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(54) **CONTROL VALVE ARRANGEMENT**

STEUERVENTILANORDNUNG

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Description

TECHNICAL FIELD

[0001] The present invention relates generally to a fuel injector and more particularly to a control valve arrangement.

BACKGROUND OF THE INVENTION

[0002] In a fuel injector, a control valve indirectly controls the motions of a valve member, also identified as a needle in reference to its elongated shape, by opening and closing an outlet conduit enabling fuel at high pressure to exit a control chamber which internal pressure solicits the needle.

[0003] The control valve comprises a body provided with a hydraulic bore opening in a recess and with a magnetic armature-and-valve-spool-assembly. The spool is slidably arranged in the bore while the disc-shape armature displaces in the recess as a function of a magnetic field generated by a controlled solenoid. The spool and body further define a valve seat which opens or closes when said assembly translates. When the seat opens, fuel at high pressure exiting the control chamber flows through the open passageway and hits the under face of the disc-shape armature when entering the recess. This violent impact disrupts the travel of the armature-and-spool-assembly and the functioning of the control valve.

[0004] Developments have conducted to design the under face of the armature with a slope mitigating the impact but without totally eliminating the motions disturbances.

[0005] Control valve arrangements are known from DE 10 2007 047152 A1 and EP 0 781 913 A2.

SUMMARY OF THE INVENTION

[0006] It is an object of the invention to resolve or at least mitigate the above mentioned problem in providing a control valve assembly for a fuel injector, the valve comprising a cylindrical body and, an armature-spool assembly adapted to translate within the body. The body extends from a first, or upper, face to an opposed second, or lower, face, and is provided with a large recess opening in the first face and also with a hydraulic distribution bore extending in the body along a main axis from the bottom face of the recess. A fixed valve seat is provided around the opening of the bore in said bottom face of the recess. The body is further provided with a hydraulic outlet conduit extending through the body and opening in the hydraulic bore and also with a return conduit extending from the large recess.

[0007] The armature-spool assembly comprises a disc shape magnetic armature having an upper face opposed to an under face and a stem forming valve spool fixed to the armature and perpendicularly extending from its under face. The armature-spool assembly is further provided

ed with a spool seat arranged in the vicinity of the under face the armature.

[0008] The armature-spool assembly is arranged in the body, the spool being slidably adjusted in the hydraulic bore and the armature being moveable in the recess. Said assembly is able to translate between a closed position where the spool seat is in sealing contact against the fixed valve seat and, an open position where the spool seat is lifted away from the fixed valve seat enabling, in use, fuel to flow to enter in the recess.

[0009] The control valve assembly is further provided with a deflector arranged in the recess, between the armature and the bottom face of the recess, the deflector being adapted to deflect away from the under face of the armature the flow of fuel entering the recess when the valve is in open position so that, the displacements of the armature-spool assembly are not disturbed by said entering flow.

[0010] Also, the deflector comprises a deflector face, or bottom face, provided with a central opening, said deflector face being arranged transverse to the valve axis and being pushed toward the bottom face of the recess by a pusher feature, while being maintained at a distance of the bottom face of the recess by a spacer feature.

[0011] The pusher feature can be a cylindrical wall integral to the deflector face and erecting from the periphery of said deflector face to an upward circular edge, said cylindrical wall outwardly protruding from the recess above the level of first face of the body so that, when the control valve assembly is arranged in a fuel injector, another part of the body of the injector that comes in surface contact with the first face of the valve body downwardly biases the deflector.

[0012] Also, the spacer feature is arranged between the deflector face of the deflector and the bottom face of the recess and it has resilient characteristics so that said spacer feature always biases the deflector face away from the bottom face of the recess.

[0013] The first face of the body is further provided with a plurality of notches, said notches opening in the recess. The deflector also comprises a transverse deflector face provided with a central opening, and with tabs radially extending from the edge of said deflector face, each tab being arranged in a notch.

[0014] In another embodiment, the deflector further comprises a tubular spacer ring non-integral to the deflector face, said spacer ring being placed over the deflector face and outwardly protruding from the recess above the level of first face of the body so that, when the control valve assembly is arranged in a fuel injector, another part of the body of the injector that comes in surface contact with the upper face of the valve body downwardly biases said the spacer ring and the deflector face.

[0015] The invention also extends to a fuel injector comprising a control valve assembly as claimed in any one of the preceding claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] The present invention is now described by way of example with reference to the accompanying drawings in which:

- Figure 1 is an axial section of a fuel injector provided with a control valve arrangement as per a first embodiment of the invention.
- Figure 2 is an axial section of the control valve of figure 1.
- Figure 3 is an exploded view of the control valve of figure 2, said valve being provided with a deflector.
- Figures 4, 5 and 6 are three different embodiments of the deflector of figure 3.
- Figure 7 is a second embodiment of a control valve as per the invention.
- Figure 8 is a top view of the second embodiment of figure 4.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0017] In reference to figure 1 is described a fuel injector 10, particularly adapted to diesel fuel although the invention is also applicable to gasoline injectors. The injector 10 has a generally elongated body 12, the injector 10 extending along a main axis X1 from a head 14 to a nozzle assembly 22. The head arrangement 14, arbitrarily drawn on the top of figure 1, comprises an electric connector 16, a fuel inlet 18 and a fuel outlet 20. The pointy tip extremity of the nozzle assembly 22, at the extreme bottom of the figure, is provided with spray holes 24 for delivering fuel in a combustion chamber.

[0018] The injector 10 generally comprises an actuator member 26 arranged above a control valve 28 arranged above the nozzle assembly 22. Said three main sub-assemblies are coaxially X1 fixed to each other's by an injector cap nut 30.

