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(54) **Hydraulic hinge for a glass door**

Hydraulisches Scharnier für eine Glastür

Charnière hydraulique pour porte en verre

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(56) References cited:
EP-A1- 2 397 635
DE-U1-202012 011 586
KR-A- 20100 033 133
US-A1- 2011 197 391

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Description

1. Field of the Invention

[0001] The present invention relats to a hydraulic hinge, especially for a hydraulic hinge for a glass door.

2. Description of Related Art

[0002] Two patent documents EP 2397635 A1 and DE202012011586 U1, respectively, disclose a hydraulic hinge.

[0003] A glass door is pivotally mounted on a doorframe by a hydraulic hinge. A conventional hydraulic hinge has a fixing plate, a rotating seat, a pivot and a buffer module. The fixing plate is mounted on the doorframe. The rotating seat is mounted on the glass door and has an oil chamber for storing oil and an oil passage communicating with the oil chamber. The pivot has a first portion, a second portion and an eccentric cam. The first portion of the pivot is mounted on the fixing plate and the second portion of the pivot is mounted into the rotating seat. The eccentric cam is located in the rotating seat. The buffer module is mounted on the rotating seat and is located in the oil chamber of the rotating seat. The buffer module has a valve and a spring. The valve has a through hole for receiving the pivot and a fixing element for abutting against the eccentric cam. The valve has a recess communicating with the through hole and the oil passage, a first oil hole and a second oil hole. The first oil hole and the second oil hole communicate with the recess and the oil chamber. The spring abuts against the rotating seat and the valve.

[0004] When the glass door is pivoted, the rotating seat is rotated relative to the fixing plate. The eccentric cam of the pivot abuts the fixing element of the valve for controlling the valve to press the spring and drive oil in the oil chamber. However, the valve is structurally complex, thereby complicating the manufacturing process. Additionally, the rotating seat provides only a single oil passage, so the glass door is closed slowly such that cool air generated by an air-conditioner escapes from the house.

[0005] To overcome the shortcomings, the present invention provides a hydraulic hinge to mitigate or obviate the aforementioned problems.

[0006] The main object of the present invention is to provide a hydraulic hinge for a glass door; the hydraulic hinge has a fixing plate, a rotating seat, a pivot and a buffer module.

[0007] The rotating seat has a body, an oil chamber, a first oil passage and a second oil passage. The oil chamber, the first oil passage and the second oil passage are formed in the body. The first oil passage has a first inlet and a first outlet. The first inlet and the first outlet are in communication with the oil chamber respectively. The second oil passage has a second inlet and a second outlet. The second inlet is in communication with the first oil passage. The second outlet is in communication with the oil chamber and is disposed between the first inlet and the first outlet.

[0008] The pivot is combined with the fixing plate and the rotating seat, and has a first portion, a second portion and an abutted surface. The first portion is mounted steadily on the fixing plate. The second portion is opposite to the first portion and is mounted rotatably into the rotating seat. The abutted surface is formed on the pivot and is located in the oil chamber of the rotating seat. The abutted surface is flat.

[0009] The buffer module is mounted in the rotating seat and is located in the oil chamber of the rotating seat and has a valve and a spring. The valve abuts against the pivot. The valve has an outer surface, a first surface, a second surface, an axial hole, a ball, a baffle, a circular groove and a radial hole. The first surface abuts against the pivot. The second surface is opposite to the first surface. The axial hole is formed through the valve and has a first opening and a second opening. The first opening is formed on the first surface. The second opening is formed on the second surface. The ball is mounted in the axial hole of the valve. The baffle is mounted on the first opening of the axial hole and has a via hole communicating with the oil chamber and the axial hole. The circular groove is formed around the outer surface of the valve. The radial hole is formed radially in the valve and is in communication with the axial hole and the circular groove. The spring is mounted in the oil chamber of the rotating seat and has a first end and a second end. The first end abuts against the body of the rotating seat. The second end is opposite to the first end and abuts against the second surface of the valve.

[0010] The fixing plate of the hydraulic hinge is mounted on a doorframe. The rotating seat is mounted on a glass door. When the glass door is closed to a specific angle, the circular groove of the valve communicates with the second oil passage, and then oil in the oil chamber can flow through the circular groove of the valve, the radial hole of the valve, and further flow out the second surface of the valve. Therefore, the refluxing of oil in the hydraulic hinge is increased to increase the velocity of repositioning the rotating seat and the velocity of closing the glass door. Thus, the velocity of closing the glass door increases gradually from low speed to high speed, such that cool air escaping from the house is reduced. In addition, the valve of the hydraulic hinge is structurally simple, thereby simplifying the manufacturing process.

IN THE DRAWINGS:

[0011]

Fig. 1 is a perspective view of a hydraulic hinge for a glass door in accordance with the present invention;

Fig. 2 is an exploded perspective view of the hydraulic hinge in Fig. 1;

Fig. 3 is another perspective view of the hydraulic hinge in Fig. 1;
Fig. 4 is an enlarged cross sectional side view of a valve of the hydraulic hinge in Fig. 2;
Fig. 5 is a side view in partial section of the valve of the hydraulic hinge in Fig.4 combined with a ball and a baffle;
Fig. 6 is a side view in partial section of the hydraulic hinge in Fig. 1, showing the hydraulic hinge unactuated;
Fig. 7 is a side view in partial section of the hydraulic hinge in Fig. 1, showing the hydraulic hinge actuated;
Fig. 8 a side view in partial section of the hydraulic hinge in Fig. 1 showing an oil flow path;
Fig. 9 is a front view in partial section of the hydraulic hinge along line 9-9 in Fig. 6;
Fig. 10 is a side view in partial section of the hydraulic hinge in Fig. 1 showing a first oil flow path during repositioning of the rotating seat;
Fig. 11 is a side view in partial section of the hydraulic hinge along line 11-11 in Fig. 9 showing a second oil flow path during repositioning of the rotating seat; and
Fig. 12 is an operational side view in partial section of the hydraulic hinge in Fig. 1 combined with a doorframe and a glass door.

[0012] With reference to Figs. 1 to 3, a hydraulic hinge for a glass door in accordance with the present invention comprises a fixing plate 10, a rotating seat 20, a pivot 30 and a buffer module 40.

[0013] The fixing plate 10 has a top surface, a side surface, a connecting hole 11, a side opening 12, multiple through holes 15 and a lid 13. The side surface is connected to the top surface. The connecting hole 11 is formed in the top surface and extends through the fixing plate 10. With reference to Fig. 7, the side opening 12 is formed in the side surface of the fixing plate 10 and is in communication with the connecting hole 11. The through holes 15 are formed in the top surface and extend through the fixing plate 10. The lid 13 is mounted in the side opening 12 and has a cambered surface 14.

[0014] With reference to Figs. 2, 10 and 11, the rotating seat 20 has a body 21, an oil chamber 22, a first oil passage 23 and a second oil passage 24. The oil chamber 22, the first oil passage 23 and the second oil passage 24 are formed in the body 21 and are filled with oil. The first oil passage 23 has a first inlet 231 and a first outlet 232. The second oil passage 24 has a second inlet and a second outlet 241. The second inlet is in communication with the first oil passage 23. The first inlet 231, the first outlet 232 and the second outlet 241 are in communication with the oil chamber 22. The second outlet 241 is located between the first inlet 231 and the first outlet 232.

[0015] With reference to Figs. 2 and 6, the pivot 30 has a first portion, a second portion, an abutted surface 31 and a toothed part 32. The first portion of the pivot 30 is mounted steadily on the fixing plate 10 and is inserted into the connecting hole 11 of the fixing plate 10. The second portion of the pivot 30 is mounted rotatably into the rotating seat 20. The abutted surface 31 is formed on the pivot 30 and is located in the oil chamber 22 of the rotating seat 20. The toothed part 32 is formed on the first portion of the pivot 30, and the cambered surface 14 of the lid 13 of the fixing plate 10 abuts against the toothed part 32 of the pivot 30.

[0016] The buffer module 40 is mounted in the rotating seat 20 and is located in the oil chamber 22 of the rotating seat 20. The buffer module 40 has a valve 41 and a spring 42. The valve 41 is cylindrical and abuts against the pivot 30. The valve 41 has an outer surface, a first surface 43, a second surface 44, an axial hole 45, a ball 46, a baffle 47, a circular groove 48 and a radial hole 49. The first surface 43 abuts against the pivot 30. The second surface 44 is opposite to the first surface 43.

[0017] With further reference to Figs. 4 and 5, the axial hole 45 is formed through the valve 41 and has a first opening 451 and a second opening 452. The first opening 451 is formed in the first surface 43 and the second opening 452 is formed in the second surface 44. The ball 46 is mounted in the axial hole 45 of the valve 41. The baffle 47 is mounted in the first opening 451 of the axial hole 45 and has a via hole 471 communicating with the oil chamber 22 and the axial hole 45.

