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(73) Proprietor: **TOYOTA JIDOSHA KABUSHIKI KAISHA**
1, Toyota-cho
Toyota-shi
Aichi-ken (JP)

Proprietor: **NIPPONDENSO CO., LTD.**
1-1, Showa-cho
Kariya-shi
Aichi-ken (JP)

(72) Inventor: **Takano, Yuichi c/o Toyota Jidosha Kabushiki Kaisha**
1, Toyota-cho
Toyota-shi
Aichi (JP)
Inventor: **Kushibe, Takahiro Toyota Jidosha Kabushiki Kaisha**
1, Toyota-cho
Toyota-shi
Aichi (JP)
Inventor: **Shirabe, Naotaka**
53-2, Aza Myogan
Narumi-cho
Midori-ku
Nagoya-shi (JP)

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(74) Representative: **Tiedtke, Harro, Dipl.-Ing.**
Patentanwaltsbüro
Tiedtke-Bühling-Kinne & Partner
Bavariaring 4
D-80336 München (DE)

Description

The present invention relates to a fuel supply device of an engine, according to the preamble of claim 1.

In a known "air blast" valve, the opening and closing operation of the nozzle opening is electromagnetically controlled by a needle, to cause an injection of fuel by pressurized air. A pressurized air passage extending from the nozzle opening along'the needle is formed around the needle and connected to a pressurized fuel source, a nozzle chamber open to the pressurized air passage is provided, and the nozzle of the fuel injector is arranged deep in the interior of the nozzle chamber. The needle has a guide portion formed thereon, this guide portion having three equally spaced lobes which are in slidable contact with the inner wall of the pressurized air passage, to support and guide the needle. Because of the provision of the lobes to support and guide the needle, passages formed between the lobes for the fuel-air charge must have a relatively large cross sectional area, to reduce flow resistance.

After fuel is injected from the fuel injector toward the needle, the needle opens the nozzle opening and the thus injected fuel is injected together with pressurized air from the nozzle opening of the air blast valve according to the teaching of WO-A87 005837.

Where, however, passages formed between the lobes for the fuel-air charge have a relatively large cross sectional area, as in the above-mentioned air blast valve, when fuel is injected from the fuel injector toward the needle, most of the fuel injected from the fuel injector passes through passages formed between the lobes and collects in the pressurized air passage, near the nozzle opening, and as a result the fuel collected near the nozzle openings forced out as liquid fuel by the pressure of the pressurized air when the needle opens the nozzle opening, and thus a problem arises in that fuel injected from the nozzle opening is not fully atomized and is not completely mixed with the air.

Furthermore in document US-A-1 615 457 there has been disclosed a fuel supply device comprising a guide member of approximately rectangular shape in cross section being enclosed in a circular member, thereby providing longitudinal passages which are supplied with oil. The circular member comprises tangential passages for supplying fuel from said longitudinal passages to the pressurized air passage thereby maintaining a whirling motion of the body of fuel. In this manner the mixing of fuel and air should be improved. Despite of the very complicated construction of such a fuel supply device, the fuel cannot be fully atomized and completely mixed with the air by means of this device.

According to document JP-A-63-167071, there has been disclosed a generic fuel supply device having a plunger provided with plural through holes, said plunger being stored in an air passage and lowered by the activation of an electromagnetic coil, thereby opening an inner valve so that pressurized air is injected from a nozzle hole. Said device further comprises a seat valve opened by the change of the magnetic force of said electromagnetic coil, whereby fuel is supplied to the passage at the flat faces of a guide member and injected after having been mingled with the pressurized air.

An object of the present invention is to provide a fuel supply device capable of injecting fuel which has been fully atomized and completely mixed with the air from the nozzle opening.

This object is achieved by means of the features defined in the characterizing part of claim 1. According to these features the fuel supply device further comprises an air injection means arranged in the pressurized air passage at a position opposite to the nozzle opening with respect to the fuel supply means to inject pressurized air into the pressurized air passage, wherein the valve means opens the nozzle opening due to the pressure of pressurized air in the pressurized air passage when the air injection means injects pressurized air into the pressurized air passage, the pressurized air passage has an upstream passage and an enlarged passage downstream of the upstream passage, which has a cross-sectional area larger than that of the upstream passage, and the valve means is arranged in the enlarged passage, the guide member (62) being fitted into and fixed to the enlarged passage upstream of the valve means; and wherein the enlarged passage and the upstream passage are in the form of a coaxial cylinder, and the enlarged passage and the upstream passage (54a) are connected by a conical passage, the guide member further comprising a head portion arranged in the conical passage to form a further fuel and air passage between the inner face of the conical passage and the outer face of the head portion.

The present invention may be more fully understood from the description of preferred embodiments of the invention set forth below, together with the accompanying drawings.

In the drawings:

Fig. 1 is a partly cross-sectional side view of an embodiment of an air blast valve;

Fig. 2 is an enlarged cross-sectional side view of a tip portion of the air blast valve illustrated in Fig. 1;

Fig. 3 is an enlarged cross-sectional view of the guide member, taken along the line IX - IX in

Fig. 2;
Fig. 4 is perspective view of the guide member;
Fig. 5 is a bottom view of the inner wall of the cylinder head of a two-stroke engine;
Fig. 6 is a cross-sectional side view of the two-stroke engine;
Fig. 7 is a diagram illustrating the opening timing of the intake valve and the exhaust valve;
Fig. 8 is an enlarged cross-sectional side view of another embodiment of a tip portion of the air blast valve;
Fig. 9 is an enlarged cross-sectional side view of a further embodiment of a tip portion of the air blast valve; and
Fig. 10 is an enlarged cross-sectional side view of a still further embodiment of a tip portion of the air blast valve.