[0019] The actuator member 26 comprises an actuator body 32 extending from the head 14 to a lower face 34 where opens a recess 36 upwardly extending in the body 32. A solenoid 38 is arranged in the recess 36 and is electrically connected to the connector 16 via electric conductors 40 upwardly extending in a specific conduit 42 opening in the upper part of the recess 36. Between the solenoid 38 and the bottom of the recess 36 is arranged a compression leaf spring 44 downwardly soliciting the solenoid 38. The solenoid itself is provided with an internal blind bore 46 wherein is compressed a coil spring 48.

[0020] The control valve 28 has a valve body 50 axially X1 extending between an upper face 52 and an opposed lower face 54. The valve body 50 is provided with a hydraulic bore 56 axially extending along a valve axis X2 that is parallel and slightly offset with the main axis X1. The bore 50 upwardly opens in the bottom face 58 of a large recess 60 itself opening in the upper face 52 of the valve body 50. The opening of the hydraulic bore 56 in

the bottom face 58 of the recess is surrounded by a conical face forming a fixed valve seat 62.

[0021] Said axial offset introduced in European patent EP0740068 presents multiple advantages and is utilized in this description. Despite these advantages, the present invention can be implemented in other injector wherein the two axis are strictly aligned.

[0022] In the large recess 60 is arranged a deflector 64, a first embodiment of which being detailed on figures 2 and 3. Said first embodiment of the deflector 64 is a punched metal sheet having a cup-like shape with a bottom face 66 provided with a central hole 68 and with a peripheral cylindrical wall 70 perpendicularly upwardly erecting from the circular edge of the bottom face 66 up to an upper circular edge 72. The deflector 64 is arranged in the large recess 60 so the central hole 68 is aligned with the hydraulic bore 56 and, the bottom face 66 of the deflector is parallel to the bottom face 58 of the recess, a leaf spring 74 being arranged between said two bottom faces 58, 66 so that, an inter-space S remains open under the deflector 64. Alternatively to a washer type leaf spring, any type of spring, such as resilient tongues, enabling to maintain a distance between said two bottom faces 58, 66, fits the purpose. For instance figures 4, 5 and 6 present different alternatives of spring 74 that are integral to the bottom face 66 of the deflector 64. The springs 74 are provided by partially cutting said bottom face 66 in order to form tongues 75 that are outwardly bent around a non-cut edge, said bending providing resilient characteristics to the tongue 75.

[0023] The embodiment of figure 4 comprises three rectangular tongues 75 each being cut on three sides and slightly bent on the fourth. To provide stability when arranged in the large recess 60, the tongues 75 are arranged every 120° relative to the valve axis X2.

[0024] The embodiment of figure 5 comprises six rectangular tongues 75 arranged by pair of face to face tongues that are cut along their common length and a common width. The tongues 75 are bent about their non-cut width. To provide stability when arranged in the large recess 60, the pair of tongues 75 are arranged every 120° relative to the valve axis X2.

[0025] The embodiment of figure 6 comprises three tongues 75 each forming a circular segment. The cut is operated along the circular edge of the bottom face 58 and the binding is done along the chord of said segment. Again, to provide stability when arranged in the large recess 60, the tongues 75 are arranged every 120° relative to the valve axis X2.

[0026] In the above examples the tongues 75 are arranged every 120° while other embodiments of four or more tongues arranged every 90° or less is also possible.

[0027] In a free state, when not assembled in the injector, the upper circular edge 72 of the peripheral wall slightly protrudes above the level of the upper face 52 of the valve body.

[0028] Finally, the control valve 28 is provided with an armature-spool assembly 76 comprising a magnetic

disc-shape armature 78 and a stem-like cylindrical spool 80. The spool 80 downwardly axially X2 extends from an upper end that is inserted and crimped in a central orifice of the armature 78, the top face 82 of said upper end slightly protruding above the armature 78. The spool 80 is provided with a plurality of cylindrical portions of different diameters and, just below the armature 80, with a conical face forming a spool seat 84.

[0029] When arranged in the valve body 50, as shown on figure 2, the spool 80 is slidably adjusted in the hydraulic bore 56, the spool seat 84 cooperates with the fixed valve seat 62 and, the spool extends through the central hole 68 of the deflector 64 for the armature 78 to be inside the cup-like deflector 64.

[0030] The nozzle assembly 22 has a body 86 which extends from an upper face 88 down to the tip provided with the spray holes 24. The body 86 is provided with an axial valve bore 90 in which is slidably arranged a valve member 92, also known as a needle valve in reference to its elongated shape. Said member 92 extends from a needle head protruding in a control chamber 94, close to the upper face 88, down to a pointy tip that forms another valve seat cooperating with the spray holes 24.

[0031] Externally the lower portion of the nozzle body 86 is thinner than its upper portion, a transverse shoulder face 96 joining both portions.

[0032] The three main parts of the injector 10 are fixed together by the cap nut 30, the thinner part of the nozzle being inserted in the nut 30 which comes in abutment against the shoulder face 96, the nut 30 being then threaded to the actuator body 32.

[0033] By tightening the cap nut 30, the valve body 50 is axially X1 compressed between the actuator body 32 and the nozzle body 86. In particular, the lower face 34 of the actuator body comes in sealing surface contact with the upper face 52 of the valve body and, in doing so, the deflector 64, which upper circular edge 72 was protruding above the upper face 52, is slightly pushed downward inside the large recess 60 compressing the leaf spring 74 which still maintains open the inter space S.

[0034] As it is well known, the coil spring 48 protruding out of the solenoid is further compressed as it comes in contact against the top face 82 of the spool.

[0035] Also well-known and now briefly described, the injector 10 is provided with a high pressure conduit 98, for conveying fuel at high pressure from the fuel inlet 18 down to the spray holes 24. This high pressure conduit 98 comprises a plurality of portions aligned throughout the actuator, the valve and the nozzle bodies 32, 50, 86. It also diverts from its main path, inlet 18 to holes 24, by having a branch 100 joining the control chamber 94.

[0036] Furthermore, the injector 10 is also provided with a return conduit 102 comprising a first portion 104, or outlet conduit extending in the valve body 50 from the control chamber 94 to the hydraulic bore 56 then, a second portion 106 extending in the actuator body 32 from the large recess 60 to the fuel outlet 20.