[0018] With further reference to Fig. 9, the circular groove 48 is formed around the outer surface of the valve 41. The radial hole 49 is formed radially in the valve 41 and is in communication with the axial hole 45 and the circular groove 48.

The spring 42 is mounted in the oil chamber 22 and has a first end and a second end. The first end of the spring 42 abuts against the body 21 of the rotating seat 20. The second end of the spring 42 abuts against the second surface 44 of the valve 41.

[0019] With reference to Figs. 1 and 2, the hydraulic hinge in accordance with the present invention may further have a first cover 17 and a second cover 18. The first cover 17 and the second cover 18 are symmetrically mounted on the body 21 of the rotating seat 20. With reference to Figs. 10 and 11, the rotating seat 20 further has a first adjustment element 25 and a second adjustment element 26. The first adjustment element 25 is mounted in the body 21 of the rotating seat 20, extends into the first oil passage 23 and faces the first outlet 232. The second adjustment element 26 is mounted in the body 21 of the rotating seat 20, extends into the second oil passage 24 and faces the second outlet 241. With reference to Fig. 6, the oil chamber 22 is divided into a first space and a second space by the valve 41. The first space is located outside the valve relative to the first surface 43 of the valve 41. The second space is located outside the valve relative to the second surface 44 of the valve 41.

[0020] With reference to Fig. 12, the fixing plate 10 is mounted on a doorframe by multiple screws 16 that are inserted through the through holes 15 respectively. The

rotating seat 20 is mounted on a glass door 60. With reference to Fig. 6, when the glass door 60 is closed, the first surface 43 abuts against the abutted surface 31 of the pivot 30. With reference to Figs. 7 and 8, when the glass door 60 is open, the rotating seat 20 and the buffer module 40 are pivoted relative to the pivot 30 and the fixing plate 10. The contacted area between the first surface 43 and the abutted surface 31 is reduced, and the valve 41 is moved by the pivot 30 and further presses the spring 42. Accordingly, oil in the second space is compressed and flows into the axial hole 45 of the valve 41 to push the ball 46 and flows through the via hole 471 of the baffle 47 and into the first space.

[0021] With reference to Fig. 10, when the glass door 60 is closed, oil in the first space reflows and pushes the ball 46 to close the axial hole 45. Then, oil in the first space flows into the first oil passage 23 of the rotating seat 20 and flows out of the first outlet 232 of the first oil passage 23 and into the second space. The valve 41 is moved toward the pivot 30 by the restoring force of the spring 42. The contacted area between the first surface 43 and the abutted surface 31 is increased, and then the glass door 60 is closed slowly.

[0022] When the glass door 60 is closed to a specific angle, a passage between the glass door 60 and the doorframe 50 cannot provide enough space for users to pass through. With reference to Figs. 9 and 11, when the valve 41 is moving a distance, the circular groove 48 of the valve 41 is in communication with the second oil passage 24 of the rotating seat 20. Oil in the first space further flows into the second oil passage 24 via the first oil passage 23. Then, oil passes through the second outlet 241 of the second oil passage 24, the radial hole 49 of the valve 41, and the axial hole 45 of the valve 41, and then flows into the second space to increase the refluxing of oil flowing into the second space. Thus, the velocity of closing the glass door 60 gradually increases from low speed to high speed.

[0023] If the combination positions of the hydraulic hinge and the glass door 60 are offset from each other, the lid 13 of the fixing plate 10 can be disassembled for adjusting the pivot 30. When the adjustment of the pivot 30 is finished, the lid 13 of the fixing plate 10 can be reassembled and the toothed part 32 of the pivot 30 abuts against the cambered surface 14 of the lid 13 for increasing the combination stability between the pivot 30 and the fixing plate 10. Furthermore, the amount of oil flowing out of the first outlet 232 is controlled by the first adjustment element 25, and the amount of oil flowing out the second outlet 241 is controlled by the second adjustment element 26.

[0024] Accordingly, the circular groove 48 of the valve 41 communicates with the second oil passage 24 when the glass door 60 is closed to a specific angle, and then oil can flow through the circular groove 48 of the valve 41, the radial hole 49 of the valve 41, and further flow into the second space. Therefore, the refluxing of oil in the hydraulic hinge is increased, and the velocity of repositioning the rotating seat and the velocity of closing the glass door 60 are increased. Thus, the velocity of closing the glass door 60 gradually increases from low speed to high speed for reducing the cool air escaping from the house. In addition, the valve 41 of the hydraulic hinge is structurally simple, thereby simplifying the manufacturing process.

Claims

1. A hydraulic hinge for a glass door (60) having:

a fixing plate (10);
a rotating seat (20) having

a body (21);
an oil chamber (22) formed in the body (21);

a pivot (30) combined with the fixing plate (10) and the rotating seat (20), and having

a first portion mounted steadily on the fixing plate (10);
a second portion mounted rotatably into the rotating seat (20); and
an abutted surface (31) formed on the pivot (30) and located in the oil chamber (22) of the rotating seat (20);

a buffer module (40) mounted in the rotating seat (20), located in the oil chamber (22) of the rotating seat (20) and having

a cylindrical valve (41) abutting against the pivot (30) and having

an outer surface;
a first surface (43) abutting against the pivot (30);
a second surface (44) opposite to the first surface (43);
an axial hole (45) formed through the cylindrical valve (41);
wherein the oil chamber (22) is divided into a first space and a second space by the cylindrical valve (41); and
a spring (42) mounted in the oil chamber (22) of the rotating seat (20) and having

a first end abutting against the body (21) of the rotating seat (20); and
a second end abutting against the second surface (44) of the cylindrical valve (41);

the hydraulic hinge being **characterized in that**
a first oil passage (23) is formed in the body (21) having

a first inlet (231) communicating with the first space of the oil chamber (22); and
a first outlet (232) communicating with the second space of the oil chamber (22);

a second oil passage (24) is formed in the body (21) having

a second inlet communicating with the first oil passage (23); and
a second outlet (241) communicating with the oil chamber (22) and located between the first inlet (231) and the first outlet (232);

in that the cylindrical valve (41) comprises

a first opening (451) formed in the first surface (43); and
a second opening (452) formed in the second surface (44);

a ball (46) mounted in the axial hole (45) of the cylindrical valve (41);
a baffle (47) mounted in the first opening (451) of the axial hole 45) and having a via hole (471) communicating with the oil chamber (22) and the axial hole (45);
a circular groove (48) formed around the outer surface of the cylindrical valve (41); and
a radial hole (49) formed radially in the cylindrical valve (41) and communicating with the axial hole (45) and the circular groove (48); such that

when the glass door (60) is opening, oil in the second space is compressed and flows into the axial hole (45) of the cylindrical valve (41) and into the first space;
when the glass door (60) is closed, oil in the first space flows into the second space via the first oil passage (23); and when the door is closed to the specific angle, the circular groove (48) is connected with the second oil passage (24) while the cylindrical valve (41) is moved at a specific position; and oil in the first space flows into the second space via the first and second oil passages (23, 24).

2. The hydraulic hinge as claimed in claim 1, wherein the pivot (30) has a toothed part (32) formed on the first portion of the pivot (30); and
the fixing plate (10) has

a lid (13) having a cambered surface (14) abutting against the toothed part (32) of the pivot (30).

3. The hydraulic hinge as claimed in claim 1 or 2, wherein
the rotating seat (20) has

a first adjustment element (25) mounted in the body (21) of the rotating seat (20), extending into the first oil passage (23) and facing the first outlet (232); and
a second adjustment element (26) mounted in the body (21) of the rotating seat (20), extending into the second oil passage (24) and facing the second outlet (241).

4. The hydraulic hinge as claimed in any one of claim 1 to 3, wherein the hydraulic hinge has a first cover (17) and a second cover (18) symmetrically mounted on the rotating seat (20).