DESCRIPTION OF PREFERRED EMBODIMENTS

Referring to Figs. 5 and 6, reference numeral 1 designates a cylinder block, 2 a piston, 3 a cylinder head, and 4 a combustion chamber; 5 designates a pair of intake valves, 6 intake ports, 7 a pair of exhaust valves, 8 exhaust ports; and 9 designates a spark plug. Masking walls 10, each masking the valve opening formed between the valve seat and the peripheral portion of the intake valve 5, which is located on the exhaust valve side, for the entire time for which the intake valve 5 is open, are formed on the inner wall of the cylinder head 3. Consequently, when the intake valves 5 open, fresh air flows into the combustion chamber 4 from the valve opening which is located at a position opposite to the exhaust valves 7, as illustrated by the arrow A in Fig. 6. An air blast valve 20 is arranged on the inner wall of the cylinder head 3 between the intake valves 5.

Figure 1 illustrates an embodiment of the present invention. Referring to Fig. 1, a housing 51 of an air blast valve 50 comprises a nozzle portion 51a and a body portion 51b. The nozzle portion 51a extends through the cylinder head 3, and the body portion 51b is fixed to the upper end of the nozzle portion 51a. A fuel injector 52 and an air injector 53 are arranged at the body portion 51b. A straight fuel and air supply bore 54 is formed in the nozzle portion 51a, and a nozzle opening 52a of the fuel injector 52 is arranged at the upper end of the fuel and air supply bore 54. Fuel having a small spread angle is injected from the nozzle opening 52a along the axis of the fuel and air supply bore 54. An air supply air bore 55 is connected to the upper end of the fuel and air supply bore 54 and a nozzle opening 53a of the air injector 53 is arranged at the end of the air supply bore 55. Pressurized air injected from the air injector 53 is supplied to the fuel and air supply bore 54 via the air supply bore 55. A nozzle opening 56 is formed at the lower end of the nozzle portion 51a and is arranged in the combustion chamber 4. An automatic opening and closing valve 57 for the opening and closing the nozzle opening 56 is arranged in the nozzle portion 51a.

Referring to Figures 2 through 4, the automatic opening and closing valve 57 comprises a mushroom-shaped valve head 58, a valve shaft 59 extending in and along the axis of the fuel and air supply bore 54, a spring retainer 60 arranged at the top of the valve shaft 59, and a compression spring 61 constantly urging the spring retainer 60 upward. As shown in Fig. 2, the nozzle opening 56 is normally closed by the valve head 58 due to the spring force of the compression spring 61. The fuel and air supply bore 54 comprises a small diameter portion 54a having a constant cross-sectional area and extending from near the spring retainer 60 to the fuel injector 52 (Fig. 1), and a large diameter portion 54b formed around the valve shaft 59 and extending upward. The small and the large diameter portions 54a, 54b are formed coaxially. The spring retainer 60 is arranged in the large diameter portion 54b. An upper end 54c of the large diameter portion 54b is formed into a conical shape by which the cross-sectional area thereof is gradually reduced upward, and the upper end 54c of the large diameter portion 54b is connected to the lower end of the small diameter portion 54a. A guide member 62 having a diameter larger than that of the spring retainer 60 is fitted into and fixed to the large diameter portion 54b. The guide member 62 has a base portion 63 and a head portion 64.

The head portion 64 is formed into a conical shape by which the cross-sectional area thereof is gradually reduced upward and is coaxial with the large diameter portion 54b. The base portion 63 has four cylindrical portions 63a in contact with the cylindrical inner wall of the large diameter portion 54b, and four flat faces 63b each extending between the cylindrical portions 63a which are located on each side of the flat face 63b. A narrow passage 65 having a constant cross-sectional area is formed between the flat face 63b and the large diameter portion 54b. Also, a narrow passage 66 having a constant cross-sectional area is formed between the head portion 64 and the upper end 54c of the large diameter portion 54b.

Figure 1 illustrates the case where the air blast valve 50 is used for a two-stroke engine, and Figure 7 illustrates an example of the opening timing of the intake valves 5 and the exhaust valves 7, the fuel injection timing of the fuel injector 52, and the air injection timing of the air injector 53. As shown in Fig. 7, the air injection is started immediately before the closing of the intake valves 5,

and the fuel injection from the fuel injector 52 is carried out at any time after the air injection is completed but before the next air injection is started.

Fuel is injected from the fuel injector 52 toward the guide member 62. As the cross-sectional area of the narrow passages 65, 66 is relatively small, a large part of fuel injected from the fuel injector 52 adheres to the inner walls and the outer walls of the narrow passages 65, 66, and thus a very small amount of the fuel reaches the valve head 58. Then, when pressurized air is injected from the air injector 53, the valve head 58 opens the nozzle opening 56 as illustrated by the phantom line in Fig. 2. At that time, as the cross-sectional area of the narrow passages 65, 66 is small, air flows in the narrow passages 65, 66 at a high speed, and thus the fuel stuck to the inner and outer walls of the narrow passages 65, 66 is atomized and carried away by the pressurized air. Accordingly, the injection of the atomized fuel from the nozzle opening 56 is started as soon as pressurized air is injected from the nozzle opening 56. In this embodiment, the first stage of the atomization of the fuel is carried out in the narrow passages 65, 66, and the second stage of the atomization of fuel is carried out when fuel is injected from the nozzle opening 56. Namely, in this embodiment, as two stages of the atomization of the fuel are carried out, fuel that is fully atomized and completely mixed with the air is injected from the nozzle opening 56 from the beginning of the air-fuel injecting operation.

Note, when air and fuel are injected from the nozzle opening 56, as the exhaust valves 7 are already closed, fuel injected from the nozzle opening 56 does not flow into the exhaust ports 8.