[0037] In use, the injector 10 is arranged in a fuel in-

jection equipment of an internal combustion engine and, a control unit, not represented, is connected to the injector to enable piloting to energize the solenoid 38.

[0038] When the solenoid 38 is not energized, the coil spring 48 downwardly pushes the armature-spool assembly 76 in a closed position CPV where the spool seat 84 is in sealing contact against the fixed valve seat 62. Fuel at several thousands of bars flows in the high pressure conduit 98 and its diverting branch 100, fills in the control chamber 94, the outlet conduit 104 and the hydraulic bore 56. The high pressure in the control chamber 94 solicits the needle valve 92 in a closed position CPN where fuel injection through the spray holes 24 is prohibited.

[0039] When the solenoid 38 is energized, it generates a magnetic field that attracts the armature 78 which then translates toward the solenoid 38 further compressing the coil spring 48. The armature-spool assembly 76 moves to an open position OPV where the spool seat 84 lifts away from the fixed valve seat 62 and opens passageway for the high pressure fuel to spring out of the hydraulic bore 56 and enter the large recess 60. The decreasing pressure in the control chamber 94 enables the needle valve 92 to lift in an open position OPN enabling fuel injection through the spray holes 24.

[0040] The jet flow entering the large recess 60 hits the under face of the deflector 64 then flows in the inter space S toward the second portion 106 of the return conduit. The deflector 64 deflects the jet flow away from the armature 78, the displacements of the armature-spool assembly 76 being undisturbed.

[0041] In reference to figures 7 and 8 is now described a second embodiment of the deflector 64, keeping the references of features having similar a function as in the first embodiment.

[0042] In this second embodiment, the valve body 50 is provided on its upper face 52 with two notches 108 diametrically arranged about the opening of the large recess 60. The deflector 64 comprises a deflector face 110 which is a circular disc plate provided with a central hole 68 and also with two arms 112 radially extending from the outer edge 114 of the disc. Said arms 112 are slightly angled relative to the plan of the disc 110 so, when in position, the deflector face 110 is placed in deep inside the recess and parallel to the bottom face 58 of the recess and, the two radial arms 112 are set in the notches 108. In that position the inter space S is preserved.

[0043] The deflector 64 further comprises a cylindrical tubular spacer ring 116 placed on the top deflector face 110 and the radial arms 112. The spacer ring 116 has a height such that in place before the general assembly of the injector 10, it slightly protrudes above the level of the upper face 52 of the valve body and, it also has an outer diameter smaller than the opening of the large recess 60 so that, when the injector 10 is assembled and the cap nut 30 is tightened, the spacer ring 116 is pushed downward, pushing in turn the deflector face 110 and obliging the radial arms 112 to further resilient bending while still

keeping open the inter space S. In this second embodiment there is no need for leaf spring 74 placed in the inter space S.

[0044] The deflector face has been described with two radial arms 112 although an embodiment with another number of flexible arms is possible.

LIST OF REFERENCES

[0045]

10 fuel injector
12 injector body
14 injector head
16 electric connector
18 fuel inlet
20 fuel outlet
22 nozzle assembly
24 spray holes
26 actuator member
28 control valve
30 injector cap nut
32 actuator body
34 lower face of the actuator body
36 recess
38 solenoid
40 electric conductors
42 conductors conduit
44 leaf spring
46 blind bore internal to the solenoid
48 coil spring
50 valve body
52 upper face of the valve body
54 lower face of the valve body
56 hydraulic bore
58 bottom face of the large recess
60 large recess
62 fixed valve seat
64 deflector
66 bottom face of the deflector - deflector face
68 central hole provided in the bottom face of the deflector
70 peripheral cylindrical wall
72 upper circular edge of the peripheral wall
74 leaf spring
75 tongue
76 armature-spool assembly
78 magnetic armature
80 spool
82 top face of the spool
84 spool seat
86 nozzle body
88 upper face of the nozzle body
90 valve bore
92 valve member
94 control chamber
96 shoulder face
98 high pressure conduit

100 branch of the high pressure conduit
102 return conduit
104 first portion of the return conduit - outlet conduit
106 second portion of the return conduit
5 108 notches - 2nd embodiment
110 deflector face - 2nd embodiment
112 radial arms - 2nd embodiment
114 outer edge of the deflector face - 2nd embodiment
116 spacer ring - 2nd embodiment

10

X1 main axis

X2 valve axis

15

S inter space

CPV closed position of the valve

OPV open position of the valve

20

CPN closed position of the needle

OPN open position of the needle

25

Claims

1. Control valve assembly (28) for a fuel injector (10),
the control valve assembly (28) comprising a cylindrical body (50) and, an armature-spool assembly (76) adapted to translate within the body (50),
the body (50) extending from a first, or upper, face (52) to an opposed second, or lower, face (54), and being provided with a large recess (60) opening in the first face (52) and also with, a hydraulic distribution bore (56) extending in the body along a main axis (X2) from the bottom face (58) of the recess, a fixed valve seat (62) being provided around the opening of the bore (56) in said bottom face (58) of the recess,
the body (50) being further provided with a hydraulic outlet conduit (102, 104) extending through the body and opening in the hydraulic bore (56) and also with, a return conduit (102, 106) extending from the large recess (60),
the armature-spool assembly (76) comprising a disc shape magnetic armature (78) having an upper face opposed to an under face and, a stem, forming valve spool (80), fixed to the armature (78) and perpendicularly extending from its under face, the armature-spool assembly (76) being further provided with a spool seat (84) arranged in the vicinity of the under face the armature,
the armature-spool assembly (76) being arranged in the body (50), the spool (80) being slidably adjusted in the hydraulic bore (56) and the armature (78) being moveable in the recess (60), said assembly (76) being able to translate between a closed position (CPV)