Patentansprüche

1. Hydraulisches Scharnier für eine Glastür (60), wobei das hydraulische Scharnier Folgendes aufweist:

eine Befestigungsplatte (10);
einen Drehsitz (20), der Folgendes aufweist:

einen Körper (21);
eine Ölkammer (22), die in dem Körper (21) gebildet ist;

einen Drehzapfen (30), der mit der Befestigungsplatte (10) und dem Drehsitz (20) kombiniert ist und Folgendes aufweist:

einen ersten Abschnitt, der feststehend an der Befestigungsplatte (10) angebracht ist;
einen zweiten Abschnitt, der drehbar in dem Drehsitz (20) angebracht ist; und
eine Stoßfläche (31), die an dem Drehzapfen (30) gebildet ist und die sich in der Ölkammer (22) des Drehsitzes (20) befindet;

ein Puffermodul (40), das in dem Drehsitz (20) angebracht ist, das sich in der Öl-kammer (22) des Drehsitzes (20) befindet und Folgendes auf-

weist:

ein zylindrisches Ventil (41), das an dem Drehzapfen (30) anliegt und Folgendes aufweist:

eine Außenoberfläche;
eine erste Oberfläche (43), die an dem Drehzapfen (30) anliegt;
eine zweite Oberfläche (44), die der ersten Oberfläche (43) gegenüberliegt;
ein axiales Loch (45), das durch das zylindrische Ventil (41) gebildet ist;

wobei die Ölkammer (22) durch das zylindrische Ventil (41) in einen ersten Raum und einen zweiten Raum geteilt ist; und

in der Ölkammer (22) des Drehsitzes (20) eine Feder (42) angebracht ist und Folgendes aufweist:

ein erstes Ende, das an dem Körper (21) des Drehsitzes (20) anliegt; und
ein zweites Ende, das an der zweiten Oberfläche (44) des zylindrischen Ventils (41) anliegt;

wobei das hydraulische Scharnier **dadurch gekennzeichnet ist, dass**

in dem Körper (21) ein erster Ölkanal (23) gebildet ist und Folgendes aufweist:

einen ersten Einlass (231), der mit dem ersten Raum der Ölkammer (22) in Verbindung steht; und
einen ersten Auslass (232), der mit dem zweiten Raum der Ölkammer (22) in Verbindung steht;

in dem Körper (21) ein zweiter Ölkanal (24) gebildet ist und Folgendes aufweist:

einen zweiten Einlass, der mit dem ersten Ölkanal (23) in Verbindung steht; und
einen zweiten Auslass (241), der mit der Ölkammer (22) in Verbindung steht und sich zwischen dem ersten Einlass (231) und dem ersten Auslass (232) befindet;

das zylindrische Ventil (41) umfasst:

eine erste Öffnung (451), die in der ersten Oberfläche (43) gebildet ist; und
eine zweite Öffnung (452), die in der zweiten Oberfläche (44) gebildet ist;

eine Kugel (46), die in dem axialen Loch (45) des zylindrischen Ventils (41) angebracht ist;
ein Leitblech (47), das in der ersten Öffnung (451) des axialen Lochs (45) angebracht ist und das ein Durchgangsloch (471) aufweist, das mit der Ölkammer (22) und mit dem axialen Loch (45) in Verbindung steht;
eine Kreisnut (48), die um die Außenoberfläche des zylindrischen Ventils (41) gebildet ist; und
ein radiales Loch (49), das radial in dem zylindrischen Ventil (41) gebildet ist und mit dem axialen Loch (45) und mit der Kreisnut (48) in Verbindung steht; so dass

wenn sich die Glastür (60) öffnet, Öl in dem zweiten Raum verdichtet wird und in das axiale Loch (45) des zylindrischen Ventils (41) und in den ersten Raum strömt;
wenn die Glastür (60) geschlossen wird, Öl in dem ersten Raum über den ersten Ölkanal (23) in den zweiten Raum strömt; und
wenn die Tür auf den spezifischen Winkel geschlossen wird, die Kreisnut (48) mit dem zweiten Ölkanal (24) verbunden wird, während das zylindrische Ventil (41) in eine spezifische Position bewegt wird, und Öl in dem ersten Raum über den ersten und den zweiten Ölkanal (23, 24) in den zweiten Raum strömt.

2. Hydraulisches Scharnier gemäß Anspruch 1, wobei der Drehzapfen (30) ein gezahntes Teil (32) aufweist, das an dem ersten Abschnitt des Drehzapfens (30) gebildet ist; und
die Befestigungsplatte (10) Folgendes aufweist:

eine Kappe (13), die eine abgefaste Oberfläche (14) aufweist, die an dem gezahnten Teil (32) des Drehzapfens (30) anliegt.

3. Hydraulisches Scharnier gemäß Anspruch 1 oder 2, wobei der Drehsitz (20) Folgendes aufweist:

ein erstes Justierelement (25), das in dem Körper (21) des Drehsitzes (20) angebracht ist, das in den ersten Ölkanal (23) verläuft und das dem ersten Auslass (232) zugewandt ist; und
ein zweites Justierelement (26), das in dem Körper (21) des Drehsitzes (20) angebracht ist, das in den zweiten Ölkanal (24) verläuft und das dem zweiten Auslass (241) zugewandt ist.

4. Hydraulisches Scharnier gemäß einem der Ansprüche 1 bis 3, wobei das hydraulische Scharnier eine erste Abdeckung (17) und eine zweite Abdeckung

(18), die an dem Drehsitz (20) symmetrisch angebracht sind, aufweist.

Revendications

1. Charnière hydraulique pour une porte en verre (60) comprenant :

une plaque de fixation (10) ;
un siège pivotant (20) comprenant
un corps (21) ;
une chambre d'huile (22) formée dans ledit corps (21) ;
un pivot (30) combiné avec la plaque de fixation (10) et le siège pivotant (20), et comportant
une première portion montée de manière immobile sur la plaque de fixation (10) ;
une deuxième portion montée de manière rotative dans le siège pivotant (20) ; et
une surface aboutée (31) formée sur le pivot (30) et située dans la chambre d'huile (22) du siège pivotant (20) ;
un module tampon (40) monté dans le siège pivotant (20), situé dans la chambre d'huile (22) du siège pivotant (20) et comprenant une soupape cylindrique (41) en butée contre le pivot (30) et ayant une surface extérieure ;
une première surface (43) en butée contre le pivot (30) ;
une deuxième surface (44) opposée à la première surface (43) ;
un trou axial (45) formé à travers la soupape cylindrique (41) ; dans lequel la chambre d'huile (22) est divisée en un premier espace et un deuxième espace par la soupape cylindrique (41) ; et
un ressort (42) monté dans la chambre d'huile (22) du siège pivotant (20) et comportant
une première extrémité en butée contre le corps (21) du siège pivotant (20) ; et
une deuxième extrémité en butée contre la deuxième surface (44) de la soupape cylindrique (41) ;
la charnière hydraulique étant **caractérisée en ce que** un premier passage d'huile (23) est formé dans le corps (21) comportant une première entrée (231) communiquant avec le premier espace de la chambre d'huile (22) ; et
une première sortie (232) communiquant avec le deuxième espace de la chambre d'huile (22) ;
un deuxième passage d'huile (24) est formé dans le corps (21) comportant
une deuxième entrée communiquant avec le premier passage d'huile (23) ; et
une deuxième sortie (241) communiquant avec la chambre d'huile (22) et située entre la première entrée (231) et la première sortie (232) ;
en ce que la soupape cylindrique (41) comprend
une première ouverture (451) formée dans la première surface (43) ; et
une deuxième ouverture (452) formée dans la deuxième surface (44) ;
une bille (46) montée dans le trou axial (45) de la soupape cylindrique (41) ;
un déflecteur (47) monté dans la première ouverture (451) du trou axial (45) et ayant un trou d'interconnexion (471) communiquant avec la chambre d'huile (22) et le trou axial (45) ;
une rainure circulaire (48) formée autour de la surface extérieure de la soupape cylindrique (41) ; et
un trou radial (49) formé radialement dans la soupape cylindrique (41) et communiquant avec le trou axial (45) et la rainure circulaire (48) ; de manière que
quand la porte en verre (60) est ouverte, l'huile dans le deuxième espace soit compressée et s'écoule dans le trou axial (45) de la soupape cylindrique (41) et dans le premier espace ;
quand la porte en verre (60) est fermée, l'huile dans le premier espace s'écoule dans le deuxième espace par l'intermédiaire du premier passage d'huile (23) ; et
quand la porte est fermée avec l'angle spécifique, la rainure circulaire (48) soit connectée avec le deuxième passage d'huile (24) alors que la soupape circulaire (41) est déplacée dans une position spécifique, et l'huile dans le premier espace s'écoule dans le deuxième espace par l'intermédiaire des premier et deuxième passages d'huile (23, 24).

2. Charnière hydraulique selon la revendication 1, dans laquelle
le pivot (30) a une partie dentée (32) formée sur la première portion du pivot (30) ; et
la plaque de fixation (10) comporte
un couvercle (13) ayant une surface bombée (14) venant en butée contre la partie dentée (32) du pivot (30).

3. Charnière hydraulique selon la revendication 1 ou 2, dans laquelle
le siège pivotant (20) comporte
un premier élément de réglage (25) monté dans le corps (21) du siège pivotant (20), s'étendant dans le premier passage d'huile (23) et faisant face à la première sortie (232) ; et
un deuxième élément de réglage (26) monté dans le corps (21) du siège pivotant (20), s'étendant dans le deuxième passage d'huile (24) et faisant face à la deuxième sortie (241).