Figures 8 through 10 illustrate another embodiment wherein the shape of the head portion 64 of the guide member 62 is changed.

In the embodiment illustrated in Fig. 8, the apical angle θ_1 of the head portion 64 formed in a conical shape is larger than the apical angle θ_2 of the upper end 54c of the large diameter portion 54b, which is also formed in a conical shape. Accordingly, in the embodiment illustrated in Fig. 8 the cross-sectional area of the narrow passage 66 gradually becomes smaller in the downstream direction.

In the embodiment illustrated in Fig. 9, the head portion 64 is formed into the shape of a truncated cone.

In the embodiment illustrated in Fig. 10, the head portion 64 is formed into the shape of a sphere.

Note, the air blast valve according to this invention can be used for a four-stroke engine, and fuel may be injected to the intake port.

While the invention has been described with reference to specific embodiments chosen for purposes of illustration, it should be apparent that numerous modifications could be made thereto by those skilled in the art.

Claims

1. A fuel supply device of an engine, comprising:

a pressurized air passage (55, 54);

a nozzle opening (56) formed at a tip end of said pressurized air passage (55, 54) for injecting fuel and pressurized air;

a valve means (58, 59, 60, 61) for controlling an opening of said nozzle opening (56);

a fuel supply means (52) for supplying fuel to said pressurized air passage (55, 54); and

a guide member (62) having at least three contacting faces (63a) in contact with a cylindrical inner wall and said guide member (62) having at least three substantially flat faces (63b) each extending approximately in a straight line between said contacting faces (63a) which are located on each side of said flat face (63b), wherein

said guide member (62) is arranged in said pressurized air passage (54) between said nozzle opening (56) and said fuel supply means (52) to form a fuel and air passage (65) between said cylindrical inner wall of said pressurized air passage (54) and said flat face (63b);

characterized in that

said fuel supply device further comprises an air injection means (53) arranged in said pressurized air passage (55, 54) at a position opposite to said nozzle opening (56) with respect to said fuel supply means (52) to inject pressurized air into said pressurized air passage, wherein said valve means opens said nozzle opening (56) due to the pressure of pressurized air in said pressurized air passage when said air injection means (53) injects pressurized air into said pressurized air passage (55, 54);

said pressurized air passage (54) has an upstream passage (54a) and an enlarged passage (54b) downstream of said upstream passage, which has a cross-sectional area larger than that of said upstream passage (54a), and said valve means is arranged in said enlarged passage (54b), said guide member (62) being fitted into and fixed to said enlarged passage (54b) upstream of said valve means; and

said enlarged passage (54b) and said upstream passage (54a) are in the form of a coaxial cylinder, and said enlarged passage (54b) and said upstream passage (54a) are

connected by a conical passage (54c), said guide member (62) further comprising a head portion (64) arranged in said conical passage (54c) to form a further fuel and air passage between the inner face of said conical passage (54c) and the outer face of said head portion (64).

2. A fuel supply device according to claim 1, **characterized in that** said contacting face (63a) is formed by a part of a cylindrical face having approximately a same radius as that of said cylindrical inner wall.

3. A fuel supply device according to claim 1, **characterized in that** said guide member (62) has four contacting faces (63a) and four substantially flat faces (63b).

4. A fuel supply device according to claim 3, **characterized in that** a cross section of said guide member (62) has a shape of approximately a square inscribed in said cylindrical inner wall at said contacting face (63a).

5. A fuel supply device according to claim 1, **characterized in that** said pressurized air passage (54) has a straight passage, and said nozzle opening (56) is formed at one end of said straight passage, said fuel supply means (52) being arranged at the other end of said straight passage.

6. A fuel supply device according to claim 5, **characterized in that** said fuel supply means (52) comprises a nozzle arranged on the axis of said straight passage to inject fuel from said nozzle along the axis of said straight passage.

7. A fuel supply device according to claim 1, **characterized in that** said head portion (64) is in the form of a cone which is coaxial with an axis of said conical passage (54c) and said head portion (64) is tapered toward said upstream passage (54a).

8. A fuel supply device according to claim 7, **characterized in that** an apical angle of said head portion (64) is larger than an apical angle of said conical passage (54c).

9. A fuel supply device according to claim 1, **characterized in that** said head portion (64) is in the form of a truncated cone which is coaxial with an axis of said conical passage (54c) and said head portion (64) is tapered toward said upstream passage (54a).

10. A fuel supply device according to claim 1, **characterized in that** said head portion (64) has a spherical shape.

11. A fuel supply device according to claim 1, **characterized in that** said valve means comprises a valve shaft (59), a valve head (58) formed at one end of said valve shaft (59) to open and close said nozzle opening (56), and a spring retainer (60) formed at the other end of said valve shaft (59) to retain a spring (61) which forces said valve head (58) to close said nozzle opening (56), and said guide member (62) faces said spring retainer (60) and covers an entire face of said spring retainer (60) which faces said guide member (62).

12. A fuel supply device according to claim 1, **characterized in that** said valve means comprises a valve head (58) urged by a spring (61) to close said nozzle opening (56).