where the spool seat (84) is in sealing contact against the fixed valve seat (62) and, an open position (OPV) where the spool seat (84) is lifted away from the fixed valve seat (62) enabling, in use, fuel to flow to enter in the recess (60),

characterized in that

the control valve assembly (28) is further provided with a deflector (64) arranged in the recess (60), between the armature (78) and the bottom face (58) of the recess, the deflector (64) being adapted to deflect away from the under face of the armature the flow of fuel entering the recess (60) when the valve is in open position (OPV) so that, the displacements of the armature-spool assembly (76) are not disturbed by said entering flow and,

the deflector (64) comprises a deflector face, or bottom face, (66) provided with a central opening (68), said deflector face (66) being arranged transverse to the valve axis (X2), and being pushed toward the bottom face (58) of the recess by a pusher feature (70, 116) while being maintained at a distance of the bottom face (58) of the recess by a spacer feature (74, 112) and, the pusher feature (70, 116) is a cylindrical wall integral to the deflector face (66) and erecting from the periphery of said deflector face (66) to an upward circular edge (72), said cylindrical wall (70) outwardly protruding from the recess (60) above the level of first face (52) of the body (50) so that, when the control valve assembly (28) is arranged in a fuel injector (10), another part of the body of the injector that comes in surface contact with the first face (52) of the valve body downwardly biases the deflector (64) and wherein,

the spacer feature (74) is arranged between the deflector face (66) of the deflector and the bottom face (58) of the recess and it has resilient characteristics so that, said spacer feature (74) always biases the deflector face (66) away from the bottom face (58) of the recess and wherein, said spacer feature (74) is provided by partially cutting said bottom face (66) to form tongues (75) that are outwardly bent around a non-cut edge, said bending providing resilient characteristics to the tongue (75).

2. Fuel injector (10) comprising a control valve assembly (28) as claimed in any one of the preceding claims.

Patentansprüche

1. Steuerventilanordnung (28) für einen Kraftstoffinjektor (10), wobei die Steuerventilanordnung (28) einen

zylindrischen Körper (50) und eine Ankerspulenordnung (76) aufweist, die ausgebildet ist, innerhalb des Körpers (50) versetzt zu werden,

wobei sich der Körper (50) von einer ersten oder oberen Fläche (52) zu einer gegenüberliegenden zweiten oder unteren Fläche (54) erstreckt und mit einer großen Ausnehmung (60) vorgesehen ist, die sich in der ersten Fläche (52) öffnet, und ebenso mit einer hydraulischen Verteilungsbohrung (56), die sich in dem Körper entlang einer Hauptachse (X2) von der Bodenfläche (58) der Ausnehmung erstreckt, wobei ein fester Ventilsitz (62) um die Öffnung der Bohrung (56) in der Bodenfläche (58) der Ausnehmung vorgesehen ist,

wobei der Körper (50) weiter mit einer hydraulischen Auslassleitung (102, 104) vorgesehen ist, die sich durch den Körper erstreckt und in die hydraulische Bohrung (56) öffnet, sowie mit einer Rückführleitung (102, 106), die sich von der großen Ausnehmung (60) erstreckt,

wobei die Ankerspulenordnung (76) einen scheibenförmigen Magnetanker (78) mit einer einer unteren Fläche gegenüberliegenden oberen Fläche und einen Schaft, der eine Ventilschule (80) bildet, an dem Anker (78) befestigt ist und sich senkrecht von dessen unterer Fläche erstreckt, aufweist, wobei die Ankerspulenordnung (76) weiter mit einem Spulensitz (84) vorgesehen ist, der in der Nähe der unteren Fläche des Ankers angeordnet ist,

wobei die Ankerspulenordnung (76) in dem Körper (50) angeordnet ist, wobei die Spule (80) in der hydraulischen Bohrung (56) verschiebbar angepasst ist und der Anker (78) in der Ausnehmung (60) bewegbar ist, wobei die Anordnung (76) zwischen einer geschlossenen Position (CPV), in der der Spulensitz (84) in abdichtendem Kontakt mit dem festen Ventilsitz (62) ist, und einer offenen Position (OPV) versetzt werden kann, in der der Spulensitz (84) von dem festen Ventilsitz (62) abgehoben wird, wodurch, in Betrieb, ein Eintritt von Kraftstoff in die Ausnehmung (60) ermöglicht wird,

dadurch gekennzeichnet, dass

die Steuerventilanordnung (28) weiter mit einem in der Ausnehmung (60) angeordneten Abweiser (64) zwischen dem Anker (78) und der Bodenfläche (58) der Ausnehmung vorgesehen ist, wobei der Abweiser (64) ausgebildet ist, den in die Ausnehmung (60) eintretenden Kraftstoffstrom von der unteren Fläche des Ankers weg zu lenken, wenn das Ventil in der offenen Position (OPV) ist, so dass die Versetzungen der Ankerspulenordnung (76) nicht durch den eintretenden Strom gestört sind, und wobei der Abweiser (64) eine Abweiserfläche oder Bodenfläche (66) aufweist, die mit einer zentralen Öffnung (68) vorgesehen ist, wobei die Abweiserfläche (66) quer zu der Ventilachse (X2) angeordnet ist und durch ein Schiebermerkmal (70, 116) hin zu der Bodenfläche (58) der Ausnehmung gedrückt

wird, während durch ein Abstandsmerkmal (74, 112) in einem Abstand der Bodenfläche (58) der Ausnehmung gehalten, und das Schiebermerkmal (70, 116) eine zylindrische Wand integral zu der Abweiserfläche (66) ist und sich von dem Umfang der Abweiserfläche (66) zu einem nach oben weisenden kreisförmigen Rand (72) erstreckt, wobei die zylindrische Wand (70) von der Ausnehmung (60) über die Höhe der ersten Fläche (52) des Körpers (50) nach außen vorsteht, so dass, wenn die Steuerventilanordnung (28) in einem Kraftstoffinjektor (10) angeordnet ist, ein anderer Teil des Körpers des Injektors, der in Oberflächenkontakt mit der ersten Fläche (52) des Ventilkörpers kommt, den Abweiser (64) nach unten beeinflusst, und wobei das Abstandsmerkmal (74) zwischen der Abweiserfläche (66) des Abweisers und der Bodenfläche (58) der Ausnehmung angeordnet ist und elastische Charakteristiken hat, so dass das Abstandsmerkmal (74) die Abweiserfläche (66) immer weg von der Bodenfläche (58) der Ausnehmung beeinflusst, und wobei das Abstandsmerkmal (74) vorgesehen ist durch teilweises Schneiden der Bodenfläche (66), um Zungen (75) zu bilden, die um eine nicht-geschnittene Kante nach außen gebogen sind, wobei das Biegen elastische Charakteristiken für die Zunge (75) vorsieht.

