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(54) **A DOOR ASSEMBLY CLOSING DEVICE**

SCHLIESSVORRICHTUNG FÜR EINE TÜRANORDNUNG

DISPOSITIF DE FERMETURE POUR PORTE

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US-A- 3 006 683 **US-A- 3 339 226**

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Description

[0001] The invention relates to a door assembly and is primarily concerned with a door assembly closing device for a motor vehicle.

[0002] The parking of vehicles in confined spaces can make it difficult to open driver and passenger doors and, hitherto, it has been proposed to mount a door using two arms in a parallelogram-type manner to overcome the foregoing problem. Unfortunately, with the two arm arrangements, pressure from a door seal tends to force the forward edge of the door (i.e. that edge of the door adjacent to a support for the door) outwards and an object of the present invention is to provide an improved door assembly which reduces that problem.

[0003] It is known from US-A-3339226 to provide a door assembly having a door mounted for hinging movement between a closed position in which it is in contact with a door seal and an open position, the door assembly comprising a mounting mechanism including a mounting arm having a first end pivotally connected to a support for the door and a second end pivotally connected to the door and a second arm for controlling pivotal movement of the door relative to the mounting arm, the mounting mechanism including a closing device to urge the door against the door seal.

[0004] According to the invention there is provided a door assembly characterised in that the closing device comprises of a closure member mounted on the support which is movable during closing movement of the door into engagement with a closure surface on the door by an operating member mounted on the mounting arm.

[0005] With such an arrangement, the closing device positively urges the door against the door seal particularly in the region of the edge of the door adjacent to the support.

[0006] The closure member may be pivotally mounted on the support for the door.

[0007] The aforesaid operating member may be arranged to strike the closure member during closing movement of the door to move the closure member into engagement with the closure surface. The striking of the closure member may take place prior to the door reaching its fully closed position.

[0008] The operating member and closure member are preferably formed with the respective rows of teeth so that the teeth of the operating member mesh with the teeth of the closure member to move the closure member into engagement with the closure surface.

[0009] Such an arrangement provides a particularly effective way of drawing the door against the door seal as it moves into its fully closed position.

[0010] Preferably, the row of teeth on the operating member is formed as an arc having its centre of curvature on the axis of pivoting of the first end of the said one arm.

[0011] The closure surface may be defined by a closure element, such as a pin, mounted on the door, in

which case the pin may be spaced from an internal surface of the door so that the closure member moves into the space between the pin and the internal surface of the door during closing movement of the door.

[0012] The closure member ideally pivots into engagement with the closure element or pin during closing movement of the door.

[0013] In order that the two arms may move substantially in the manner of a parallelogram, the second arm may be pivotally connected at a first end to, for example, the support for the door and pivotally connected at a second end to the door. The pivots for the first ends of the arms may be spaced apart in a direction transverse to the axes of both pivots and, for a parallelogram action, the pivots for the second ends of the arms may be spaced apart in a direction transverse to the axes of those pivots.

[0014] Preferably, the operating member is mounted on the aforesaid mounting arm for the door.

[0015] A door assembly in accordance with the invention will now be described by way of example with reference to the accompanying drawings in which:-

Fig 1 is a diagrammatic plan view of a vehicle door mounted on the vehicle by means of two arms movable after the manner of a parallelogram, and

Fig 2 is an enlarged plan view of the door assembly of Fig 1 including a closing device in accordance with the present invention.

[0016] With reference to Fig 1, a vehicle indicated generally at 10 defines a door opening 12 closeable by a door 14. The door is mounted on a door pillar 16, for example, the usual "A" post of the vehicle, by means of a mounting arm 18. The arm 18 has a first end 20 connected by a pivot 18a to a bracket 22 on the pillar 16 and a second end 24 connected by a pivot 18b to the door 14. In practice, it is anticipated that there will be two arms 18 spaced apart vertically. A control arm 26 has a first end 28 connected by a pivot 26a to the bracket 22 and a second end 29 connected by a pivot 26b to the door 14. The control arm 26 prevents uncontrolled pivoting of the door 14 on the mounting arm 18.

[0017] The door pillar pivots 18a, 26a are spaced apart in a direction transverse to their pivotal axes, the door pivots 18b, 26b are also spaced apart in a direction transverse to their pivotal axes and the lengths of the arms 18, 26 are selected so that the door 14 can move between a closed position Pc and an open position Po shown in broken lines. Normally, a seal 30a is carried by the flange on pillar 16. However, with the arrangement shown in Fig 1, the pressure exerted by the seal 30a tends to force the forward edge of the door, indicated at 32, outwards so that it stands proud from the adjacent side surface 10a of the vehicle.