4. Charnière hydraulique selon l'une quelconque des revendications 1 à 3, dans laquelle la charnière hy-

draulique comporte un premier cache (17) et un deuxième cache (18) montés symétriquement sur le siège pivotant (20).

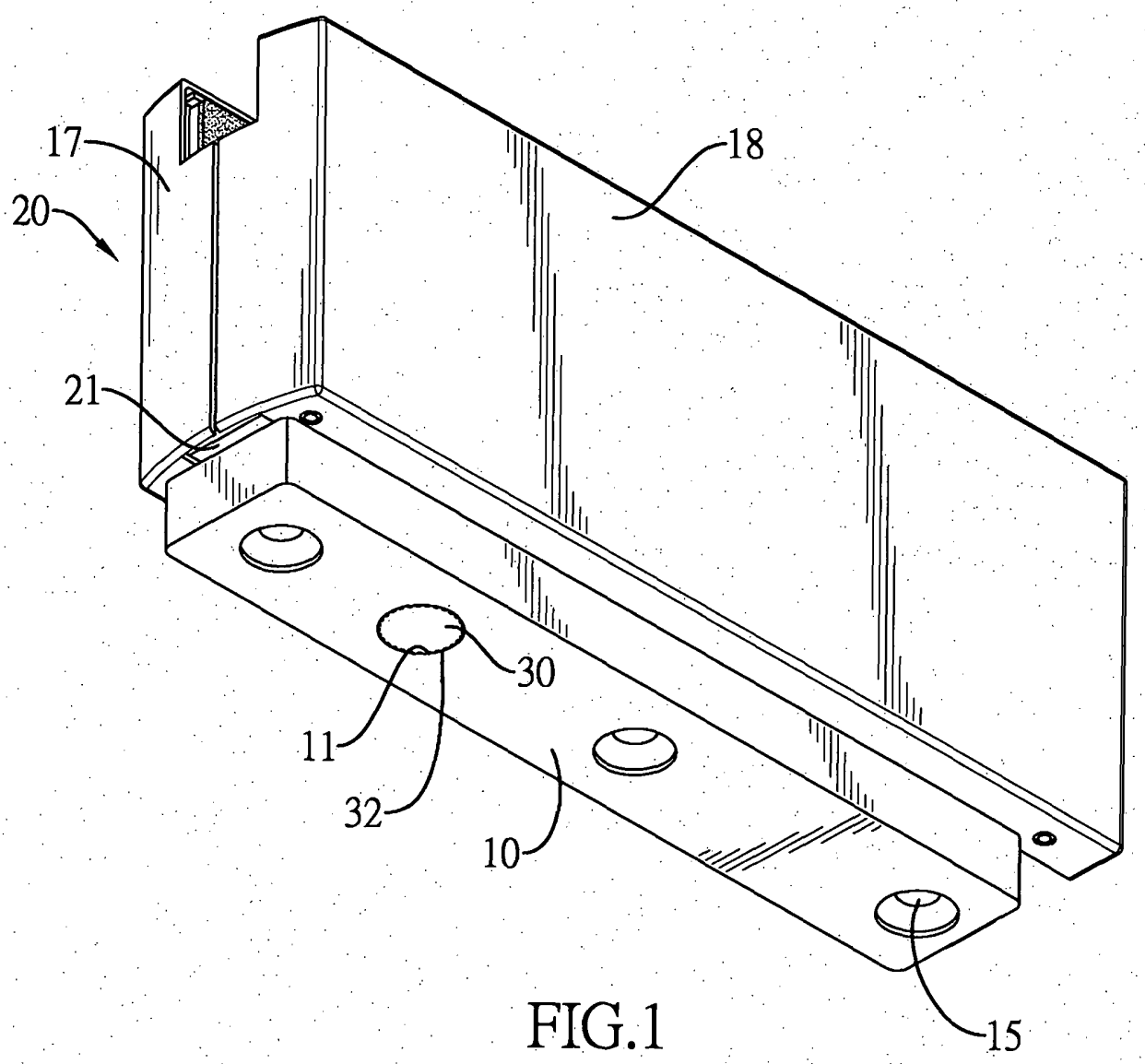

FIG.1

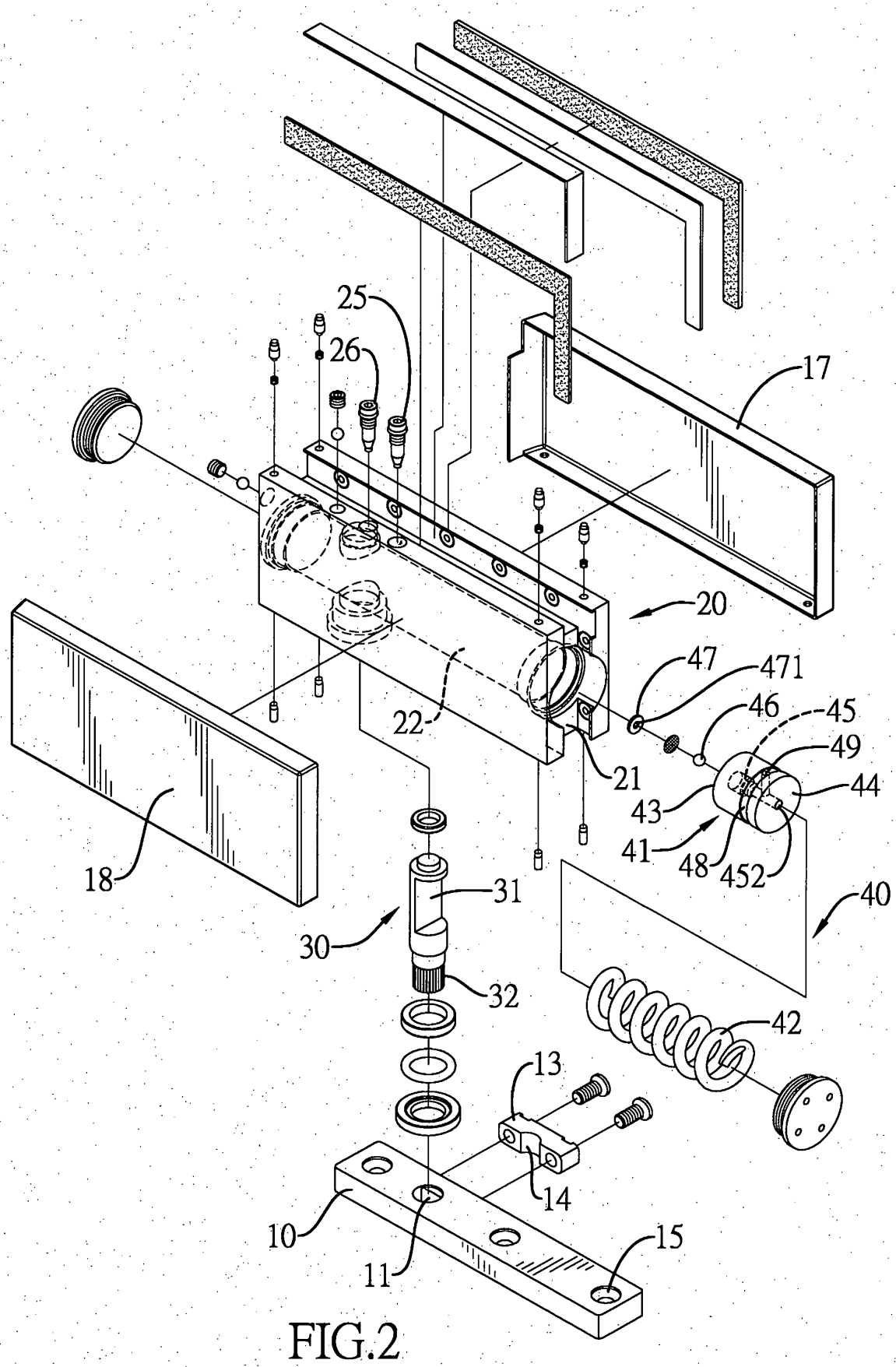
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FIG.2