2. Kraftstoffinjektor (10) mit einer Steuerventilanordnung (28) gemäß einem der vorhergehenden Ansprüche.

Revendications

1. Assemblage formant vanne de commande (28) pour un injecteur de carburant (10), l'assemblage formant vanne (28) comprenant un corps cylindrique (50) et un ensemble armature/tiroir (76) adapté à se déplacer en translation à l'intérieur du corps (50), le corps (50) s'étendant depuis une première face supérieure (52) jusqu'à une seconde face inférieure opposée (54), et étant doté d'un évidement de grande taille (60) ouvert dans la première face (52) et étant également doté d'un perçage de distribution hydraulique (56) s'étendant dans le corps le long d'un axe principal (X2) depuis la face inférieure (58) de l'évidement, un premier siège de vanne fixe (62) étant prévu autour de l'ouverture du perçage (56) dans ladite face inférieure (58) de l'évidement, le corps (50) étant en outre doté d'un conduit de sortie hydraulique (102, 104) s'étendant à travers le corps et ouvert dans le perçage hydraulique (56), et étant également doté d'un conduit de retour (102, 106) s'étendant depuis l'évidement de grande taille (60), l'ensemble armature/tiroir (76) comprenant une armature magnétique (78) en forme de disque ayant

une face supérieure à l'opposé d'une face inférieure et comprenant une tige, formant un tiroir de vanne (80), fixée à l'armature (78) et s'étendant perpendiculairement depuis sa face inférieure, l'ensemble armature/tiroir (76) étant en outre doté d'un siège de tiroir (84) agencé au voisinage de la face inférieure de l'armature,

l'ensemble armature/tiroir (76) étant agencé dans le corps (50), le tiroir (80) étant ajusté avec faculté de coulissement dans le perçage hydraulique (56) et l'armature (78) étant déplaçable dans l'évidement (60), ledit ensemble (76) étant capable de se déplacer en translation entre une position fermée (CPV) dans laquelle le siège de tiroir (84) est en contact étanche contre le siège de vanne fixe (62), et une position ouverte (OPV) dans laquelle le siège de tiroir (84) est soulevé en éloignement du siège de vanne fixe (62) ce qui permet, en utilisation, au carburant de s'écouler pour entrer dans l'évidement (60),

caractérisé en ce que

l'assemblage formant vanne de commande (28) est en outre doté d'un déflecteur (64) agencé dans l'évidement (60), entre l'armature (78) et la face inférieure (58) de l'évidement, le déflecteur (64) étant adapté pour défléchir en éloignement de la face inférieure de l'armature l'écoulement du carburant entrant dans l'évidement (60) quand la vanne est dans la position ouverte (OPV) de telle façon que les déplacements de l'ensemble armature/tiroir (76) ne sont pas perturbés par ledit flux entrant, et

le déflecteur (64) comprend une face de déflecteur, ou face inférieure (66), dotée d'une ouverture centrale (68), ladite face de déflecteur (66) étant agencée transversalement à l'axe de vanne (X2), et étant poussée vers la face inférieure (58) de l'évidement par un moyen poussoir (70, 116) tout en étant maintenue à une distance de la face inférieure (58) de l'évidement par un moyen d'écartement (74, 112), et le moyen poussoir (70, 116) est une paroi cylindrique réalisée de façon intégrale sur la face de déflecteur (66) et dressée depuis la périphérie de ladite face de déflecteur (66) jusqu'à un bord circulaire montant (72), ladite paroi cylindrique (70) se projetant vers l'extérieur depuis l'évidement (60) au-dessus du niveau de la première face (52) du corps (50) de sorte que, quand l'assemblage formant vanne de commande (28) est agencé dans un injecteur de carburant (10), une autre partie du corps de l'injecteur qui vient en contact surfacique avec la première face (52) du corps de vanne sollicite le déflecteur (64) vers le bas, et dans lequel

le moyen d'écartement (74) est agencé entre la face de déflecteur (66) du déflecteur et la face inférieure (58) de l'évidement et a des caractéristiques élastiques telles que ledit moyen d'écartement (74) sollicite toujours la face de déflecteur (66) en éloignement de la face inférieure (58) de l'évidement, et dans lequel

ledit moyen d'écartement (74) est réalisé en découpant partiellement ladite face inférieure (66) pour former des languettes (75) qui sont cintrées vers l'extérieur autour d'un bord non découpé, ledit cintrage conférant des caractéristiques élastiques à la languette (75). 5

2. Injecteur de carburant (10) comprenant un assemblage formant vanne de commande (28) selon l'une quelconque des revendications précédentes. 10