[0018] As mentioned above, the present invention is intended to overcome that particular problem and refer-

ence is now made to Fig 2 of the drawings.

[0019] In Fig 2, part corresponding to parts shown in Fig 1 carry the same reference numerals and will not be described in detail.

[0020] In Fig 2, the mounting arm 18 has an operating member 34 attached thereto, the operating member 34 having an arcuate row of teeth 36 thereon. The arc has a centre of curvature corresponding to the axis of arm pivot 18a on the bracket 22. The teeth 36 mesh with a similar arcuate row of teeth 38 formed on a spring biased closure member 40 which is mounted for pivoting on the bracket 22 about an axis 41. The closure member 40 is curved and tapers towards its left hand end 42 as viewed in Fig 2. With the door 14 in the position Pc in Fig 2, it will be noted that the closure member 40 is located behind a pin 44 carried by a bracket 46 attached the door 14. The pin 44 is spaced from the door 14 and the closure member 40 projects through the space so as to lie behind the pin.

[0021] With the door 14 in its fully open position, the operating member 34 occupies a position shown in broken lines and the closure member 40 is biased by a spring (not shown) against a stop 50 such that it occupies a position 40a. Therefore when the door is in an open position the closure member 40 is positioned in the correct position for engagement with the operating member 34 upon closing of the door.

[0022] As the door 14 is moved towards its closed position, the operating member 34 moves from the broken line position towards the full line position and eventually the leading teeth of the row 36 strike and move into mesh with the teeth 38 of the operating member 40 at the position 40a. The position of the door 14 at that point is indicated in broken lines at 14a. Further closing movement of the door causes the operating member 34 to turn the closure member 40 about the pivot 41 so that the closure member moves into the space between the pin 44 and the door 14 as shown at position 40b in broken lines. The door 40 occupies the broken line position 14b at that point. Further closing movement of the door to its fully closed position Pc finally causes the operating member 34 to pivot the closure member 40 into its full line position 40c in positive abutment with the pin 44 thereby pressing the surface 14d of the door firmly against the seal 30a.

[0023] A further seal 30 carried by the door may be provided for sealing contact against surface 16a of the pillar 16 and the operation of the closure member 40 and operating member 34 (which, in this embodiment provide the aforesaid closing device) ensure firm contact between the pillar 16 and the seal 30. The action of the closure member 40 ensures that the leading edge 32 of the door 14 does not stand proud of the side surface 10a by virtue of seal pressure when the door is closed. The opposite edge of the door will be held closed by the normal door locking mechanism (not shown).

[0024] During opening of the door 14, the operating member 34 and the closure member 40 will move in re-

verse directions thereby allowing the door 14 to be opened.

5 Claims

1. A door assembly having a door (14) mounted for hinging movement between a closed position in which it is in contact with a door seal (30a) and an open position, the door assembly further comprising a mounting mechanism including a mounting arm (18) having a first end (20) connected by a pivot (18a) to a support (16, 22) for the door (14) and a second end (24) connected by a pivot (18b) to the door (14) and a second arm (26) for controlling pivotal movement of the door (14) relative to the mounting arm (18), the mounting mechanism including a closing device to urge the door (14) against the door seal (30a) characterised in that the closing device comprises of a closure member (40) mounted on the support (16, 22) which is movable during closing movement of the door (14) into engagement with a closure surface (44) on the door (14) by an operating member (34) mounted on the mounting arm (18).
2. A door assembly according to Claim 1 in which the closure member (40) is pivotally mounted on the support (16, 22) for the door.
3. A door assembly according to Claim 1 or in Claim 2 in which the operating member (34) is fixed to said mounting arm (18) so as to move in unison therewith.
4. A door assembly according to any of Claims 1 to 3 in which the operating member (34) is arranged to strike the closure member (40) during closing movement of the door (14) so as to move the closure member (40) into engagement with the closure surface (44).
5. A door assembly according to any of Claims 1 to 4 in which the operating member (34) and the closure member (40) are formed with respective rows of teeth (36, 38) arranged so that the teeth (36) of the operating member (34) mesh with the teeth (38) of the closure member (40) to move the closure member (40) into engagement with the closure surface (44).
6. A door assembly according to Claim 5 in which the row of teeth (36) on the operating member (34) is formed as an arc having its center of curvature on the axis of pivoting of the first end (20) of the said mounting arm (18).
7. A door assembly according to any of Claims 1 to 6

in which the closure surface is defined by a closure element (44) mounted on the door.

