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(54) FUEL SUPPLY MODULE

KRAFTSTOFFZUFUHRMODUL

MODULE D ALIMENTATION EN CARBURANT

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Description

TECHNICAL FIELD

[0001] The present invention relates to a fuel supply module that is primarily for supplying fuel to a fuel injection valve of an engine and, in particular, to an improvement of a fuel supply module that includes a mounting base member mounted on a fuel tank and having a fuel takeoff pipe projecting from an upper face, an electric pump that is supported by the mounting base member, is housed within the fuel tank, pumps up fuel within the fuel tank, and feeds the fuel to the fuel takeoff pipe, and a regulator valve having a valve tube retained in the mounting base member and returning into the fuel tank part of the fuel discharged from the electric pump so as to regulate the discharge pressure thereof.

BACKGROUND ART

[0002] Such a fuel supply module is already known, as disclosed in Patent Publication 1. Patent Publication 1: Japanese Patent Application Laid-open No. 2007-291866

[0003] The present inventors have found that one of the factors causing noise during operation of such a fuel supply module is vibration due to opening and closing of a valve body in the regulator valve being transmitted to the mounting base member and the mounting base member generating resonance.

[0004] At least the preferred embodiment of the present invention therefore has an object of providing a quiet fuel supply module by preventing as much as possible vibration due to opening and closing of a valve body in a regulator valve from being transmitted to a mounting base member.

[0005] A further fuel supply module is disclosed in EP 0666415, in which a pressure regulator for the fuel system is supported and centered by two concentric walls that are separated by a gap.

MEANS FOR SOLVING THE PROBLEMS

[0006] According to a first aspect, the present invention provides a fuel supply module comprising a mounting base member mounted on a fuel tank and having a fuel takeoff pipe projecting from an upper face, an electric pump that is supported by the mounting base member, is housed within the fuel tank, pumps up fuel within the fuel tank, and feeds the to the fuel takeoff pipe, and a regulator valve having a valve tube retained in the mounting base member and returning into the fuel tank part of the fuel discharged from the electric pump so as to regulate the discharge pressure thereof, wherein formed on the mounting base member are a retaining tube and a surrounding wall surrounding the retaining tube via a gap, at least part of the valve tube of the regulator valve being press-fitted into the retaining tube, characterised in that the mounting base member is provided with a guide hole connected to the inner peripheral face of the retaining tube, the valve tube is provided with a guide tube portion fitted into the guide hole via a seal and a press-fit tube portion press-fitted into the inner peripheral face of the retaining tube, a leakage channel is provided between the press-fit tube portion and the retaining tube, the leakage channel making an outer peripheral face of the guide tube portion adjacent to the press-fit tube portion open outside the valve tube, and when testing the function of the fuel supply module, if the seal is not fitted, fuel on the inlet side of the regulator valve flows out via the leakage channel.

[0007] Further, according to a second aspect of the present invention, in addition to the first aspect, a radial rib is formed on the mounting base member, the radial rib integrally connecting an outer peripheral face of the retaining tube and an inner peripheral face of the surrounding wall.

[0008] Furthermore, according to a third aspect of the present invention, in addition to the first aspect, a pressure regulation path providing communication between a fuel discharge passage of the electric pump and the regulator valve is provided with an orifice.

EFFECTS OF THE INVENTION

[0009] In accordance with the first aspect of the present invention, during operation of the regulator valve, vibration due to opening and closing of the valve body is transmitted to the valve tube, and is transmitted from the press-fit tube portion to the retaining tube, which are press-fitted one into the other, but most of the vibration is absorbed by the gap between the retaining tube and the surrounding wall surrounding the retaining tube, and as a result generation of resonance from the mounting base member can be suppressed, thus contributing to an improvement in the quietness of the fuel supply module.

[0010] Further, in accordance with the first aspect of the present invention, when testing the function of the fuel supply module after completion, if the seal is not fitted on the regulator valve, fuel on the inlet side of the regulator valve flows out via the leakage channel, and this enables forgetting to fit the seal to be detected.

[0011] In accordance with the second aspect of the present invention, the retaining tube is reinforced effectively by the radial rib providing a connection between the retaining tube and the surrounding wall, the tightening force of the retaining tube on the press-fit tube portion can be stabilized regardless of changes in temperature and the passage of time, and it is particularly effective when the mounting base member is made of a synthetic resin.

[0012] In accordance with the third aspect of the present invention, when discharge pressure pulsates during fuel discharge of the electric pump, the pulsations are attenuated by the orifice just before reaching the regulator valve, and it is therefore possible to prevent vibra-

tion of the valve body of the regulator valve due to pulsations of the discharge pressure of the electric pump, thereby contributing to a further improvement in the quietness of the fuel supply module.

BRIEF DESCRIPTION OF DRAWINGS

[0013]

[FIG. 1] FIG. 1 is a perspective view of a fuel supply module related to one embodiment of the present invention.
[FIG. 2] FIG. 2 is a vertical sectional view showing a state in which the fuel supply module is mounted on a fuel tank.
[FIG. 3] FIG. 3 is an enlarged view of part of FIG. 2.
[FIG. 4] FIG. 4 is a sectional view along line 4-4 in FIG. 3.
[FIG. 5] FIG. 5 is a sectional view along line 5-5 in FIG. 4.
[FIG. 6] FIG. 6 is a view, corresponding to FIG. 3, showing a state before a regulator valve is mounted.
[FIG. 7] FIG. 7 is a view, corresponding to FIG. 5, showing another embodiment of the present invention.

EXPLANATION OF REFERENCE NUMERALS AND SYMBOLS

[0014]

Ep Electric pump
M Fuel supply module
R Regulator valve
T Fuel tank
2 Mounting base member
12 Fuel takeoff pipe
35 Pressure regulation path
36 Orifice
37 Valve tube
37a Guide tube portion
37c Press-fit tube portion
56 Seal
57 Retaining tube
58 Gap
59 Surrounding wall
60 Rib
62 Guide hole
64 Leakage channel