Patentansprüche

1. Kraftstoff-Versorgungsvorrichtung eines Motors, die umfaßt:
einen Druckluftkanal (55, 54),
eine an einem Austrittsende dieses Druckluftkanal (55, 54) ausgebildete Düsenöffnung (56) zum Einspritzen von Kraftstoff und Druckluft,
Ventileinrichtungen (58, 59, 60, 61) zur Regelung eines Öffnens der genannten Düsenöffnung (56),
eine Kraftstoff-Zufuhreinrichtung (52) zur Zufuhr von Kraftstoff zu dem besagten Druckluftkanal (55, 54), und ein Führungselement (62), das wenigstens drei Berührungsflächen (63a) hat, die mit einer zylindrischen Innenwand in Anlage sind, und wobei dieses Führungselement (62) wenigstens drei im wesentlichen ebene Flächen (63b) besitzt, von denen sich jede in einer annähernd geraden Linie zwischen den erwähnten Berührungsflächen (63a), welche sich an jeder Seite der ebenen Fläche (63b) befinden, erstreckt,
wobei das erwähnte Führungselement (62) in dem besagten Druckluftkanal (54) zwischen der genannten Düsenöffnung (56) sowie der erwähnten Kraftstoff-Zufuhreinrichtung (52) angeordnet ist, um einen Kraftstoff- und Luftdurchlaß (65) zwischen der genannte zylindrischen Innenwand des besagten Druckluftkanals (54) sowie der genannten ebenen Fläche (63b) zu bilden,
dadurch gekennzeichnet, daß
die erwähnte Kraftstoff-Versorgungsvorrichtung ferner eine Luft-Einblaseeinrichtung (53) umfaßt, die in dem besagten Druckluftkanal (55,

54) an einer mit Bezug zu der erwähnten Kraftstoff-Zufuhreinrichtung (52) zu der genannten Düsenöffnung (56) entgegengesetzten Position angeordnet ist, um Druckluft in den besagten Druckluftkanal einzublasen, wobei die erwähnten Ventileinrichtungen die genannte Düsenöffnung (56) zufolge des Drucks der Druckluft in dem besagten Druckluftkanal öffnen, wenn die erwähnte Luft-Einblaseeinrichtung (53) Druckluft in den besagten Druckluftkanal (55, 54) injiziert,
der besagte Druckluftkanal (54) einen stromaufwärtigen Durchgang (54a) und einen stromab von dem erwähnten stromaufwärtigen Durchgang befindlichen vergrößerten Durchgang (54b) besitzt, welcher eine größere Querschnittsfläche als diejenige des erwähnten stromaufwärtigen Durchgangs (54a) hat, und daß die genannten Ventileinrichtungen in dem besagten vergrößerten Durchgang (54b) angeordnet sind, wobei das erwähnte Führungselement (62) in den besagten vergrößerten Durchgang (54b) eingesetzt und an diesem stromauf von den genannten Ventileinrichtungen befestigt ist, und der besagte vergrößerte Durchgang (54b) und der erwähnte stromaufwärtige Durchgang (54a) die Gestalt eines koaxialen Zylinders aufweisen und daß der besagte vergrößerte Durchgang (54b) sowie der erwähnte stromaufwärtige Durchgang (54a) mittels eines kegelförmigen Abschnitts (54c) verbunden sind, wobei das besagte Führungselement (62) ferner ein in dem kegelförmigen Abschnitt (54c) angeordnetes Kopfteil (64) umfaßt, um zwischen der Innenfläche des genannten kegelförmigen Abschnitts (54c) sowie der Außenfläche des erwähnten Kopfteils (64) einen weiteren Kraftstoff- und Luftdurchgang zu bilden.

2. Kraftstoff-Versorgungsvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, daß** die erwähnte Berührungsfläche (63a) von einem Teil einer zylindrischen Fläche gebildet ist, die annähernd einen gleichen Radius wie derjenige der genannten zylindrischen Innenwand hat.

3. Kraftstoff-Versorgungsvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, daß** das erwähnte Führungselement (62) vier Berührungsflächen (63a) und vier im wesentlichen ebene Flächen (63b) besitzt.

4. Kraftstoff-Versorgungsvorrichtung nach Anspruch 3, **dadurch gekennzeichnet, daß** ein Querschnitt des erwähnten Führungselements (62) eine Gestalt von annähernd einem Quadrat hat, das in die genannte zylindrische Innenwand an der besagten Berührungsfläche (63a) einbeschrieben ist.

5. Kraftstoff-Versorgungsvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, daß** der besagte Druckluftkanal (54) einen geraden Durchgang hat und daß die besagte Düsenöffnung (56) an einem Ende des erwähnten geraden Durchgangs ausgebildet ist, wobei die genannte Kraftstoff-Zufuhreinrichtung (52) am anderen Ende des erwähnten geraden Durchgangs angeordnet ist.

6. Kraftstoff-Versorgungsvorrichtung nach Anspruch 5, **dadurch gekennzeichnet, daß** die genannte Kraftstoff-Zufuhreinrichtung (52) eine auf der Achse des erwähnten geraden Durchgangs angeordnete Düse umfaßt, um Kraftstoff von der besagten Düse längs der Achse des erwähnten geraden Durchgangs einzuspritzen.

7. Kraftstoff-Versorgungsvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, daß** das erwähnte Kopfteil (64) die Gestalt eines Kegels hat, der mit einer Achse des genannten kegelförmigen Abschnitts (54c) koaxial ist, und daß das erwähnte Kopfteil (64) zum besagten stromaufwärtigen Durchgang (54a) hin verjüngt ist.

8. Kraftstoff-Versorgungsvorrichtung nach Anspruch 7, **dadurch gekennzeichnet, daß** ein Scheitelpunktwinkel des erwähnten Kopfteils (64) größer als ein Scheitelpunktwinkel des genannten konischen Abschnitts (54c) ist.

9. Kraftstoff-Versorgungsvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, daß** das erwähnte Kopfteil (64) die Gestalt eines Kegelstumpfes hat, der mit einer Achse des genannten kegelförmigen Abschnitts (54c) koaxial ist, und daß das erwähnte Kopfteil (64) zum besagten stromaufwärtigen Durchgang (54a) hin verjüngt ist.

10. Kraftstoff-Versorgungsvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, daß** das erwähnte Kopfteil (64) eine sphärische Gestalt hat.

