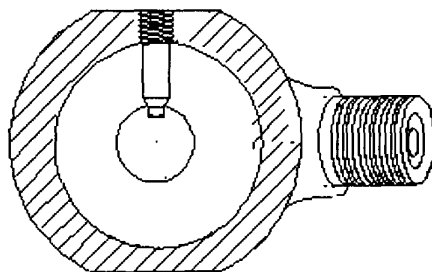


FIG. 5

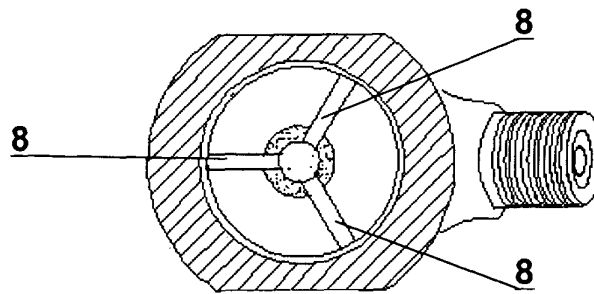


FIG. 6

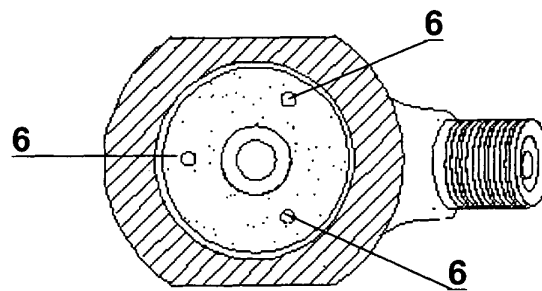