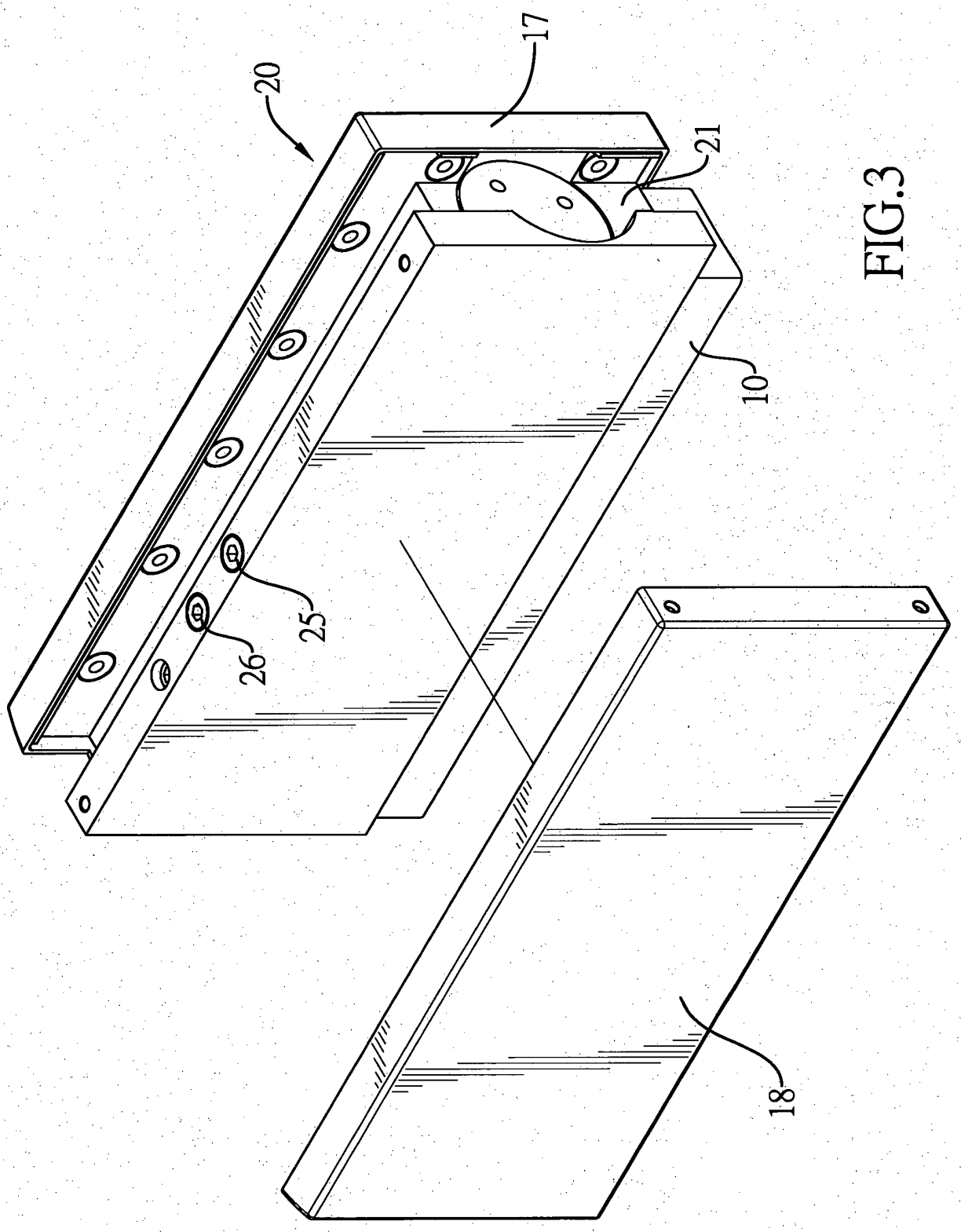

FIG.3

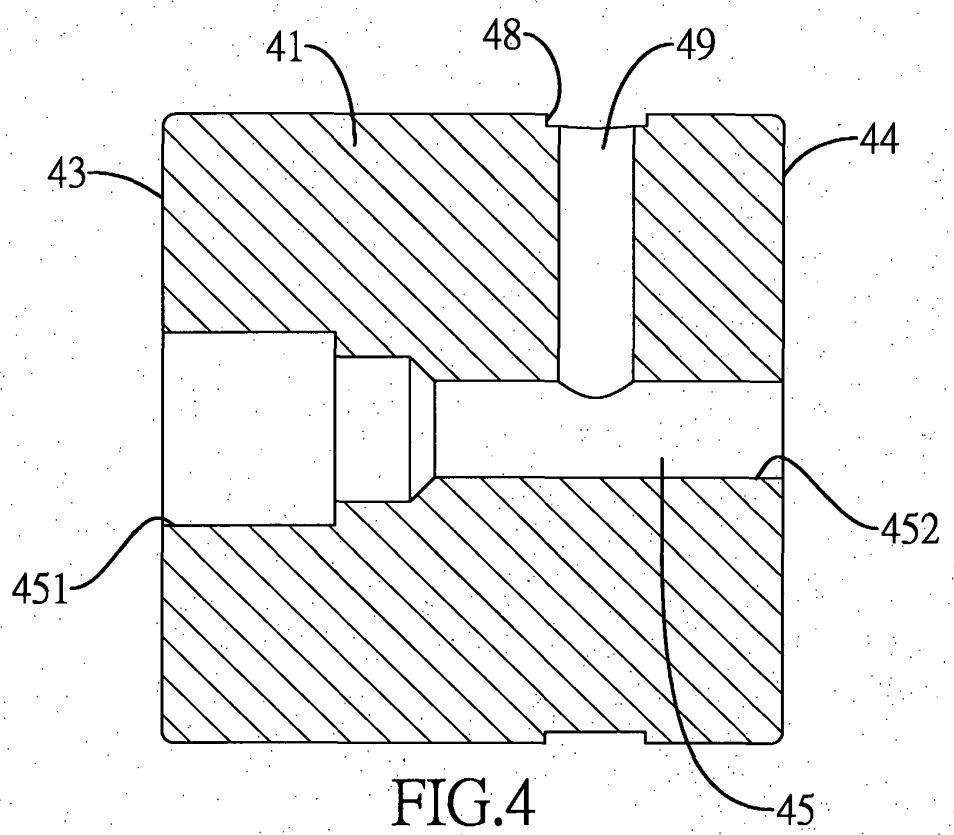

FIG.4

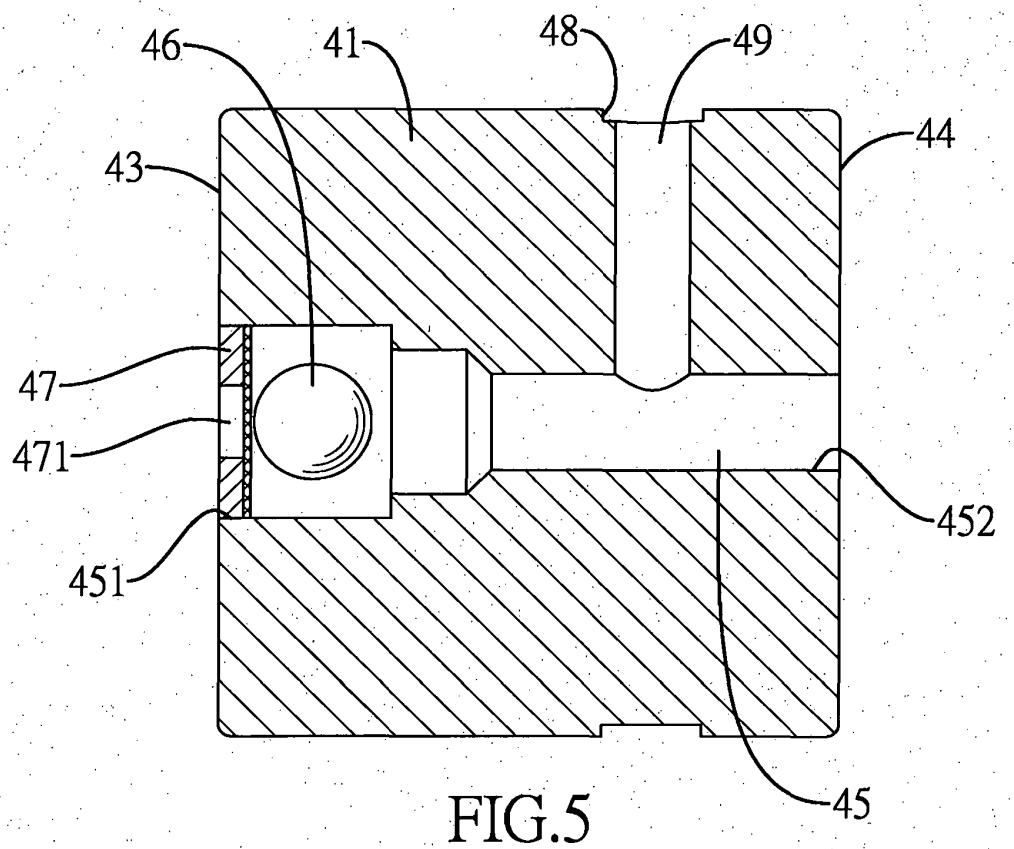

FIG.5