BEST MODE FOR CARRYING OUT THE INVENTION

[0015] Modes for carrying out the present invention are explained below by reference to preferred embodiments of the present invention shown in the attached drawings.
[0016] First, in FIG. 1 and FIG. 2, a fuel supply module M of the present invention is mounted on a ceiling wall 1 of a fuel tank T mounted in a vehicle such as a motorcycle, the fuel supply module M supplying fuel within the fuel tank T to an engine fuel injection valve I.
[0017] The fuel supply module M includes a mounting base member 2, an electric pump Ep, an upper pump holder 3A, a lower pump holder 3B, and a fuel strainer 4, the electric pump Ep being disposed immediately beneath the mounting base member 2 with its axial direction vertical, the upper pump holder 3A being formed integrally with the mounting base member 2, the lower pump holder 3B being detachably joined to the upper pump holder 3A and housing and retaining the electric pump Ep in cooperation with the mounting base member 2, and the fuel strainer 4 being mounted at the lower end of the electric pump Ep.
[0018] The ceiling wall 1 of the fuel tank T is provided with an opening 5 through which the electric pump Ep is inserted into the tank interior, and is fixedly provided with a mounting ring 6 that surrounds the opening 5. This mounting ring 6 is fixedly provided with a plurality of mounting bolts 7 projecting from an upper face thereof.
[0019] The mounting base member 2 has a disk-shaped flange portion 2a superimposed on the upper face of the mounting ring 6 so as to block the opening 5. This flange portion 2a is provided with a plurality of bolt holes 11 arranged along the outer periphery thereof, and the mounting base member 2 is fixed to the mounting ring 6 via the plurality of mounting bolts 7 inserted through these bolt holes 11 and a plurality of nuts 8 screwed and tightened on the mounting bolts 7. In this arrangement, an annular seal 9 for sealing the opening 5 is disposed between the flange portion 2a and the ceiling wall 1 of the fuel tank T.
[0020] This mounting base member 2 is made of a synthetic resin; a fuel takeoff pipe 12 projecting horizontally outside the fuel tank T is formed integrally with an upper part of the flange portion 2a, and an outer end part of the fuel takeoff pipe 12 is connected to a fuel supply pipe 33 communicating with the engine fuel injection valve I.
[0021] The upper pump holder 3A is formed integrally with a lower face of the flange portion 2a. This upper pump holder 3A projects into the interior of the fuel tank T, has a cylindrical shape so that it fits onto the outer periphery of an upper half of the electric pump Ep, and is provided with a plurality of T-shaped latching grooves 13F opening at the lower end and spaced at equal intervals in the peripheral direction.
[0022] On the other hand, the lower pump holder 3B is made of a synthetic resin in a cylindrical shape so as to house and retain a lower half of the electric pump Ep. Integrally formed with the lower pump holder 3B are a plurality of T-shaped latching tabs 13M projecting from the upper end of the lower pump holder 3B. Engaging these latching tabs 13M with the latching grooves 13F joins the upper pump holder 3A to the lower pump holder 3B. The electric pump Ep is thus housed and retained between the upper pump holder 3A and the lower pump holder 3B.
[0023] The electric pump Ep is formed from an electric

motor E having a rotor 20 facing in the vertical direction, and a fuel pump P driven by the electric motor E. The electric motor E is formed from a cylindrical stator 17 having a plurality of magnets 17a fixedly arranged on the inner periphery in the peripheral direction, an upper bearing bracket 18 joined to the upper end of the stator 17 by crimping, a lower bearing bracket 19 joined to a lower end part of the stator 17, and the rotor 20, which has a rotor shaft 20a supported by the upper and lower bearing brackets 18 and 19.

[0024] The fuel pump P is arranged as a Wesco type from a pump case 23 and a pump impeller 24, the pump case 23, together with the lower bearing bracket 19, being joined to the stator 17 by crimping so as to form a pump chamber 22 between itself and a lower face of the lower bearing bracket 19, and the pump impeller 24 being rotatably housed in the pump chamber 22 and connected to a lower end part of the rotor shaft 20a.

[0025] The pump case 23 is provided with a suction port 25 opening in the pump chamber 22, the fuel strainer 4, which is disposed in a bottom part within the fuel tank T, is connected to this suction port 25, and this fuel strainer 4 is mounted on a support shaft 26 projectingly provided on a lower face of the pump case 23 and projecting beneath the lower pump holder 3B. The lower bearing bracket 19 is provided with a discharge port 27 providing communication between the pump chamber 22 and the interior of the stator 17.

[0026] Formed integrally with the upper bearing bracket 18 is a fuel discharge pipe 30 projecting thereabove and having a final discharge port 34 communicating with the interior of the stator 17, and provided in the interior of the fuel discharge pipe 30 is a check valve 31 for preventing backflow of fuel into the final discharge port 34. This fuel discharge pipe 30 is fitted from below, via a seal 32, into the inner periphery of a connection tube 29 projectingly provided integrally with a lower face of the mounting base member 2.

[0027] Formed in the mounting base member 2 are a series of fuel passages 28 in an L shape running through the interior of the fuel takeoff pipe 12 and the interior of the connection tube 29 and communicating with the interior of the fuel discharge pipe 30, and a pressure regulation path 35 branching from a bent portion of the fuel passage 28. A regulator valve R communicating with the pressure regulation path 35 via an orifice 36 is retained in the mounting base member 2. The regulator valve R regulates the pressure within the fuel passage 28 at predetermined pressure that is suitable for fuel injection from the fuel injection valve I, and the internal structure thereof and the structure with which it is retained by the mounting base member 2 are explained later.

[0028] The fuel discharge pipe 30 is disposed on one side of an upper end face of the upper bearing bracket 18, and a power-supplying terminal 47 of the electric motor E is projectingly provided on the other side.

[0029] A coupler 48 for retaining an outside terminal 49 is formed integrally with an upper face of the mounting base member 2, an inside terminal 52 connected to the outside terminal 49 projects from the lower face of the mounting base member 2, and a cylindrical guide tube 53 surrounding the inside terminal 52 is projectingly provided integrally with the lower face of the mounting base member 2. The power-supplying terminal 47 and the inside terminal 52 are connected by a connector-equipped lead wire 50, thereby providing electrical connection between the inside terminal 52 and the power-supplying terminal 47.

[0030] Furthermore, the inside terminal 52 is disposed radially outward of the electric pump Ep, the regulator valve R is disposed immediately above the power-supplying terminal 47, and fuel discharged from the regulator valve R drops onto the upper face of the electric pump Ep around the power-supplying terminal 47. In order to make the fuel thus dropped return into the fuel tank T, a cutout window 51 is provided in a peripheral wall of the upper pump holder 3A.

[0031] The regulator valve R and the retaining structure therefor are explained by reference to FIG. 3 to FIG. 6.

[0032] First, in FIG. 3 and FIG. 4, the regulator valve R includes a cylindrical valve tube 37 equipped with an end wall 37e, the cylindrical valve tube 37 being formed separately from the mounting base member 2, and this valve tube 37 is made of a metal (e.g. stainless steel). Formed in the end wall 37e of the valve tube 37 are a valve hole 38 running through the end wall 37e and communicating with the pressure regulation path 35, and a valve seat 39 connected to the inner end of the valve hole 38. Housed in a valve chamber 40 within the valve tube 37 are a ball-shaped valve body 41, a valve retainer 42, and a valve spring 43, the valve body 41 being formed from a steel ball capable of being seated on the valve seat 39, the valve retainer 42 rotatably supporting the valve body 41 on the opposite side to the valve seat 39, and the valve spring 43 urging the valve body 41 via the valve retainer 42 with a predetermined set load in the direction in which it is seated on the valve seat 39. A guide member 44 supporting a fixed end part of the valve spring 43 and slidably supporting the valve retainer 42 in the opening and closing direction of the valve body 41 is press-fitted into and fixed to an inner peripheral face of the valve tube 37.