11. Kraftstoff-Versorgungsvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, daß** die erwähnten Ventileinrichtungen einen Ventilschaft (59), einen am einen Ende des besagten Ventilschaftes (59) ausgebildeten Ventilkegel (58), um die genannte Düsenöffnung (56) zu öffnen sowie zu schließen, und ein am anderen

Ende des besagten Ventilschaftes (59) ausgestaltetes Federgegenlager (60), um eine Feder (61) festzuhalten, die den erwähnten Ventilkegel (58) zum Schließen der besagten Düsenöffnung (56) belastet, umfassen und daß das genannte Führungselement (62) dem erwähnten Federgegenlager (60) gegenüberliegt und eine gesamte Fläche des erwähnten Federgegenlagers (60), welche dem genannten Führungselement (62) zugewandt ist, überdeckt.

12. Kraftstoff-Versorgungsvorrichtung nach Anspruch 1**, dadurch gekennzeichnet, daß** die erwähnten Ventileinrichtungen einen Ventilkegel (58) umfassen, der durch eine Feder (61) belastet ist, um die besagte Düsenöffnung (56) zu schließen.

Revendications

1. Un dispositif d'alimentation d'un moteur en carburant, comprenant:

- un passage d'air comprimé (55, 54);
- une ouverture de buse (56), formée à une extrémité d'embout dudit passage d'air comprimé (55, 54), pour injecter du carburant et de l'air comprimé;
- des moyens de soupape (58, 59, 60, 61) pour commander une ouverture de ladite ouverture de buse (56);
- des moyens d'alimentation en carburant (52) pour amener du carburant audit passage d'air comprimé (33, 35, 55, 54); et
- un organe de guidage (62) présentant au moins trois faces de contact (63a), en contact avec une paroi cylindrique intérieure et ledit organe de guidage (62) présentant au moins trois faces (63b) sensiblement planes chacune s'étendant approximativement en ligne droite, entre lesdites faces de contact (63a), situées sur chaque côté de ladite face plane (63b), dans lequel
- ledit organe de guidage (62) est disposé dans ledit passage d'air comprimé (64), entre ladite ouverture de buse (56) et lesdit moyens d'amenée de carburant (52), pour former un passage de carburant et d'air (65) entre ladite paroi cylindrique intérieure dudit passage d'air comprimé (64) et ladite face plane (63b), caractérisé en ce que:

lesdits moyens d'alimentation en carburant comprennent en outre un moyen d'injection d'air (53), disposé dans ledit passage d'air comprimé (55, 54), dans une position opposée à ladite ouverture de buse (56), par rapport auxdits moyens d'alimentation en carburant (52), pour injecter de l'air comprimé dans ledit passage d'air comprimé, dans lequel lesdits moyens de soupape ouvrent ladite ouverture de buse (56), en raison de la pression de l'air comprimé régnant dans ledit passage d'air comprimé, lorsque ledit moyen d'injection d'air (53) injecte de l'air comprimé dans ledit passage d'air comprimé (55, 54);

en ce que ledit passage d'air comprimé (54) présente un passage amont (54a) et un passage agrandi (54b) situé en aval dudit passage amont, présentant une aire de section transversale supérieure à celle dudit passage amont (54a), et lesdits moyens de soupape sont disposés dans ledit passage agrandi (54b), ledit organe de guidage (62) étant monté dans le passage agrandi (54b) et fixé à celui-ci, en amont desdits moyens de soupape, et

en ce que ledit passage agrandi (54b) et ledit passage amont (54a) se présentent sous la forme d'un cylindre coaxial, et ledit passage agrandi (54b) et ledit passage amont (54a) sont connectés par un passage conique (54c), ledit organe de guidage (62) comprenant en outre une partie de tête (64) disposée dans ledit passage conique (54c), pour former un passage supplémentaire de carburant et d'air, entre la face intérieure dudit passage conique (54c) et la face extérieure de ladite partie de tête (64).

2. Un dispositif d'alimentation en carburant selon la revendication 1, caractérisé en ce que ladite face de contact (39a, 63a) est formée par une partie d'une face cylindrique présentant approximativement le même rayon que celui de ladite paroi cylindrique intérieure.

3. Un dispositif d'alimentation en carburant selon la revendication 1, caractérisé en ce que ledit organe de guidage (62) présente quatre faces de contact (63a) et quatre faces sensiblement planes (63b).

4. Dispositif d'alimentation en carburant selon la revendication 3, caractérisé en ce que la section transversale dudit organe de guidage (62) présente approximativement la forme d'un carré inscrit dans ladite paroi cylindrique intérieure, sur ladite face de contact (63a).

5. Un dispositif d'alimentation en carburant selon la revendication 1, caractérisé en ce que ledit passage d'air comprimé (54) présente un passage droit, et ladite ouverture de buse (56) est formée à une extrémité dudit passage droit, ledit moyen d'amenée de carburant (52) étant disposé à l'autre extrémité dudit passage droit.

6. Un dispositif d'alimentation en carburant selon la revendication 5, caractérisé en ce que ledit moyen d'amenée de carburant (52) comprend une buse disposée sur l'axe dudit passage droit, pour injecter du carburant par ladite buse, le long de l'axe dudit passage droit.

7. Un dispositif d'alimentation en carburant selon la revendication 1, caractérisé en ce que ladite partie de tête (64) se présente sous la forme d'un cône, coaxial par rapport à l'axe dudit passage conique (54c), et ladite partie de tête (64) est effilée en direction dudit passage amont (54a).

8. Un dispositif d'alimentation en carburant selon la revendication 7, caractérisé en ce que l'angle au sommet de ladite partie de tête (64) est supérieur à l'angle au sommet dudit passage conique (54c).