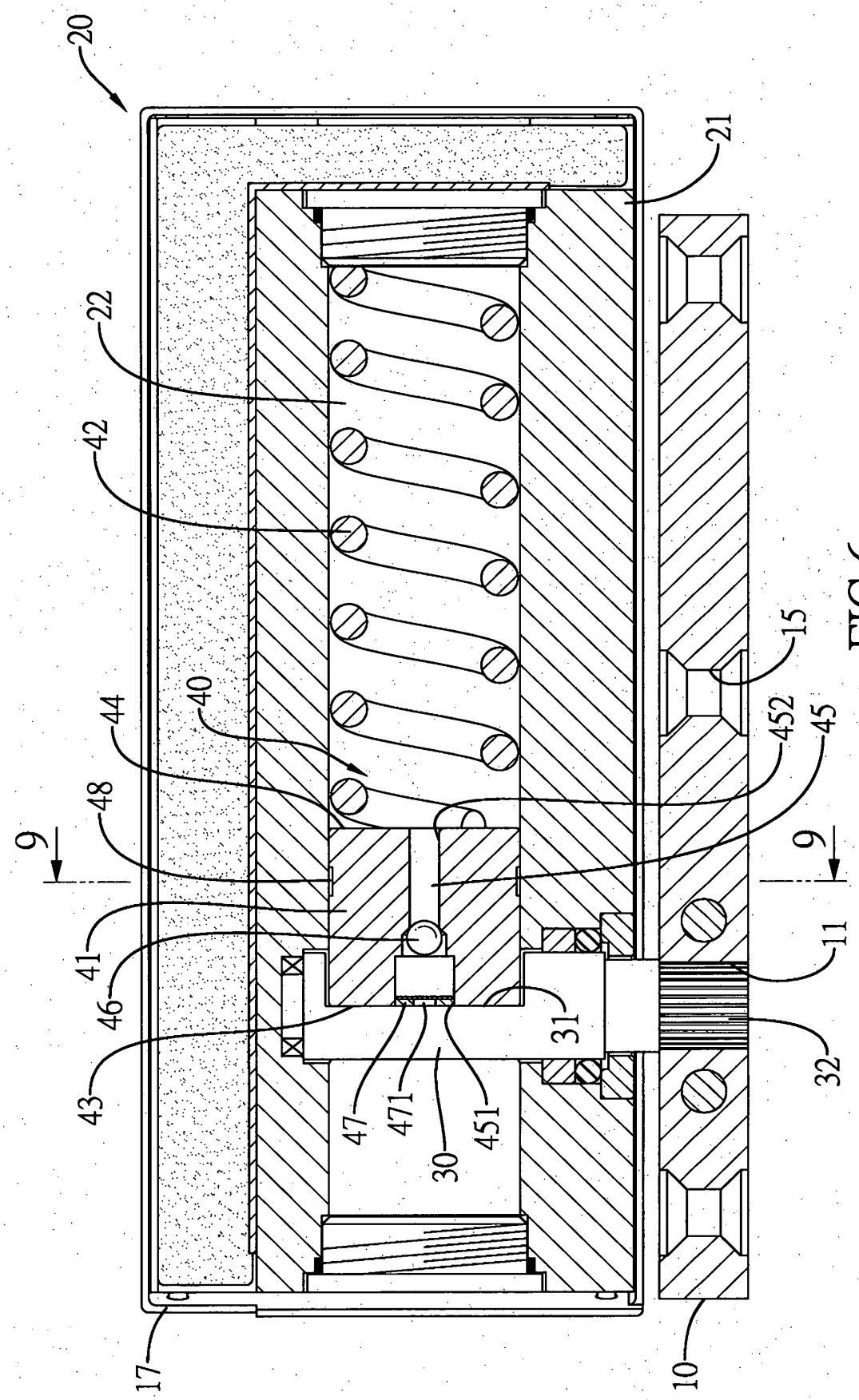

FIG.6

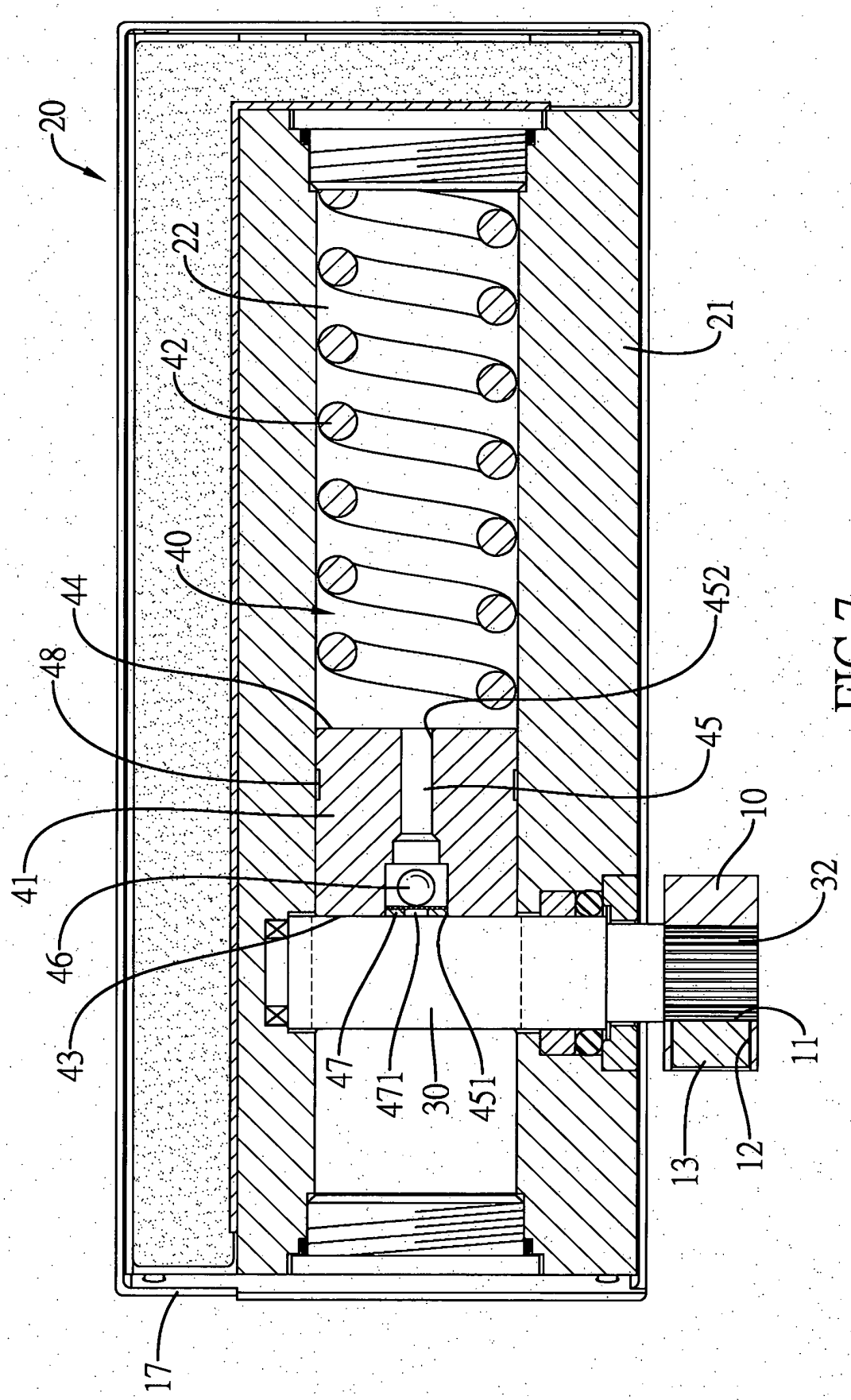

FIG.7

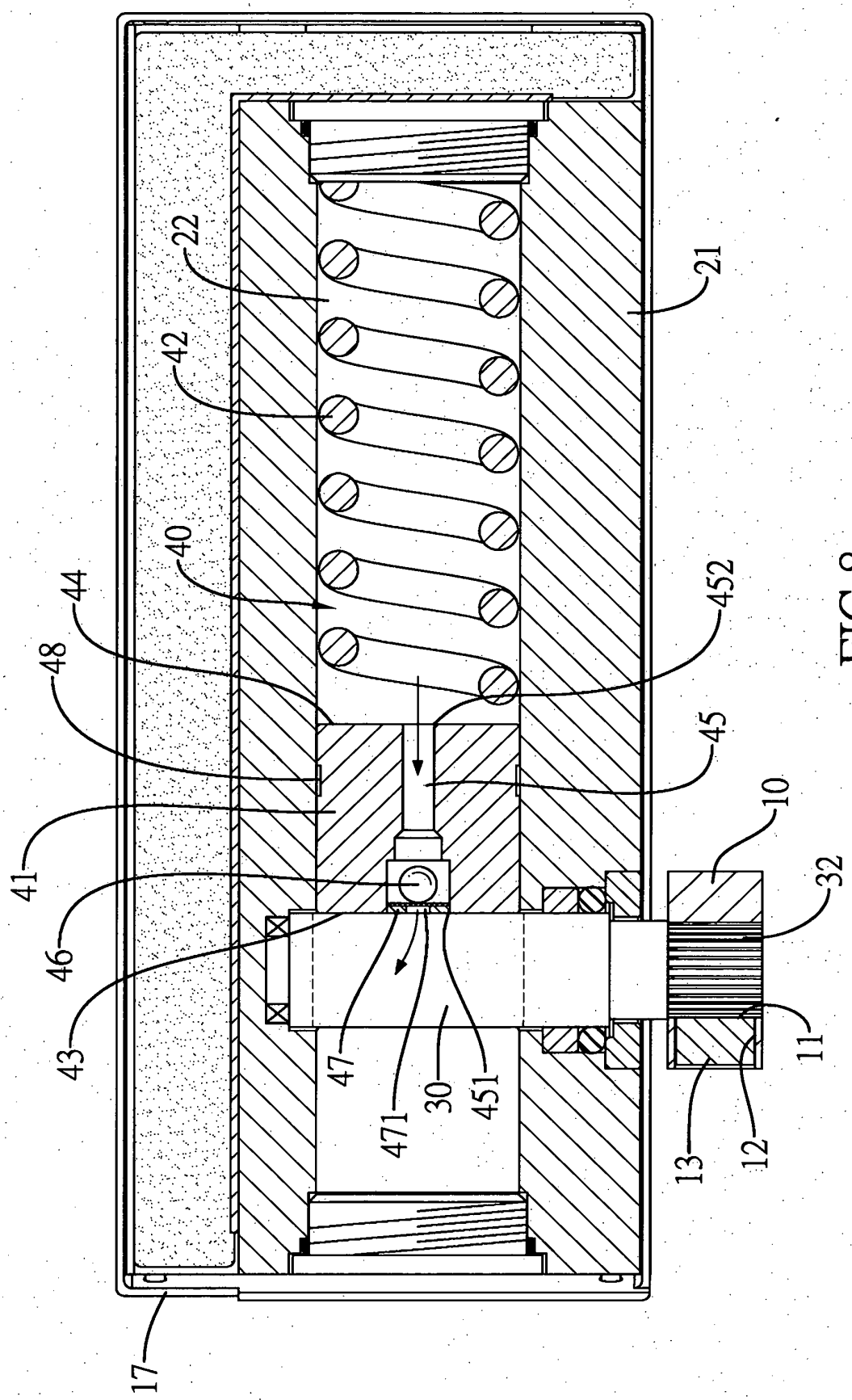

FIG.8