8. A door assembly according to Claim 7 in which the closure element is in the form of an upstanding pin (44) spaced from an internal surface of the door (14) and the closure member (40) moves into the space between the pin (44) and the internal surface of the door (14) during closing movement of the door (14).
9. A door assembly according to Claim 8 in which the closure member (40) is arranged to pivot into engagement within the pin (44) during closing movement of the door (14).
10. A door assembly according to any preceding Claim in which the second arm (26) is connected by a pivot (26a) at a first end (28) to the support (16, 22) for the door (14) and is connected by a pivot (26b) at a second end (29) to the door (14).
11. A door assembly according to Claim 10 in which the pivots (18a, 26a) for the first ends (20, 28) of the arms (18, 26) are spaced apart in a direction transverse to the axes of those pivots (18a, 26a).
12. A door assembly according to Claim 10 or 11 in which the pivots (18a, 26a) for the second ends (20, 28) of the arms (18, 26) are spaced apart in a direction transverse to the axes of those pivots (18a, 26a).

Patentansprüche

1. Türanordnung mit einer Tür (14), die zur Ausführung einer Gelenkbewegung zwischen einer geschlossenen Position, in der sie eine Türdichtung (30a) berührt, und einer geöffneten Position befestigt ist, wobei die Türanordnung weiterhin einen Befestigungsmechanismus umfaßt, der einen Befestigungsarm (18) mit einem durch einen Drehzapfen (18a) mit einer Stütze (16, 22) für die Tür (14) verbundenen ersten Ende (20) und einem durch einen Drehzapfen (18b) mit der Tür (14) verbundenen zweiten Ende (24) und einen zweiten Arm (26) zur Steuerung der Schwenkbewegung der Tür (14) bezüglich des Befestigungsarms (18) enthält, wobei der Befestigungsmechanismus eine Schließvorrichtung zum Drängen der Tür (14) gegen die Türdichtung (30a) enthält, dadurch gekennzeichnet, daß die Schließvorrichtung ein an der Stütze (16, 22) angebrachtes Verschußglied (40) umfaßt, das während einer Schließbewegung der Tür (14) durch ein an dem Befestigungsarm (18) befestigtes Betätigungsglied (34) in Eingriff mit einer Verschußfläche (44) an der Tür (14) beweglich ist.

2. Türanordnung nach Anspruch 1, bei der das Verschußglied (40) schwenkbar an der Stütze (16, 22) für die Tür angebracht ist.

3. Türanordnung nach Anspruch 1 oder 2, bei der das Betätigungsglied (34) so am Befestigungsarm (18) befestigt ist, daß es sich gleichzeitig damit bewegt.

4. Türanordnung nach einem der Ansprüche 1 bis 3, bei der das Betätigungsglied (34) so angeordnet ist, daß es während der Schließbewegung der Tür (14) am Verschußglied (40) anschlägt, um das Verschußglied (40) in Eingriff mit der Verschußfläche (44) zu bewegen.

5. Türanordnung nach einem der Ansprüche 1 bis 4, bei der das Betätigungsglied (34) und das Verschußglied (40) so mit jeweiligen Reihen von Zähnen (36, 38) ausgebildet sind, daß die Zähne (36) des Betätigungsglieds (34) mit den Zähnen (38) des Verschußglieds (40) kämmen, um das Verschußglied (40) in Eingriff mit der Verschußfläche (44) zu bewegen.

6. Türanordnung nach Anspruch 5, bei der die Reihe von Zähnen (36) am Betätigungsglied (34) bogenförmig ist und ihren Krümmungsmittelpunkt auf der Schwenkachse des ersten Endes (20) des Befestigungsarms (18) hat.

7. Türanordnung nach einem der Ansprüche 1 bis 6, bei der die Verschußfläche durch ein an der Tür angebrachtes Verschußelement (44) definiert wird.

8. Türanordnung nach Anspruch 7, bei der das Verschußelement (40) als aufrechtstehender Stift (44) ausgebildet ist, von einer Innenfläche der Tür (14) beabstandet ist, und sich während der Schließbewegung der Tür (14) in den Raum zwischen dem Stift (44) und der Innenfläche der Tür (14) bewegt.