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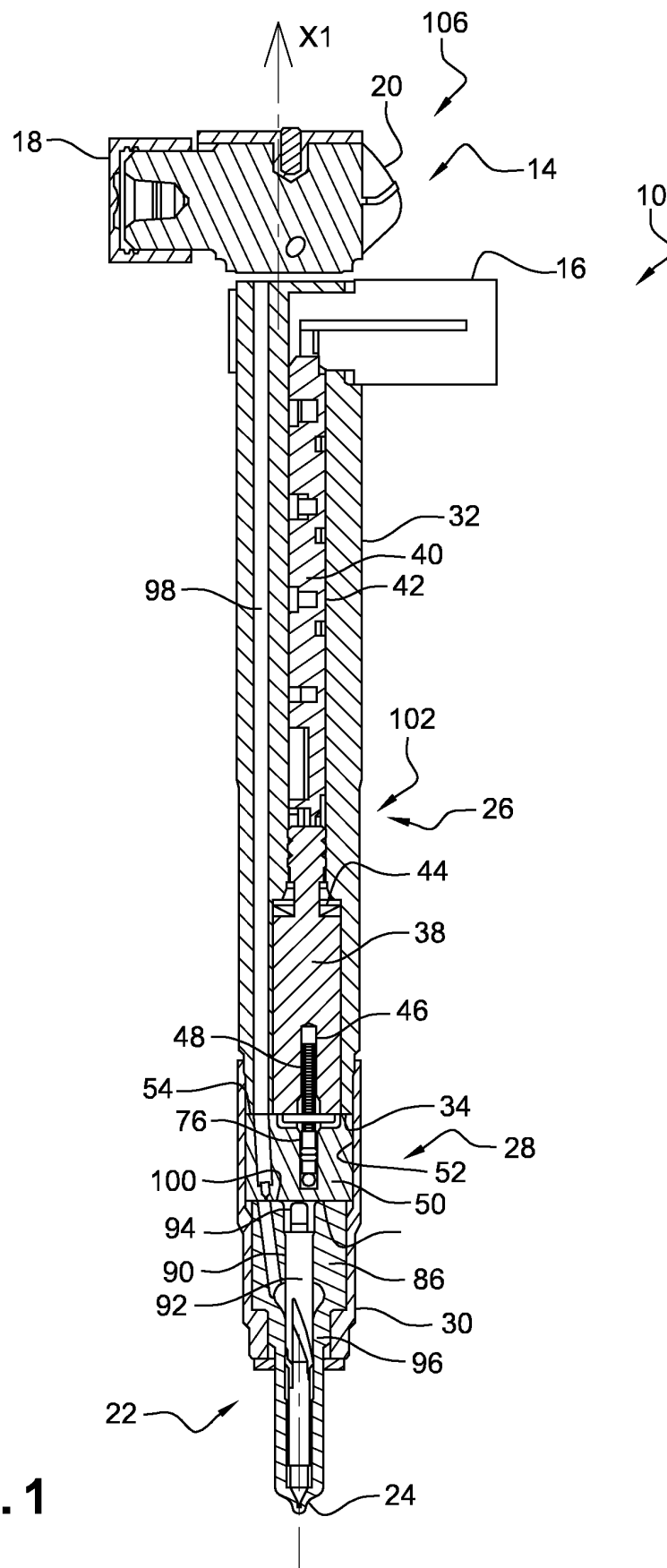