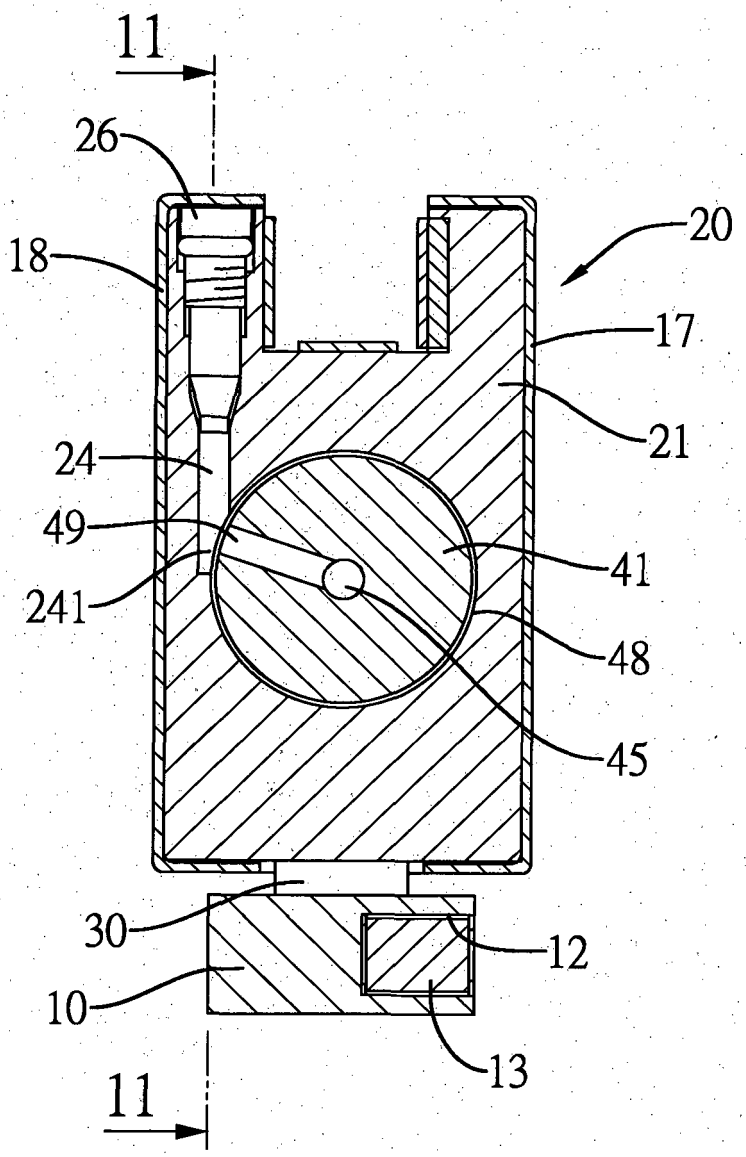

FIG.9

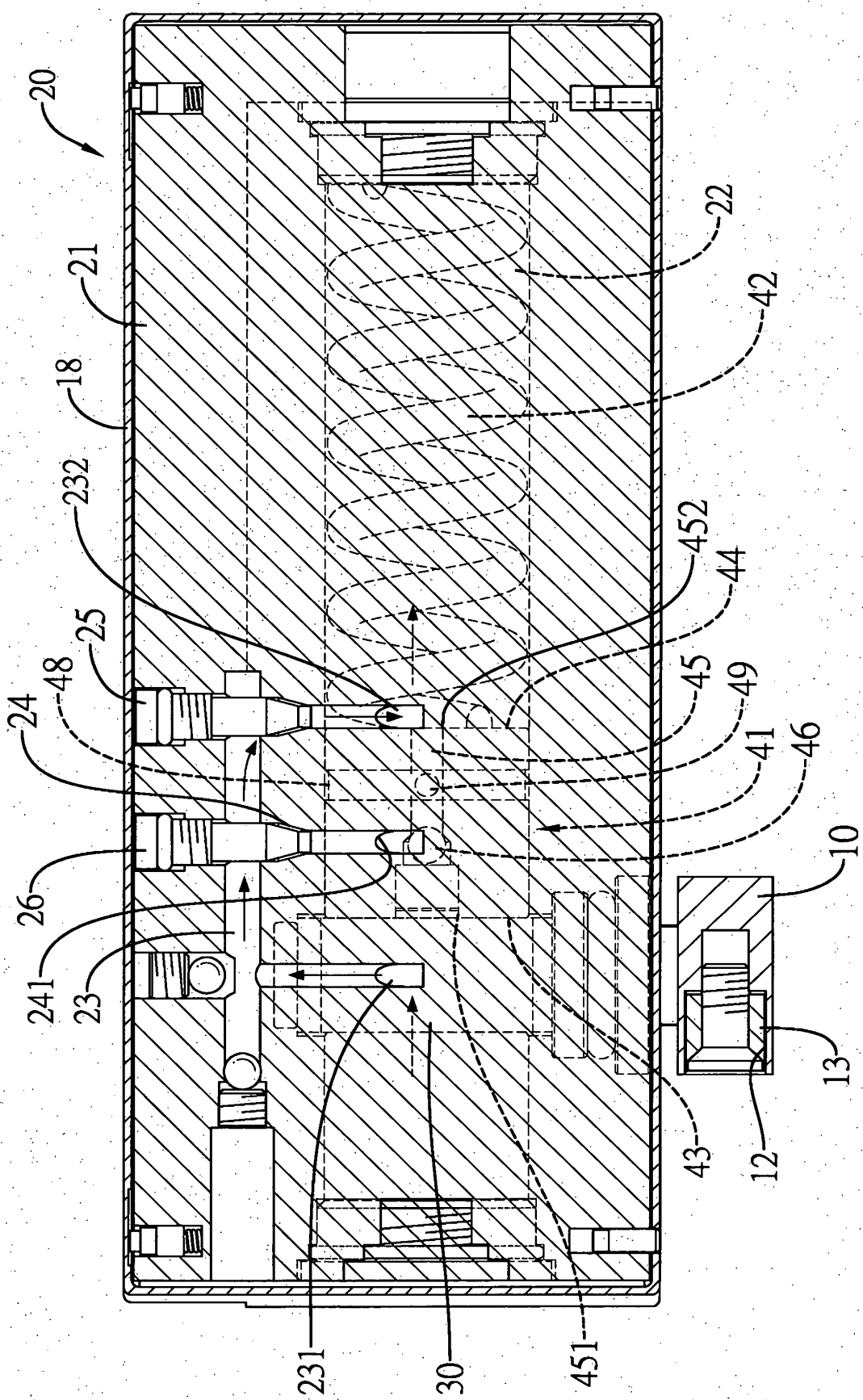
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FIG.10