FIG. 7

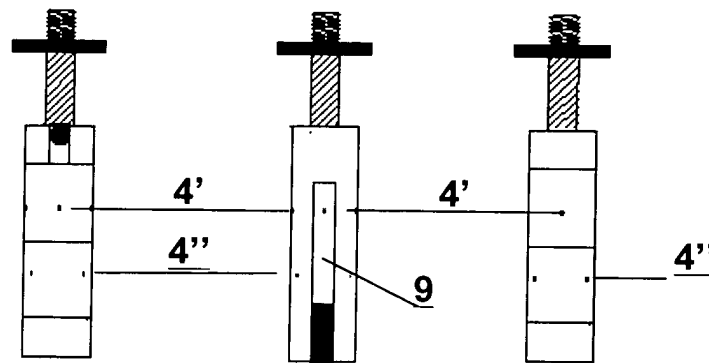


FIG. 8

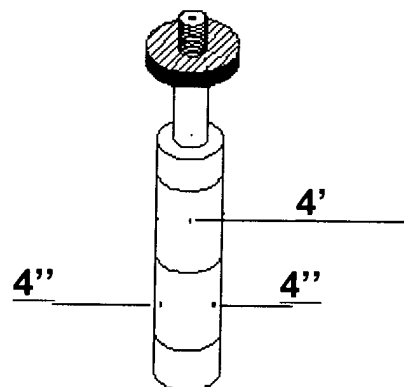


FIG. 9