[0033] The valve retainer 42 is formed in an umbrella shape from a flange 42a rotatably supporting the valve body 41 and a stem 42b that projects from a back face of the flange 42a and is slidably supported on the guide member 44. The guide member 44 is provided with a plurality of discharge holes 45 so that the valve chamber 40 opens downward.

[0034] The structure with which the valve tube 37 is retained by the mounting base member 2 is now explained. As shown in FIG. 6, the valve tube 37 is formed from a guide tube portion 37a and a press-fit tube portion 37c having a larger diameter than that of the guide tube portion 37a and connected to the lower end of the guide

tube portion 37a via a tapered portion 37b, and an upper end part of the guide tube portion 37a is provided with an annular recess 55 for mounting a seal 56.

[0035] Integrally formed with the mounting base member 2 are a retaining tube 57 having its axis extending vertically and its lower end open, a surrounding wall 59 surrounding the retaining tube 57 via a gap 58, and radial ribs 60 providing a connection between the retaining tube 57 and the surrounding wall 59. The mounting base member 2 is also provided with a guide hole 62 connected to the upper end of an inner peripheral face of the retaining tube 57 via a tapered face 61, the guide hole 62 having a smaller diameter than that of the inner peripheral face of the retaining tube 57, and the downstream end of the pressure regulation path 35 opens in a central part of an upper end wall of the guide hole 62.

[0036] The guide tube portion 37a is loosely fitted into the guide hole 62 while the inner peripheral face of the guide hole 62 makes intimate contact with the seal 56, and while being guided by the fitting the press-fit tube portion 37c is press-fitted into the inner peripheral face of the retaining tube 57. A predetermined press-fitting allowance is imparted in advance to the inner peripheral face of the retaining tube 57 or an outer peripheral face of the press-fit tube portion 37c. The press-fitting of the press-fit tube portion 37c is completed when the guide tube portion 37a abuts against the upper end wall of the guide hole 62. As a result, the valve hole 38 of the valve tube 37 communicates with the pressure regulation path 35, and the area around the communicating part is sealed by the seal 56.

[0037] A plurality of swaging pieces 63 are integrally and projectingly provided at the lower end of the retaining tube 57, and these swaging pieces 63 are hot-swaged inward in the radial direction after the press-fit tube portion 37c is press-fitted into the retaining tube 57, thus retaining the lower end of the press-fit tube portion 37c. This reinforces the retention of the valve tube 37 by the retaining tube 57.

[0038] A leakage channel 64 for making the guide hole 62 beneath the seal 56 open beneath the retaining tube 57 is provided in the inner peripheral face of the retaining tube 57 and/or the outer peripheral face of the press-fit tube portion 37c.

[0039] The operation of this embodiment is now explained.

[0040] When testing the function of the fuel supply module M after completion, if the seal 56 is not fitted on the regulator valve R, fuel on the inlet side of the regulator valve R flows out via the leakage channel 64. This enables forgetting to fit the seal 56 to be detected, and the product is sent to a repair/remediation process.

[0041] In the electric pump Ep, when the electric motor E operates, the pump impeller 24 is rotated by means of the rotor shaft 20a. Accompanying this, fuel within the fuel tank T is sucked into the pump chamber 22 via the suction port 25 while being filtered through the fuel strainer 4, pressurized by means of the pump impeller 24, then pumped to the interior of the stator 17 via the discharge port 27, and supplied from the final discharge port 34 to the fuel injection valve I via the fuel discharge pipe 30 and the fuel takeoff pipe 12, that is, the fuel passage 28.

[0042] During this process, since the pressure of the fuel passage 28, that is, the discharge pressure of the electric pump Ep, acts on the valve body 41 of the regulator valve R via the pressure regulation path 35, when the discharge pressure of the electric pump Ep exceeds a predetermined value, the valve body 39 opens against the set load of the valve spring 43, part of the fuel within the fuel passage 28 is discharged to the valve chamber 40 side, and when the pressure of the fuel passage 28 returns to the predetermined value, the valve body 41 is closed again by the set load of the valve spring 43. Since the pressure of the fuel passage 28 is thus automatically regulated at a predetermined value, the fuel injection pressure from the fuel injection valve I is controlled appropriately.

[0043] During operation of such a regulator valve R, vibration due to opening and closing of the valve body 41 is transmitted to the valve tube 37, and is then transmitted in particular from the press-fit tube portion 37c to the retaining tube 57, which are press-fitted one into the other, but since there is the gap 58 between the retaining tube 57 and the surrounding wall 59, which surrounds the retaining tube 57, most of the vibration is absorbed by the gap 58, and as a result the generation of resonance from the mounting base member 2 can be suppressed, thus contributing to an improvement in the quietness of the fuel supply module M.

[0044] Moreover, since the radial ribs 60 are provided between the retaining tube 57 and the surrounding wall 59 so as to provide a connection therebetween, the retaining tube 57 is reinforced effectively by the ribs 60, the tightening force of the retaining tube 57 on the press-fit tube portion 37c can be stabilized regardless of changes in temperature and the passage of time, and it is particularly effective when the mounting base member 2 is made of a synthetic resin.

[0045] Furthermore, when the discharge pressure pulsates during discharge of fuel from the electric pump Ep to the fuel passage 28, the pulsations are transmitted to the pressure regulation path 35 side but are attenuated by the orifice 36 just before reaching the regulator valve R. As a result, it is possible to prevent vibration of the valve body 41 of the regulator valve R due to pulsations of the discharge pressure of the electric pump Ep, thereby contributing to a further improvement in the quietness of the fuel supply module M.

[0046] Furthermore, fuel discharged from the valve chamber 42 of the regulator valve R drops onto the upper face of the upper bearing bracket 18 around the power-supplying terminal 47, that is, the upper face of the electric pump Ep, and is returned into the fuel tank T after passing through the cutout window 51 of the upper pump holder 3A. Since the area around the power-supplying terminal 47 is therefore continuously washed by fuel dis-

charged. from the regulator valve R, fuel does not remain around the power-supplying terminal 47, thereby preventing corrosion of the power-supplying terminal 47 by moisture contained in fuel that has remained there.

[0047] Moreover, since fuel that has dropped onto the upper face of the upper bearing bracket 18 has its kinetic energy attenuated there and then quietly flows down onto fuel held within the fuel tank T via the cutout window 51 of the upper pump holder 3A, the sound of fuel dropping can be eliminated.

[0048] Another embodiment of the present invention shown in FIG. 7 is now explained.