9. Türanordnung nach Anspruch 8, bei der das Verschußglied (40) so angeordnet ist, daß es während der Schließbewegung der Tür (14) in Eingriff mit dem Stift (44) schwenkt.

10. Türanordnung nach einem der vorhergehenden Ansprüche, bei der der zweite Arm (26) an einem ersten Ende (28) durch einen Drehzapfen (26a) mit der Stütze (16, 22) für die Tür (14) und an einem zweiten Ende (29) durch einen Drehzapfen (26b) mit der Tür (14) verbunden ist.

11. Türanordnung nach Anspruch 10, bei der die Drehzapfen (18a, 26a) für die ersten Enden (20, 28) der Arme (18, 26) in einer quer zu den Achsen jener Drehzapfen (18a, 26a) verlaufenden Richtung beabstandet sind.

12. Türanordnung nach Anspruch 10 oder 11, bei der die Drehzapfen (18a, 26a) für die zweiten Enden (20, 28) der Arme (18, 26) in einer quer zu den Achsen jener Drehzapfen (18a, 26a) verlaufenden Richtung beabstandet sind.

Revendications

1. Système de porte ayant une porte (14) montée de manière à décrire un mouvement de charnière entre une position fermée dans laquelle elle est en contact avec un joint de porte (30a) et une position ouverte, le système de porte comprenant en outre un mécanisme de montage comportant un bras de montage (18) ayant une première extrémité (20) connectée par un pivot (18a) à un support (16, 22) pour la porte (14), et une deuxième extrémité (24) connectée par un pivot (18b) à la porte (14), et un deuxième bras (26) pour commander le mouvement de pivotement de la porte (14) par rapport au bras de montage (18), le mécanisme de montage comportant un dispositif de fermeture pour pousser la porte (14) contre le joint de porte (30a), caractérisé en ce que le dispositif de fermeture comprend un organe de fermeture (40) monté sur le support (16, 22), qui est déplaçable, lors du mouvement de fermeture de la porte (14), en engagement avec une surface de fermeture (44) sur la porte (14), par un organe d'actionnement (34) monté sur le bras de montage (18). 10
2. Système de porte selon la revendication 1, dans lequel l'organe de fermeture (40) est monté de manière pivotable sur le support (16, 22) pour la porte. 15
3. Système de porte selon la revendication 1 ou la revendication 2, dans lequel l'organe d'actionnement (34) est fixé audit bras de montage (18) de manière à se déplacer à l'unisson avec lui. 20
4. Système de porte selon l'une quelconque des revendications 1 à 3, dans lequel l'organe d'actionnement (34) est agencé de manière à solliciter l'organe de fermeture (40) au cours du mouvement de fermeture de la porte (14) pour déplacer l'organe de fermeture (40) en engagement avec la surface de fermeture (44). 25
5. Système de porte selon l'une quelconque des revendications 1 à 4, dans lequel l'organe d'actionnement (34) et l'organe de fermeture (40) sont formés avec des rangées de dents (36, 38) respectives, arrangées de telle sorte que les dents (36) de l'organe d'actionnement (34) s'engrènent avec les dents (38) de l'organe de fermeture (40) pour déplacer l'organe de fermeture (40) en engagement avec la surface de fermeture (44). 30

6. Système de porte selon la revendication 5, dans lequel la rangée de dents (36) sur l'organe d'actionnement (34) est formée suivant un arc dont le centre de courbure se trouve sur l'axe de pivotement de la première extrémité (20) dudit bras de montage (18). 35
7. Système de porte selon l'une quelconque des revendications 1 à 6, dans lequel la surface de fermeture est définie par un élément de fermeture (44) monté sur la porte. 40
8. Système de porte selon la revendication 7, dans lequel l'élément de fermeture a la forme d'une goupille dressée (44), espacée d'une surface interne de la porte (14) et l'organe de fermeture (40) se déplace dans l'espace entre la goupille (44) et la surface interne de la porte (14) au cours du mouvement de fermeture de la porte (14). 45
9. Système de porte selon la revendication 8, dans lequel l'organe de fermeture (40) est agencé de manière à pivoter en engagement avec la goupille (44), au cours du mouvement de fermeture de la porte (14). 50
10. Système de porte selon l'une quelconque des revendications précédentes, dans lequel le deuxième bras (26) est connecté par un pivot (26a) à une première extrémité (28) au support (16, 22) pour la porte (14), et est connecté par un pivot (26b) à une deuxième extrémité (29) à la porte (14). 55
11. Système de porte selon la revendication 10, dans lequel les pivots (18a, 26a) pour les premières extrémités (20, 28) des bras (18, 26) sont espacés dans une direction transversale aux axes de ces pivots (18a, 26a).
12. Système de porte selon la revendication 10 ou 11, dans lequel les pivots (18a, 26a) pour les deuxièmes extrémités (20, 28) des bras (18, 26) sont espacés dans une direction transversale aux axes de ces pivots (18a, 26a).