9. Un dispositif d'alimentation en carburant selon la revendication 1, caractérisé en ce que ladite partie de tête (64) se présente sous la forme d'un tronc de cône, coaxial par rapport à l'axe dudit passage conique (54c), et en ce que ladite partie de tête (64) est effilée en direction dudit passage amont (54a).

10. Un dispositif d'alimentation en carburant selon la revendication 1, caractérisé en ce que ladite partie de tête (64) est de forme sphérique.

11. Un dispositif d'alimentation en carburant selon la revendication 1, caractérisé en ce que lesdits moyens de soupape comprennent une tige de soupape (59), une tête de soupape (58) formée à une extrémité de ladite tige de soupape (59), pour ouvrir et fermer ladite ouverture de buse (56), et un organe de retenue de ressort (60) formé à l'autre extrémité de ladite tige de soupape (59), pour retenir un ressort (61) qui oblige ladite tête de soupape (58) à fermer ladite ouverture de buse (56), et en ce que ledit organe de guidage (62) fait face audit organe de retenue de ressort (60) et recouvre une face entière de ce dernier, qui fait face audit organe de guidage (62).

12. Un dispositif d'alimentation en carburant selon la revendication 1, caractérisé en ce que lesdits moyens de soupape comprennent une tête de soupape (58), sollicitée par un ressort (61) pour fermer ladite ouverture de buse (56).