[0049] In this embodiment, press-fit portions 57a into which a press-fit tube portion 37c of a valve tube 37 is press-fitted are provided at a plurality of positions in the peripheral direction on an inner peripheral face of a retaining tube 57, and leakage channels 64 are formed between these press-fit portions 57a. In accordance with this embodiment, due to the dispersed disposition of the press-fit portions 57a, the press-fitting stress can be relieved. Since the arrangement is otherwise the same as that of the preceding embodiment, portions in FIG. 7 corresponding to those in the preceding embodiment are denoted by the same reference numerals and symbols, and duplication of the explanation is omitted.

[0050] The present invention is not limited to the above-mentioned embodiments, and may be modified in a variety of ways as long as the modifications do not depart from the spirit and scope thereof.

Claims

1. A fuel supply module (M) comprising a mounting base member (2) mounted on a fuel tank (T) and having a fuel takeoff pipe (12) projecting from an upper face, an electric pump (Ep) that is supported by the mounting base member (2), is housed within the fuel tank (T), pumps up fuel within the fuel tank (T), and feeds the fuel to the fuel takeoff pipe (12), and a regulator valve (R) having a valve tube (37) retained in the mounting base member (2) and returning into the fuel tank (T) part of the fuel discharged from the electric pump (Ep) so as to regulate the discharge pressure thereof, wherein formed on the mounting base member (2) are a retaining tube (57) and a surrounding wall (59) surrounding the retaining tube (57) via a gap (58), at least part of the valve tube (37) of the regulator valve (R) being press-fitted into the retaining tube (57),
characterised in that the mounting base member (2) is provided with a guide hole (62) connected to the inner peripheral face of the retaining tube (57), the valve tube (37) is provided with a guide tube portion (37a) fitted into the guide hole (62) via a seal (56) and a press-fit tube portion (37c) press-fitted into the inner peripheral face of the retaining tube (57), a leakage channel (64) is provided between the press-fit tube portion (37c) and the retaining tube (57), the leakage channel (64) making an outer peripheral face of the guide tube portion (37a) adjacent to the press-fit tube portion (37c) open outside the valve tube (37), and when testing the function of the fuel supply module (M), if the seal (56) is not fitted, fuel on the inlet side of the regulator valve (R) flows out via the leakage channel (64).

2. The fuel supply module according to Claim 1, wherein a radial rib (60) is formed on the mounting base member (2), the radial rib (60) integrally connecting an outer peripheral face of the retaining tube (57) and an inner peripheral face of the surrounding wall (59).

3. The fuel supply module according to Claim 1, wherein a pressure regulation path (35) providing communication between a fuel discharge passage of the electric pump (Ep) and the regulator valve (R) is provided with an orifice (36).

Patentansprüche

1. Ein Kraftstoff-Versorgungsmodul (M), umfassend einen auf einem Kraftstofftank (T) montierten Befestigungssockel (2) mit einer Kraftstoffentnahmeleitung (12), die von einer oberen Seite hervorragt, eine elektrische Pumpe (Ep), die vom Befestigungssockel (2) gehalten wird, innerhalb des Kraftstofftank (T) untergebracht ist, Kraftstoff in den Kraftstofftank (T) pumpt und den Kraftstoff an die Kraftstoffentnahmeleitung (12) liefert und ein Reglerventil (R) mit einem Ventilschlauch (37), der im Befestigungssockel (2) gehalten wird und in den Kraftstofftank (T) des Kraftstoffs einen Teil des von der elektrische Pumpen (Ep) beförderten Kraftstoffs zurückführt, um deren Förderdruck zu regeln, wobei im Befestigungssockel (2) ein Halterohr (57) und eine umgebende Wand (59) vorgesehen sind, die das Halterohr (57) über eine Lücke (58) umgeben, wobei mindestens ein Teil des Ventilschlauchs (37) des Reglerventils (R) in das Halterohr (57) verpresst ist,
dadurch gekennzeichnet, dass der Befestigungssockel (2) mit einem Führungsloch (62) versehen ist, das mit der inneren Umfangsfläche des Halterohrs (57) verbunden ist, wobei der Ventilschlauch (37) mit einem in das Führungsloch (62) über eine Dichtung (56) eingepassten Führungsrohrteilstück (37a) und einem in der inneren Umfangsfläche des Halterohrs (57) verpressten Rohrteilstück (37c), versehen ist, wobei ein Leckagekanal (64) zwischen dem verpressten Rohrteilstück (37c) und dem Halterohr (57) vorgesehen ist, wobei der Leckagekanal (64) eine äußere Umfangsfläche des Führungsrohrteilstücks (37a), angrenzend an das verpresste Rohrteilstück (37c), offen außerhalb des Ventilschlauchs (37), bil-

det, und wobei beim Test der Funktion des Kraftstoff-Versorgungsmoduls (M), wenn die Dichtung (56) nicht sitzt, Kraftstoff auf der Einlassseite des Reglerventils (R) über den Leckagekanal (64) ausfließt.

2. Das Kraftstoff-Versorgungsmoduls gemäß Anspruch 1, wobei auf dem Befestigungssockel (2) eine radiale Lamelle (60) gebildet wird, wobei die radiale Lamelle (60) vollständig mit einer äußeren Umfangsfläche des Halterohrs (57) und einer inneren Umfangsfläche der umgebenden Wand (59) verbunden ist.

3. Das Kraftstoff-Versorgungsmoduls (M) gemäß Anspruch 1, wobei ein Druckregelungspfad (35), der für eine Verbindung zwischen einer Kraftstoffförderpassage der elektrische Pumpe (Ep) und dem Reglerventil (R) sorgt, mit einer Öffnung (36) versehen wird.

Revendications

1. Module d'alimentation en carburant (M) comprenant un élément formant socle de fixation (2) monté sur un réservoir à carburant (T) et ayant un tuyau de prise de carburant (12) dépassant d'une face supérieure, une pompe électrique (Ep) qui est supportée par l'élément formant socle de fixation (2), est logée à l'intérieur du réservoir à carburant (T), pompe le carburant à l'intérieur du réservoir à carburant (T) et amène le carburant au tuyau de prise de carburant (12), et une vanne de régulateur (R) ayant un tube de vanne (37) retenu dans l'élément formant socle de fixation (2) et renvoyant dans le réservoir à carburant (T) une partie du carburant refoulé depuis la pompe électrique (Ep) afin de réguler la pression de refoulement de cette dernière, dans lequel sont formés sur l'élément formant socle de fixation (2) un tube de retenue (57) et une paroi d'encerclement (59) entourant le tube de retenue (57) via un espacement (58), au moins une partie du tube de vanne (37) de la vanne de régulateur (R) étant emmanchée à force dans le tube de retenue (57),
caractérisé en ce que l'élément formant socle de fixation (2) est muni d'un trou de guidage (62) relié à la face périphérique intérieure du tube de retenue (57), le tube de vanne (37) est muni d'une partie de tube de guidage (37a) ajustée dans le trou de guidage (62) via un joint (56) et une partie de tube à ajustement serré (37c) emmanchée à force dans la face périphérique intérieure du tube de retenue (57), un canal de fuite (64) est prévu entre la partie de tube à ajustement serré (37c) et le tube de retenue (57), le canal de fuite (64) rendant une face périphérique extérieure de la partie de tube de guidage (37a) adjacente à la partie de tube à ajustement serré (37c) ouverte sur l'extérieur du tube de vanne (37), et lors du test de la fonction du module d'alimentation en carburant (M), si le joint (56) n'est pas ajusté, du carburant sur le côté admission de la vanne de régulateur (R) s'écoule via le canal de fuite (64).