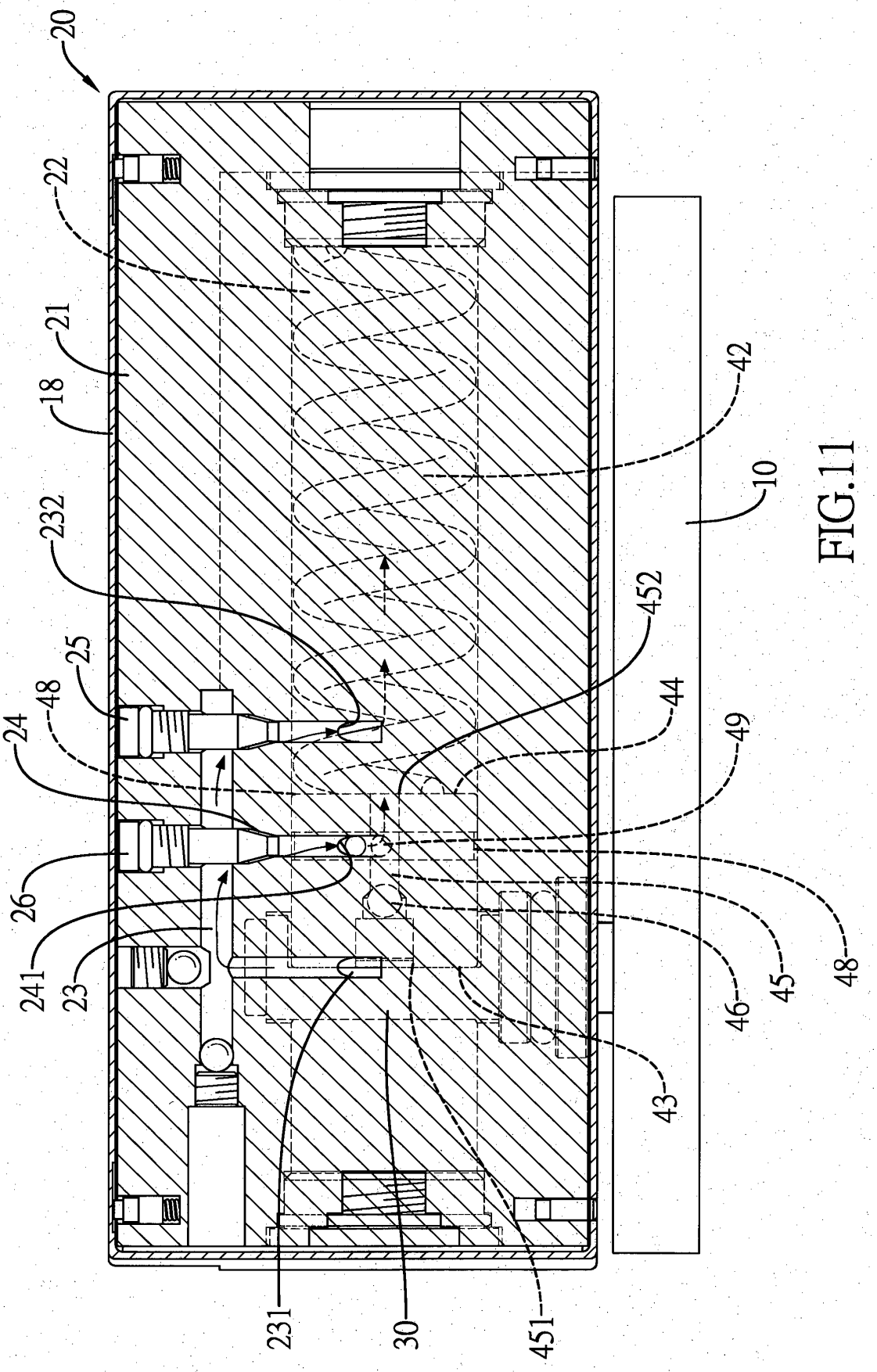
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FIG.11

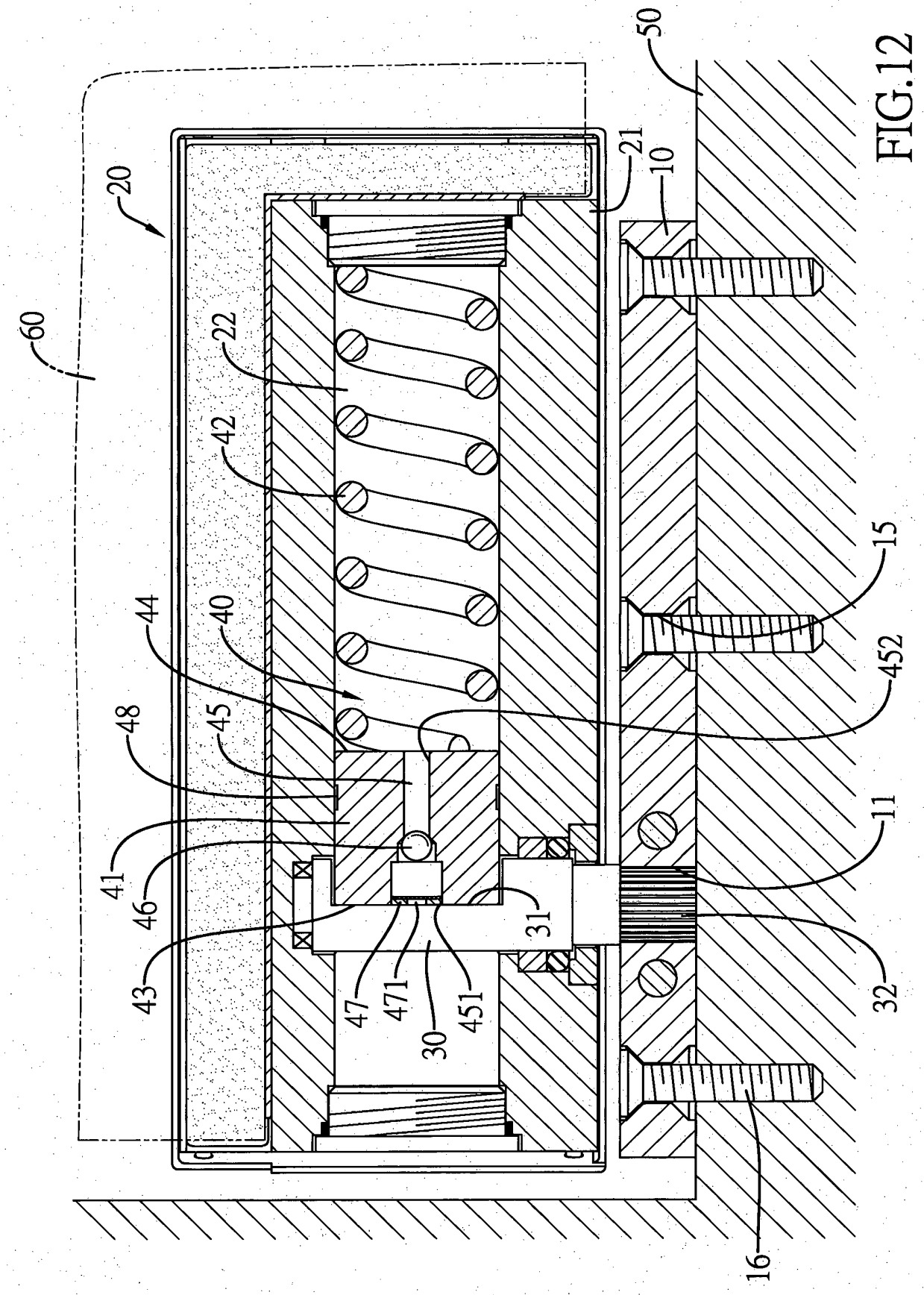
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FIG.12

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 2397635 A1 **[0002]**
- DE 202012011586 U1 **[0002]**