Fig. 1

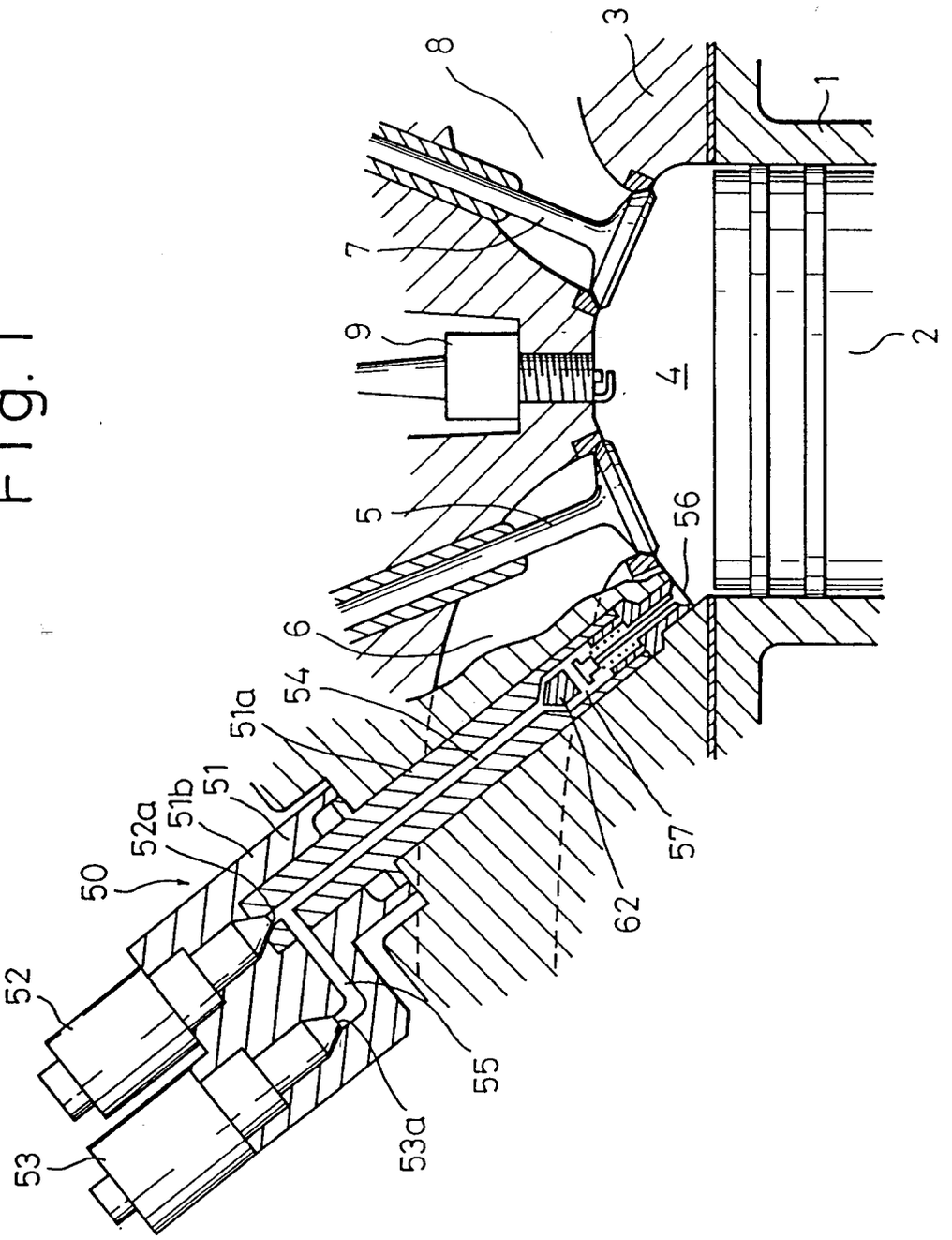


Fig. 2

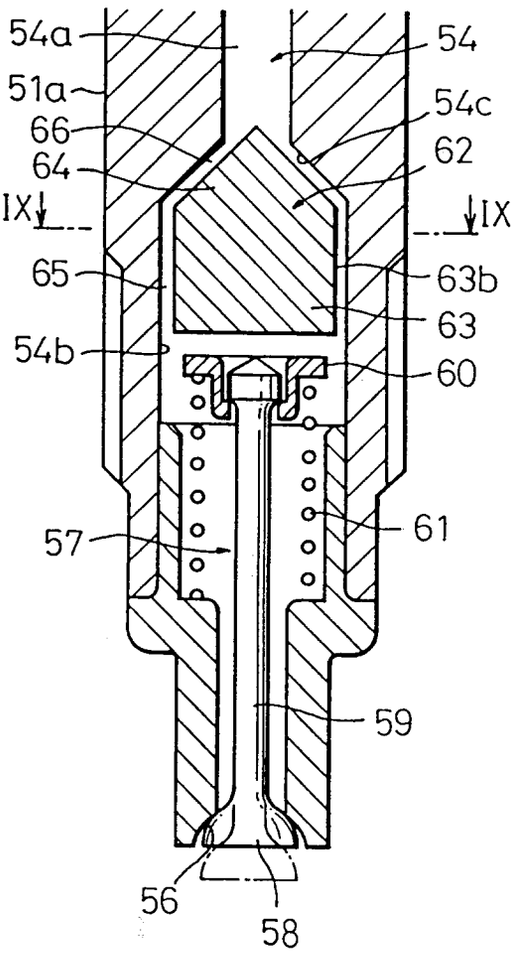


Fig. 3

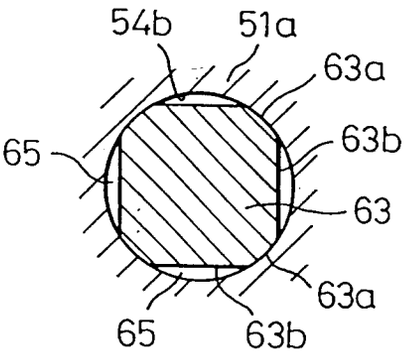
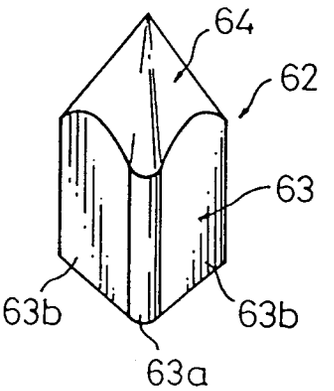


Fig. 4



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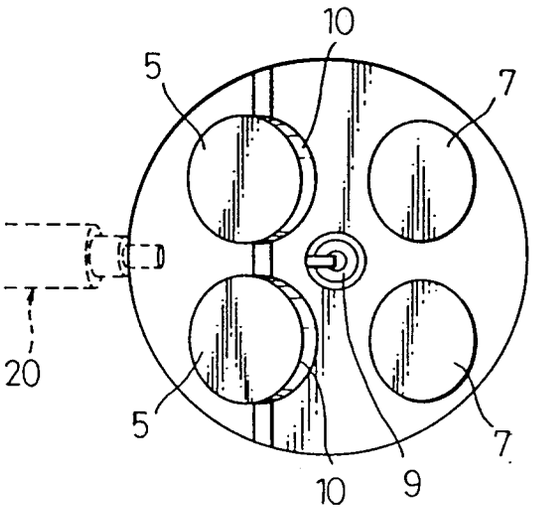

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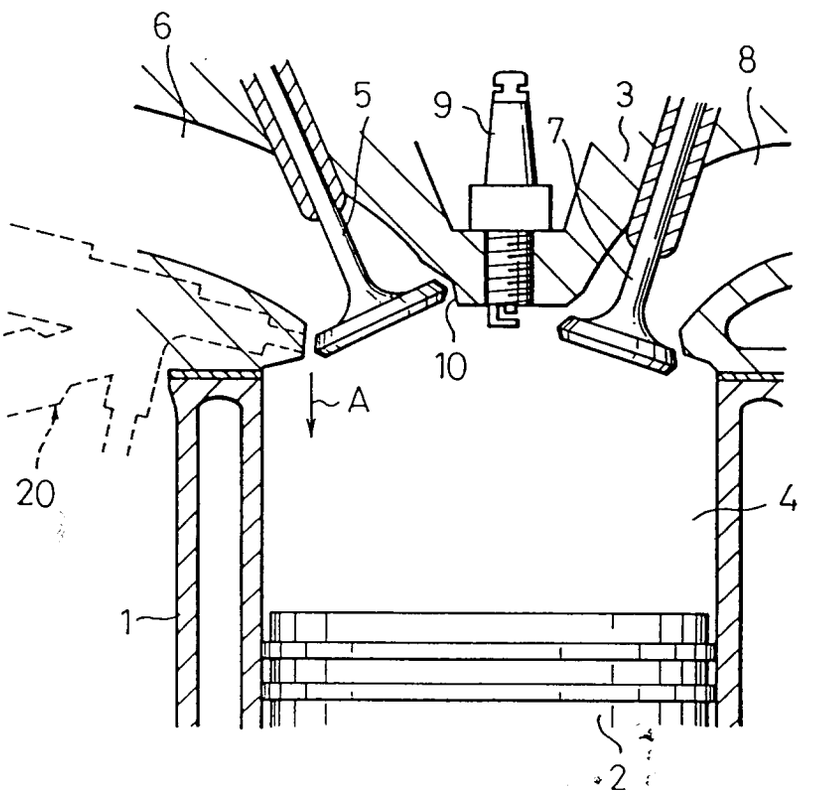