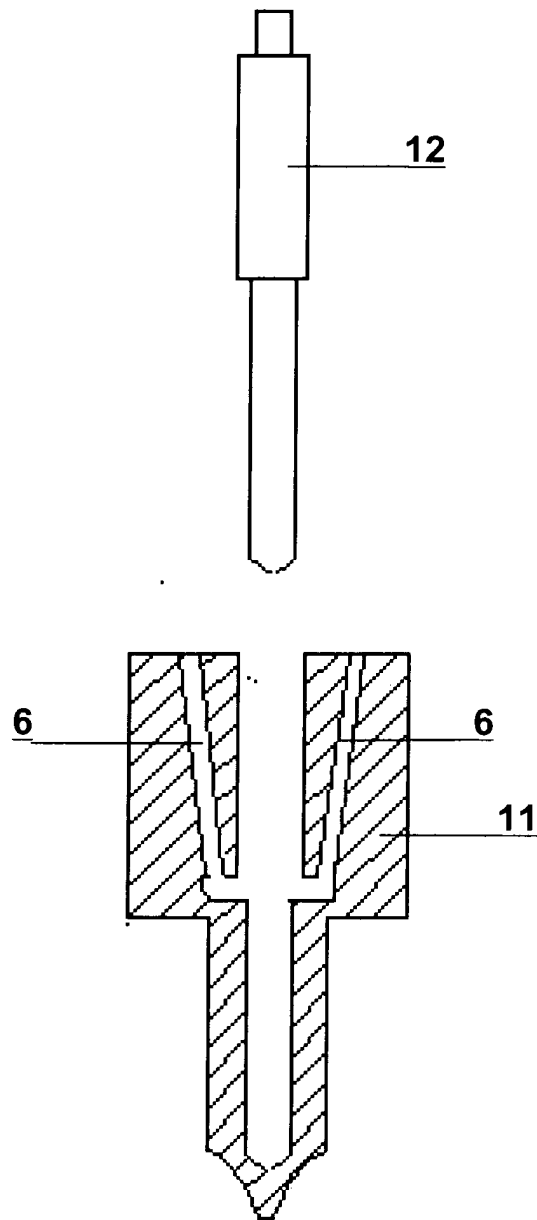


FIG. 10

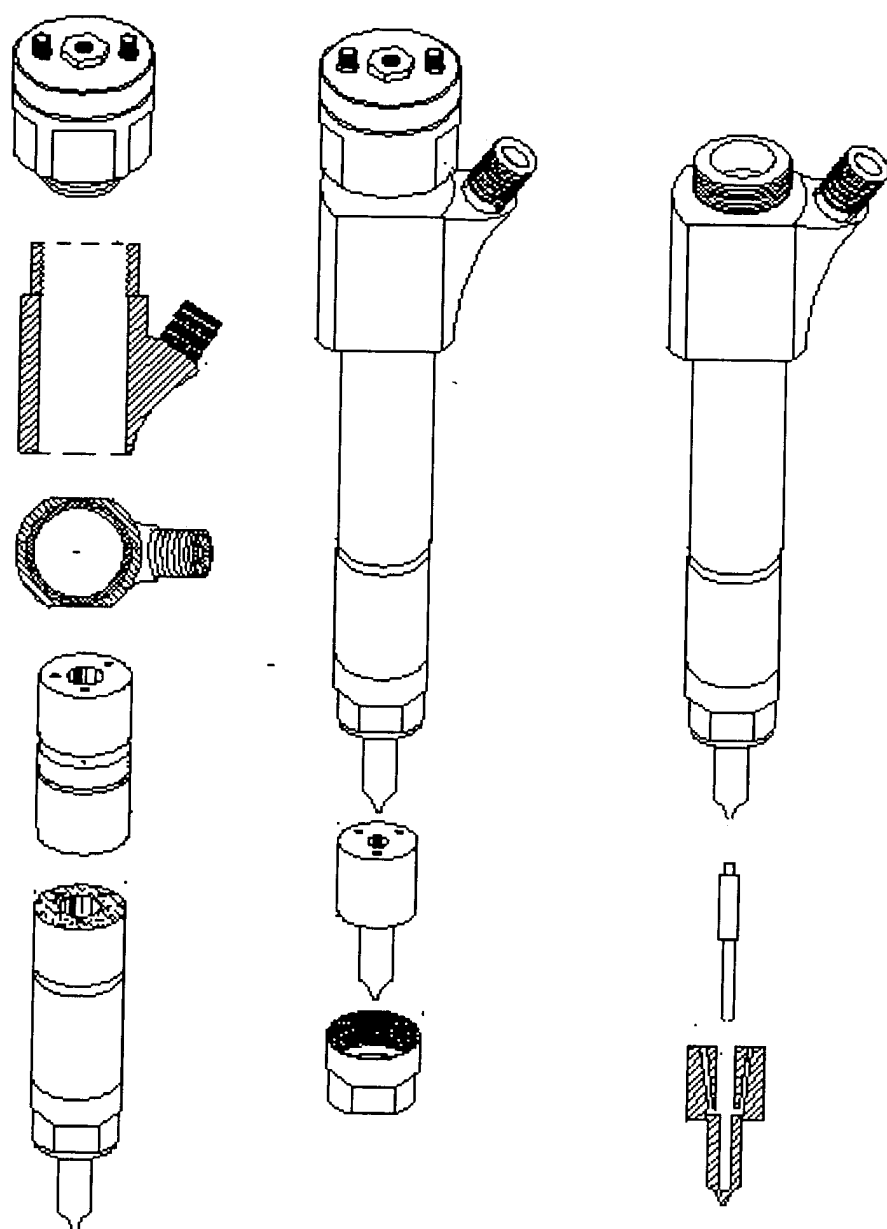


FIG. 11

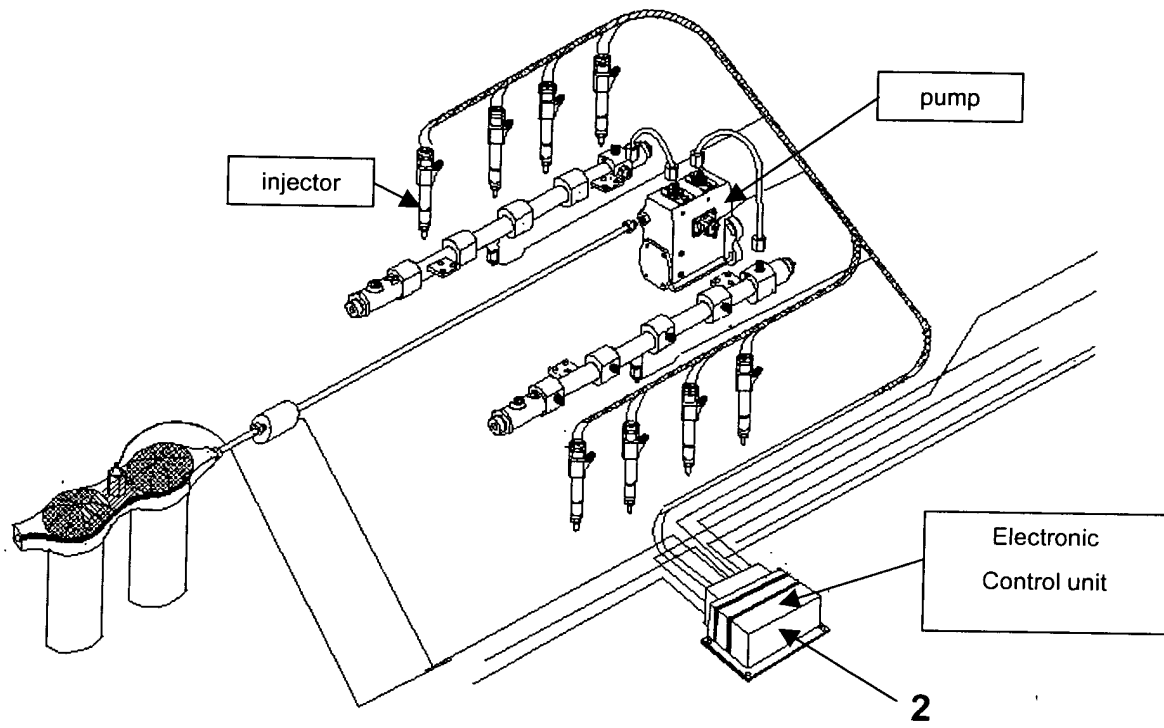


FIG. 12