2. Module d'alimentation en carburant selon la revendication 1,
dans lequel une nervure radiale (60) est formée sur l'élément formant socle de fixation (2), la nervure radiale (60) reliant d'un seul tenant une face périphérique extérieure du tube de retenue (57) et une face périphérique intérieure de la paroi d'encerclement (59).

3. Module d'alimentation en carburant selon la revendication 1,
dans lequel un chemin de régulation de pression (35) réalisant une communication entre un passage de refoulement de carburant de la pompe électrique (Ep) et la vanne de régulateur (R) est muni d'un orifice (36).

FIG.1

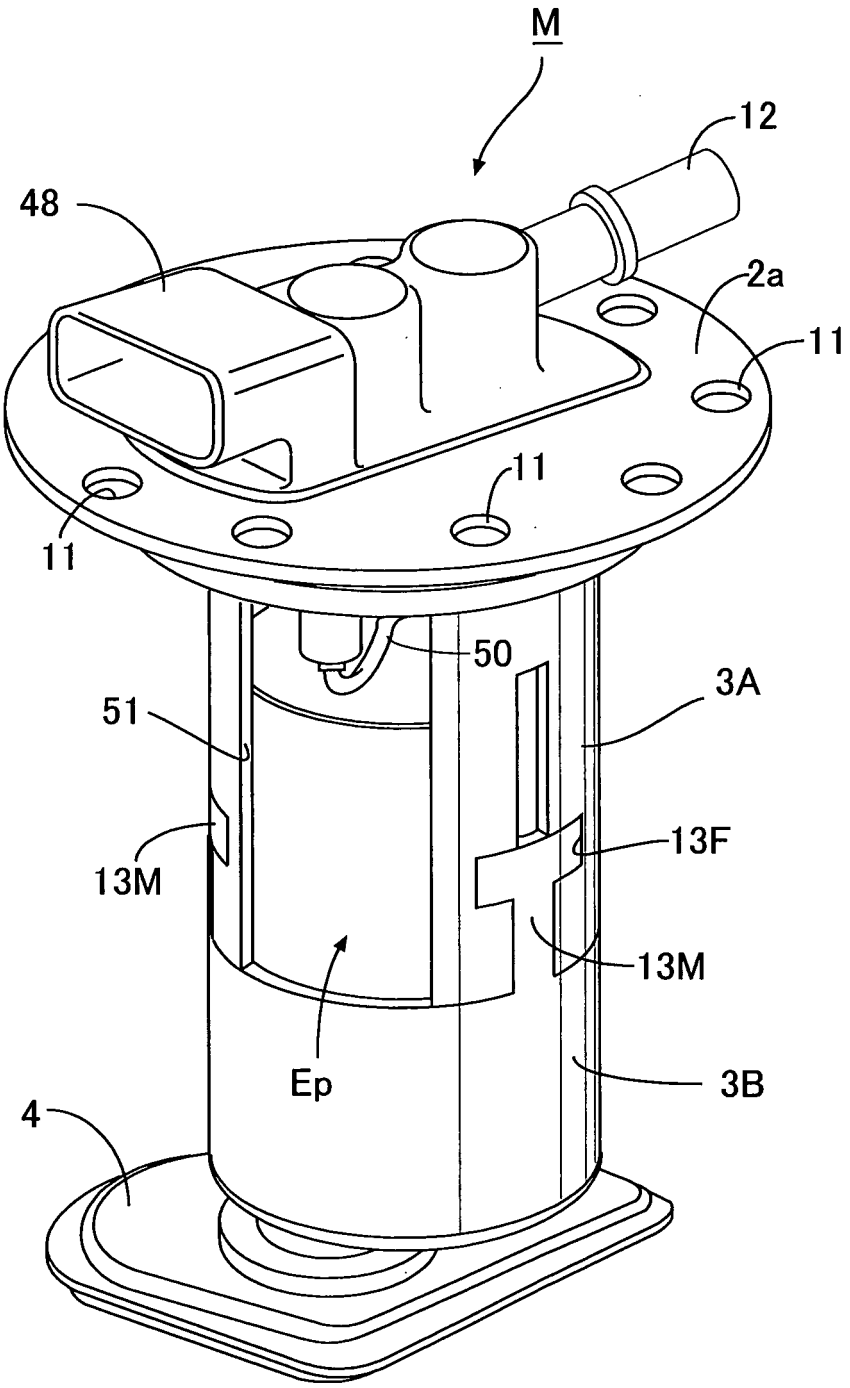


FIG.2

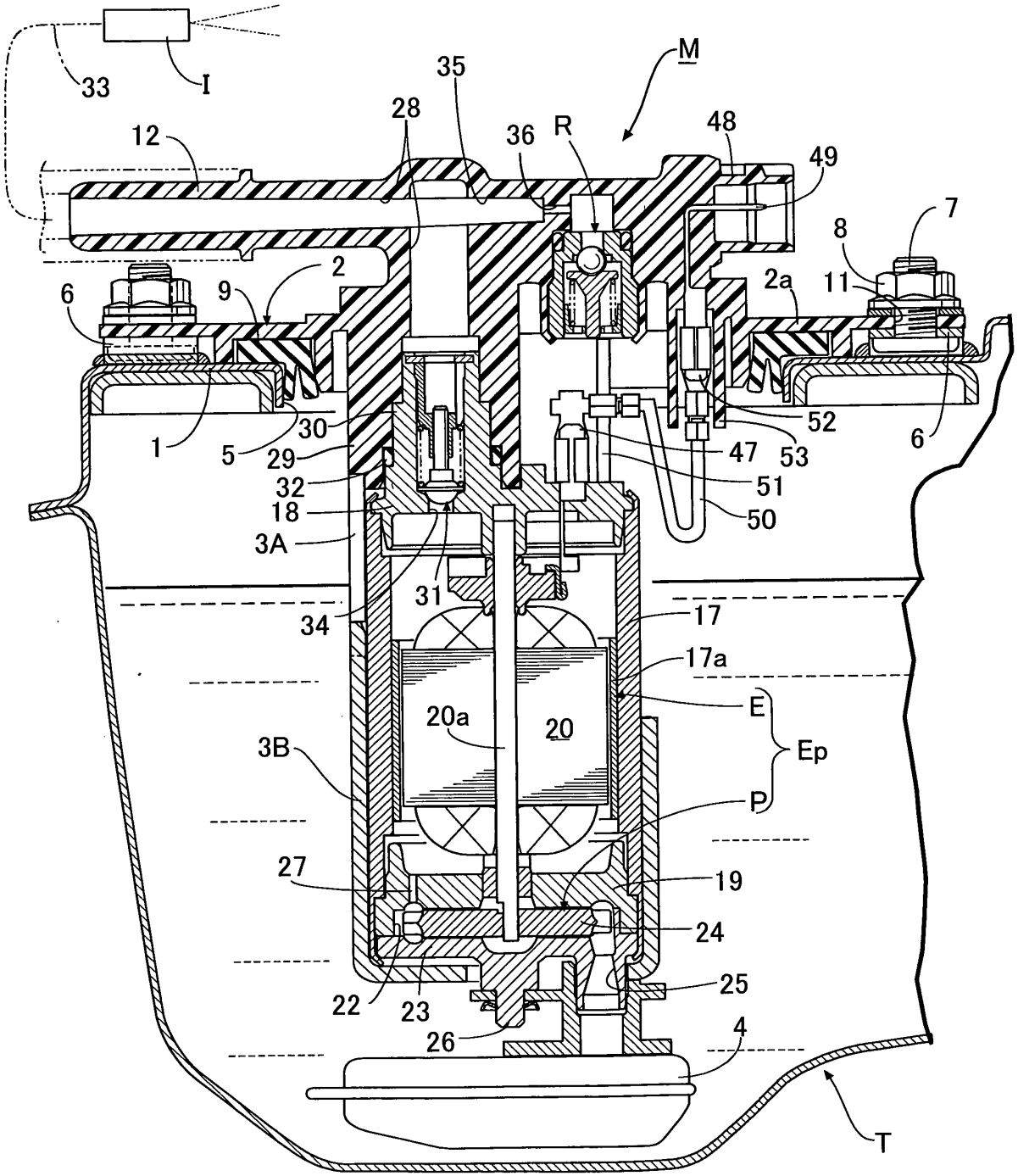

33
I
35
M
28
12
36
R
48
49
7
8
2
2a
11
6
9
1
30
5
29
32
18
3A
31
34
52
47
53
51
50
6
17
17a
E
Ep
20a
20
3B
P
27
19
24
25
22
23
26
4
T

FIG.3

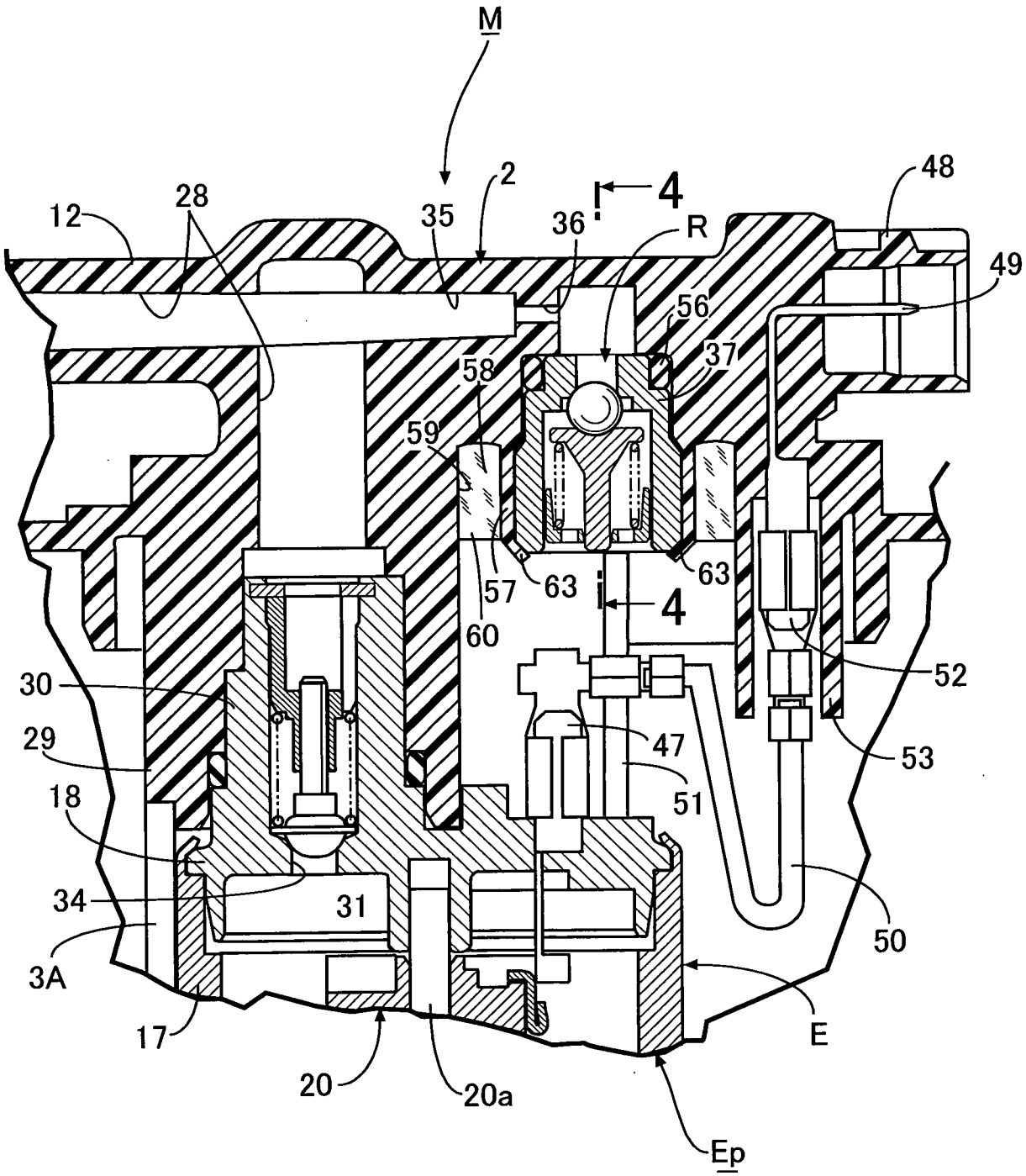

M
2
4
48
12
28
35
36
R
49
56
37
58
59
57
63
63
4
60
30
52
29
47
53
18
51
34
31
50
3A
17
E
20
20a
Ep