Fig. 7

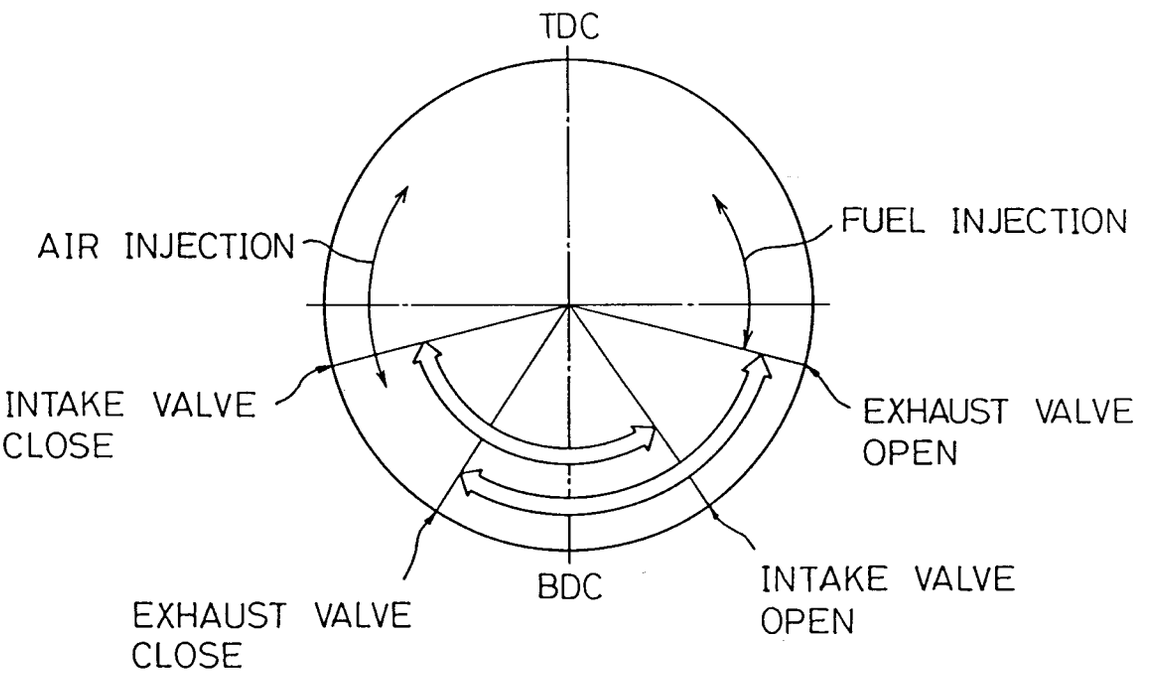
TDC
AIR INJECTION
FUEL INJECTION
INTAKE VALVE CLOSE
EXHAUST VALVE OPEN
BDC
EXHAUST VALVE CLOSE
INTAKE VALVE OPEN

Fig. 8

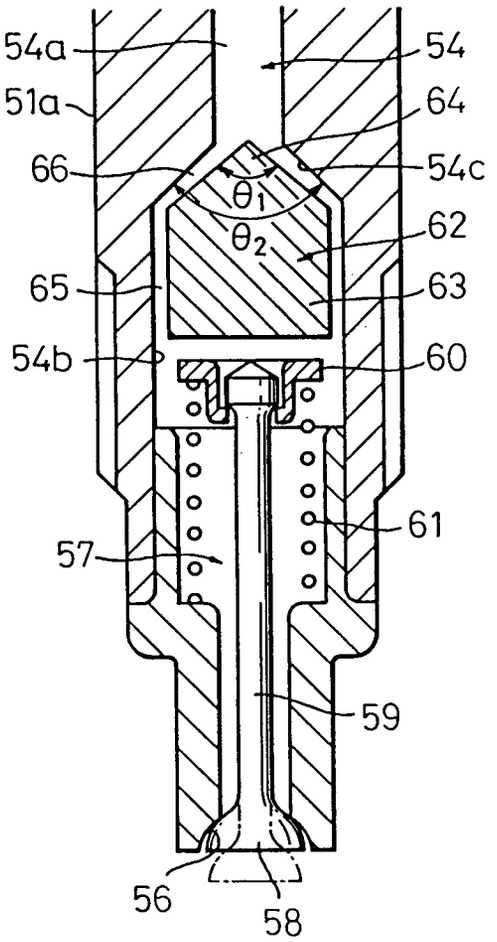
54a
54
51a
64
66
54c
θ1
θ2
62
65
63
54b
60
61
57
59
56
58

Fig. 9

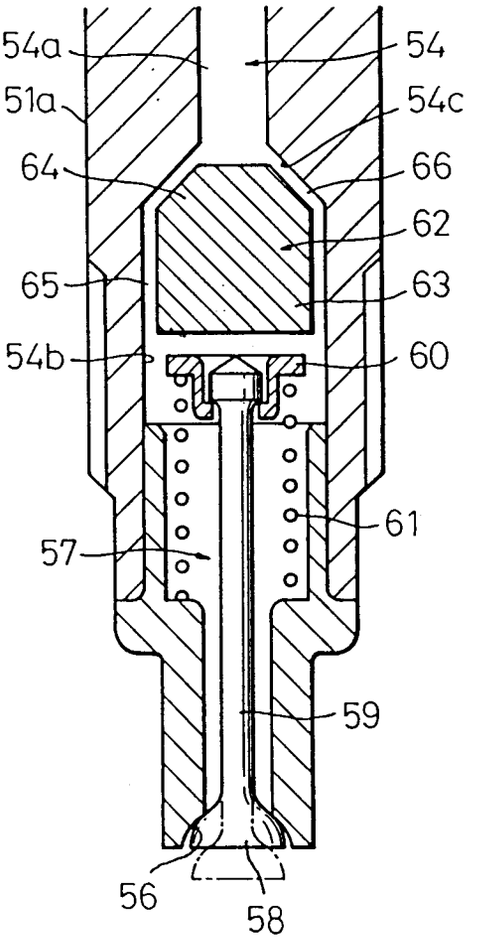
54a
54
51a
54c
64
66
62
65
63
54b
60
61
57
59
56
58

Fig. 10