Fig. 1

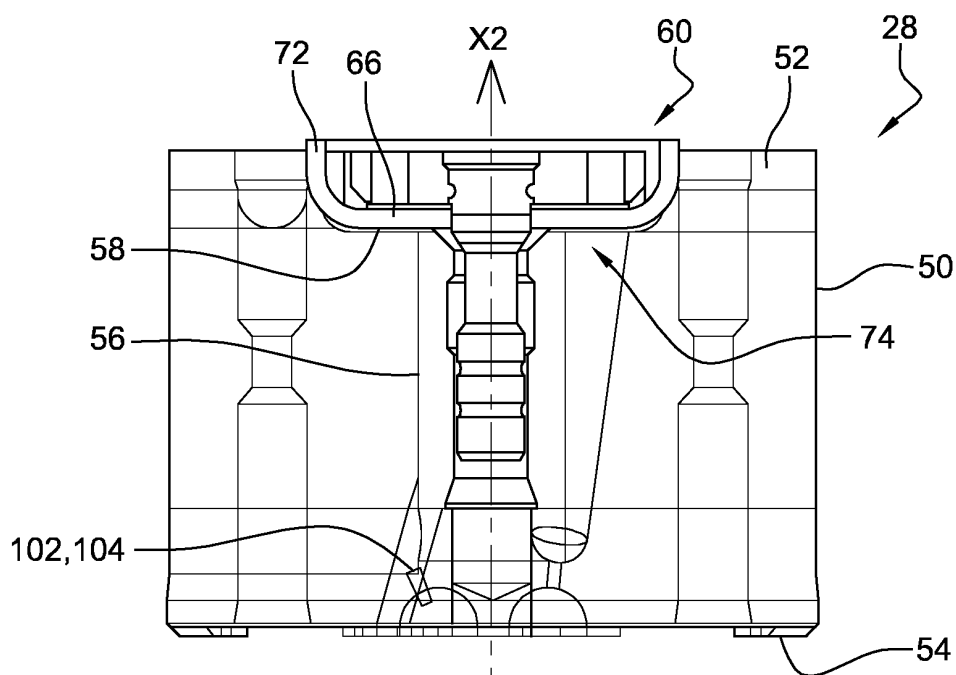


Fig. 2

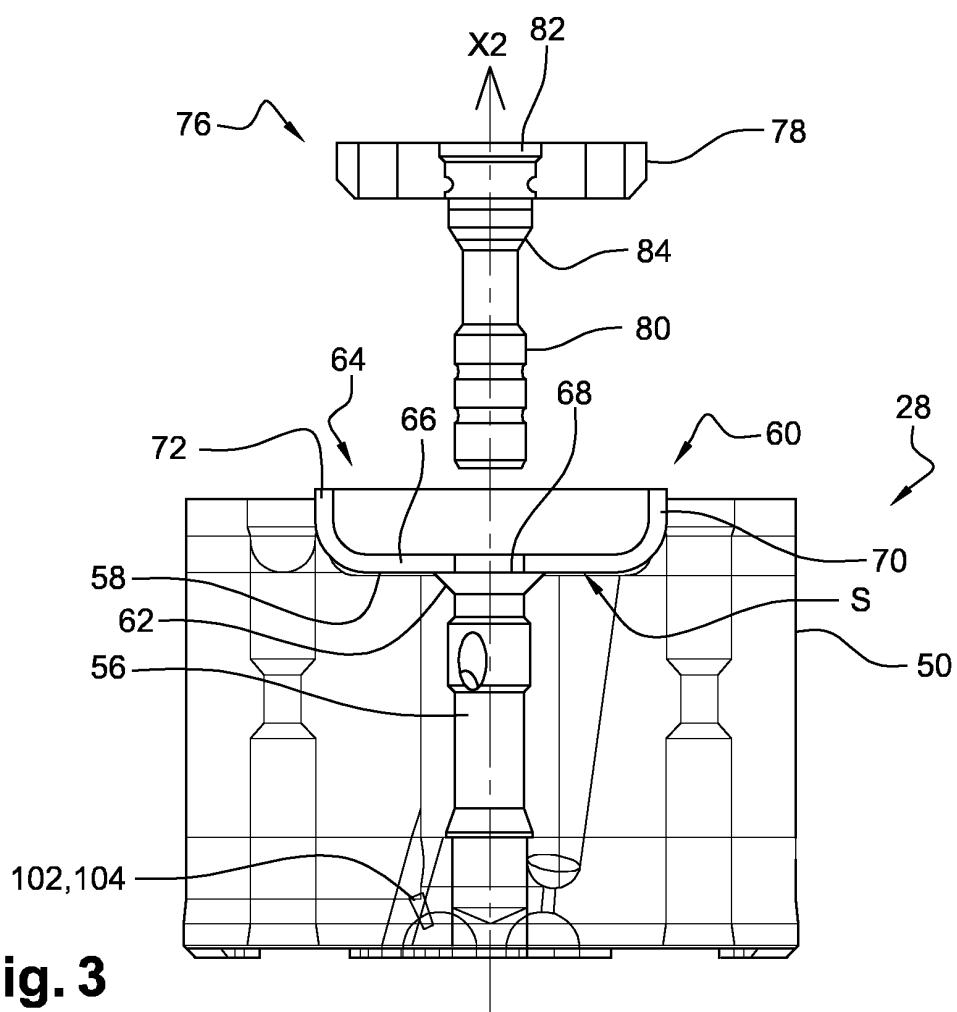


Fig. 3

Fig. 4

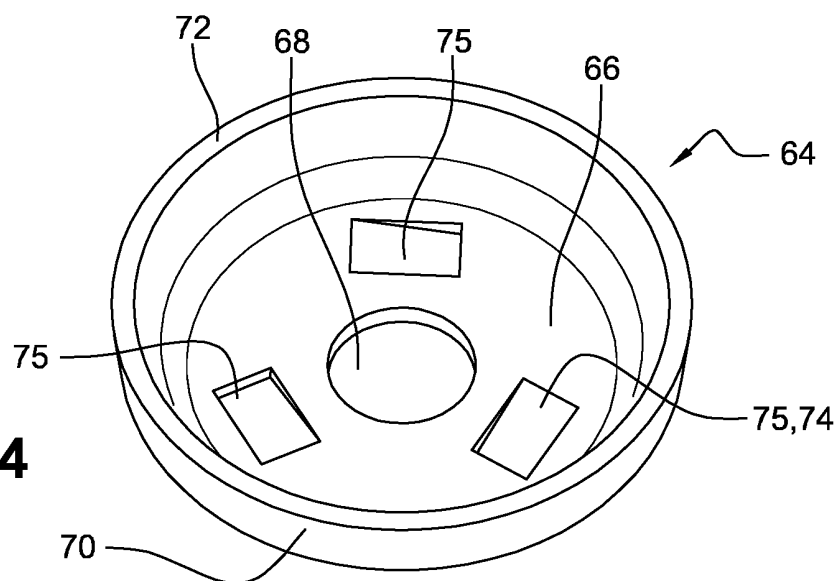


Fig. 5

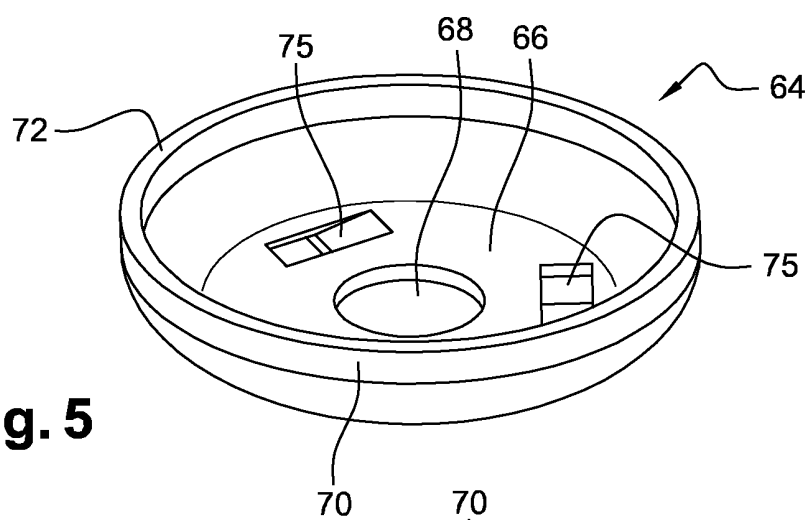
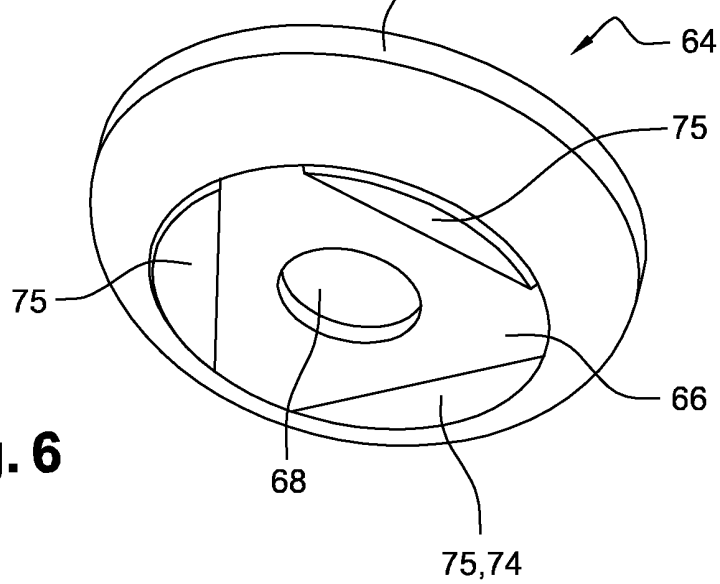