FIG.4

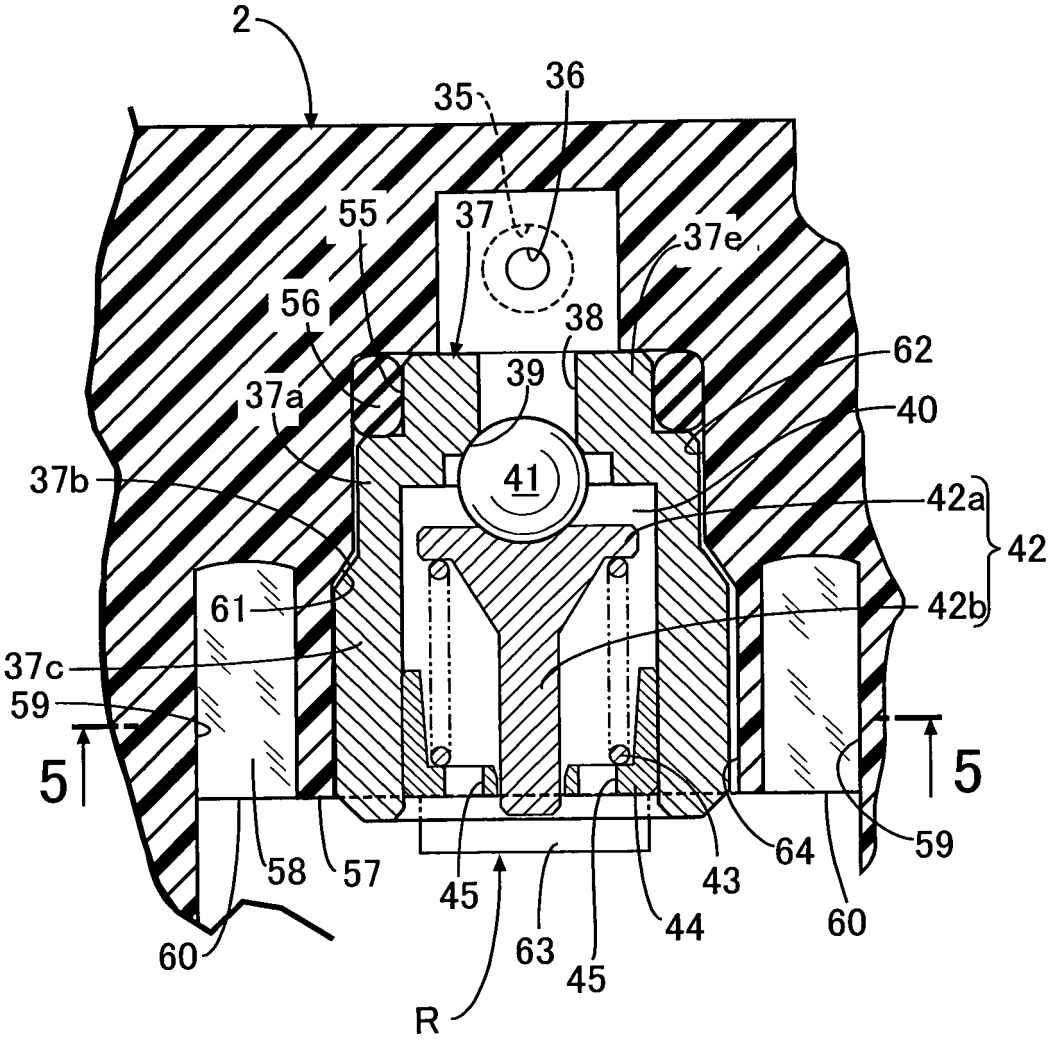

2
35
36
55
37
37e
56
38
62
39
37a
40
41
37b
42a
42
61
42b
37c
59
5
5
58
57
45
64
43
59
60
44
60
63
45
R

FIG.5

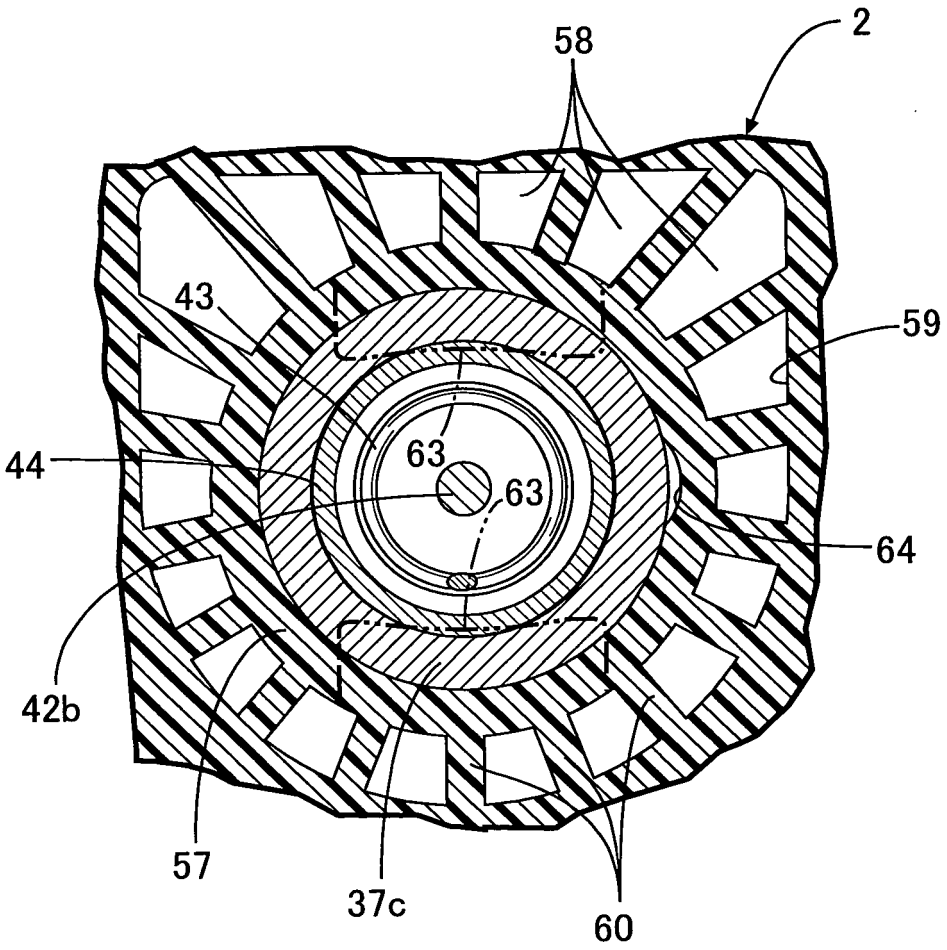


FIG.6

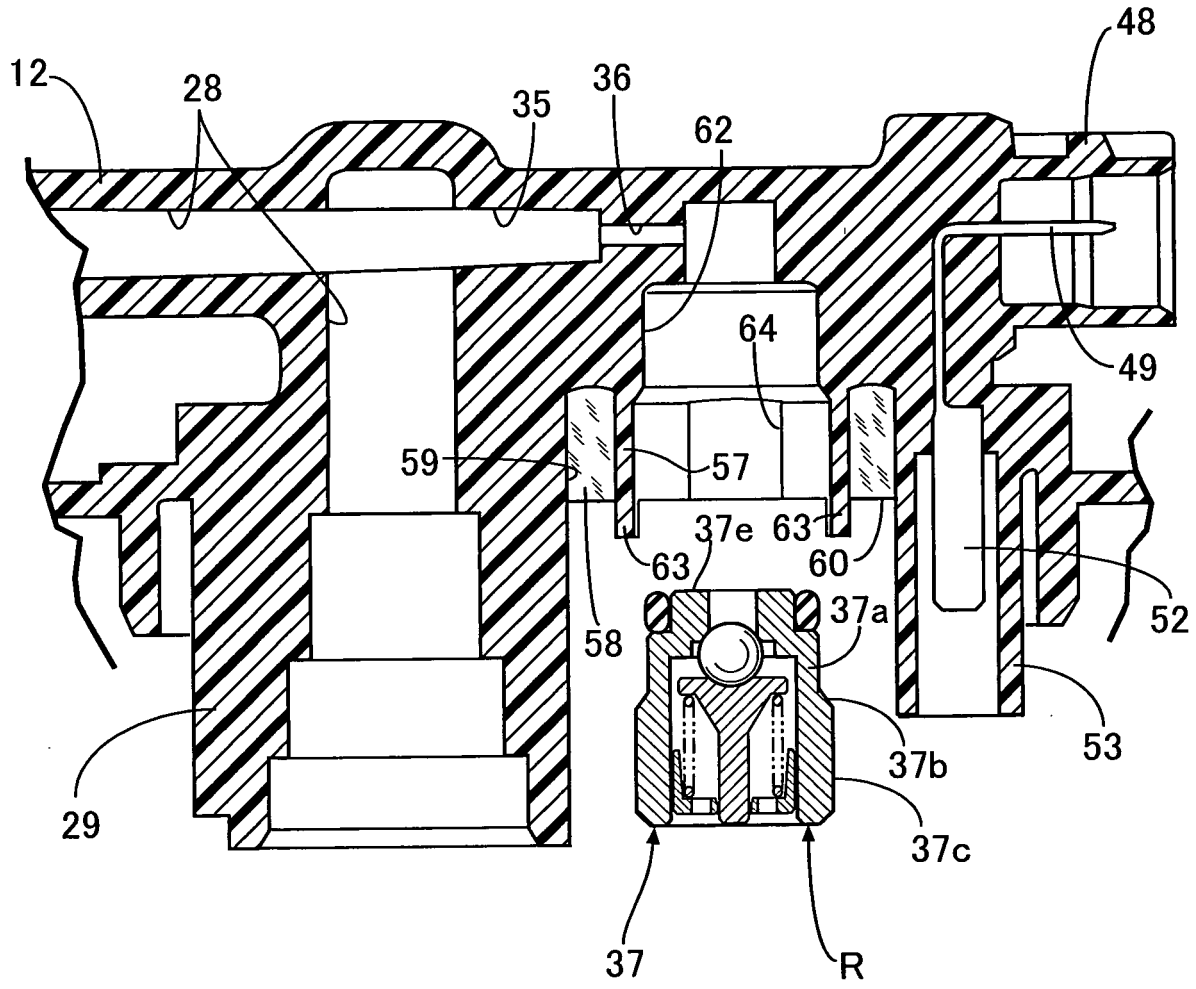
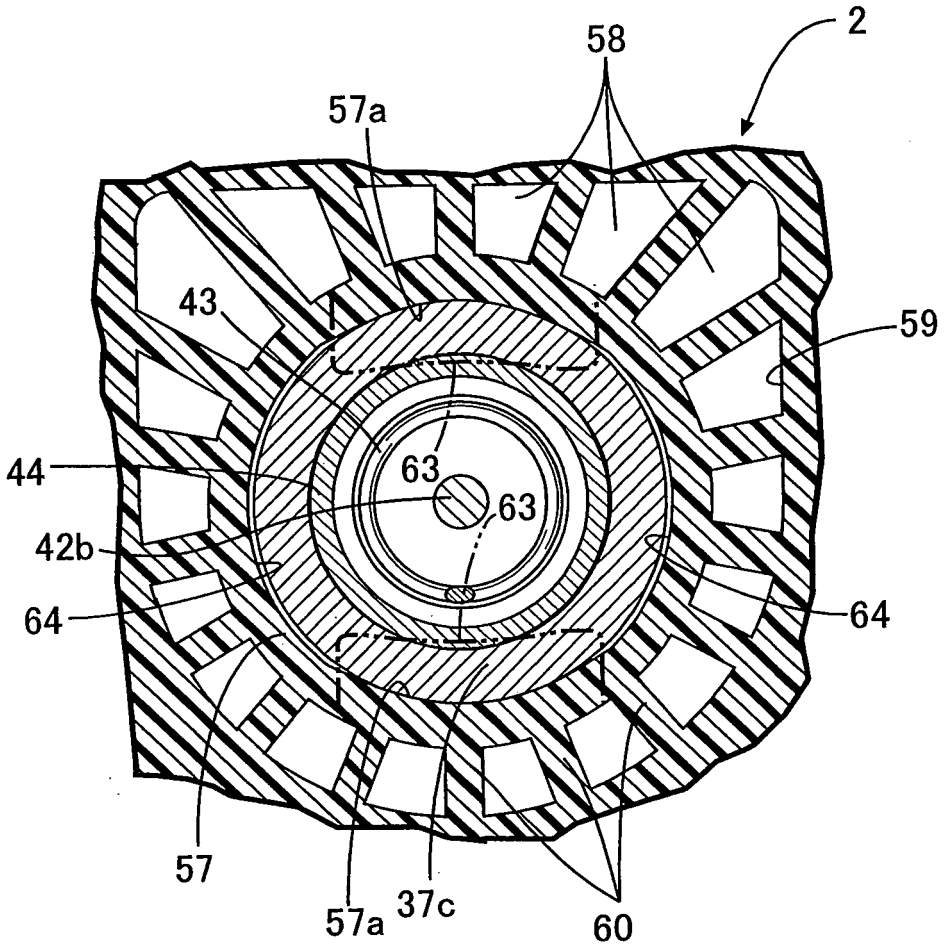


FIG.7



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Patent documents cited in the description

- JP 2007291866 A **[0002]**
- EP 0666415 A **[0005]**