Fig. 6



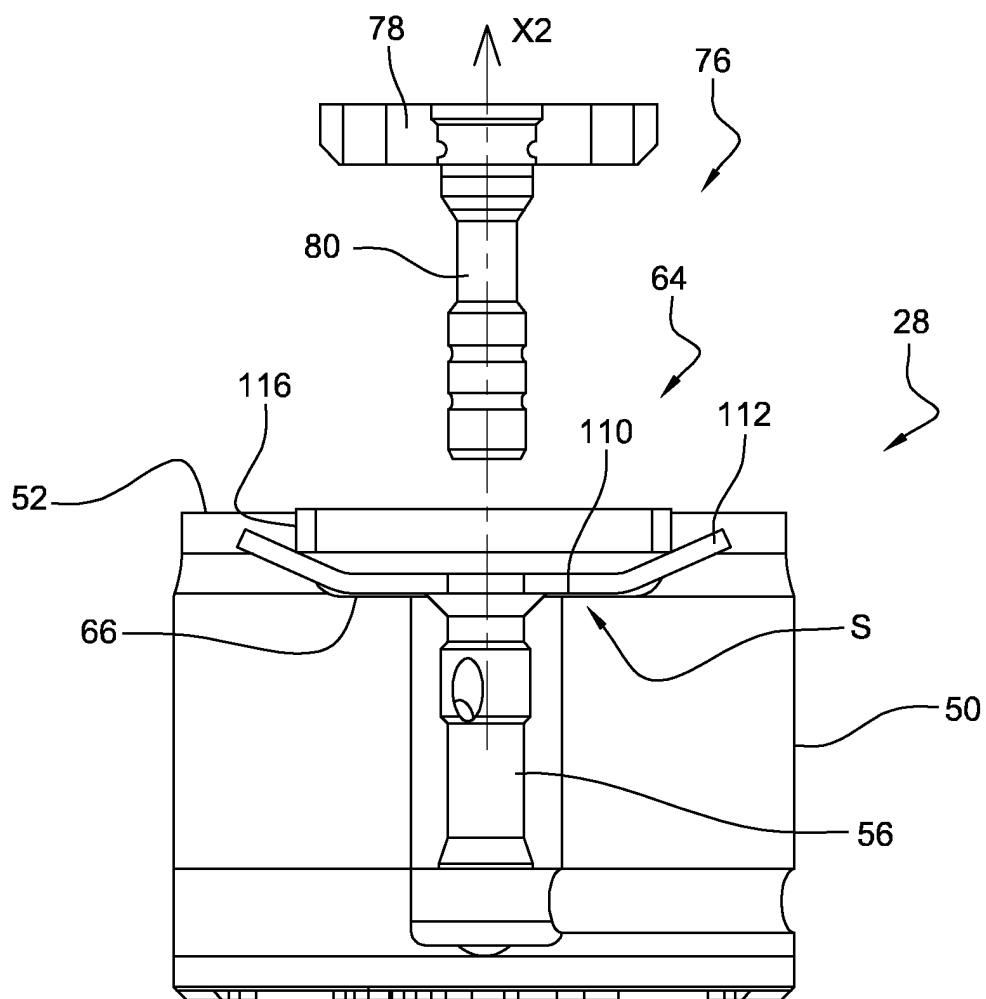


Fig. 7

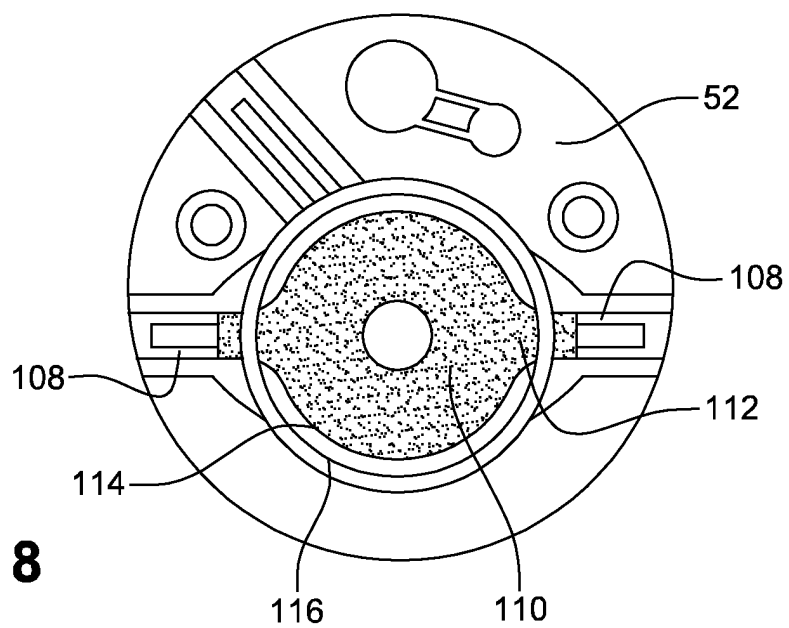


Fig. 8

REFERENCES CITED IN THE DESCRIPTION

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