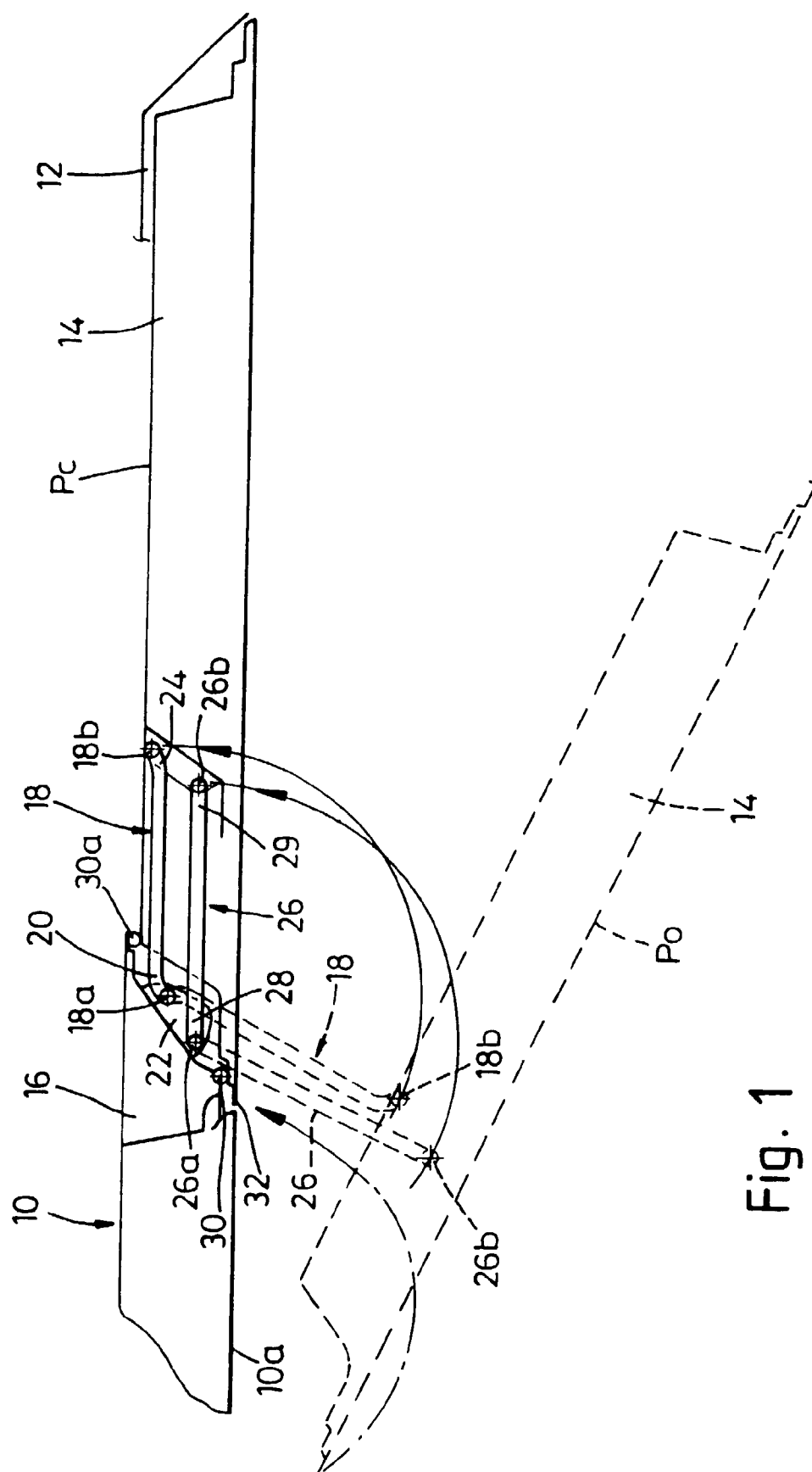


Fig. 1

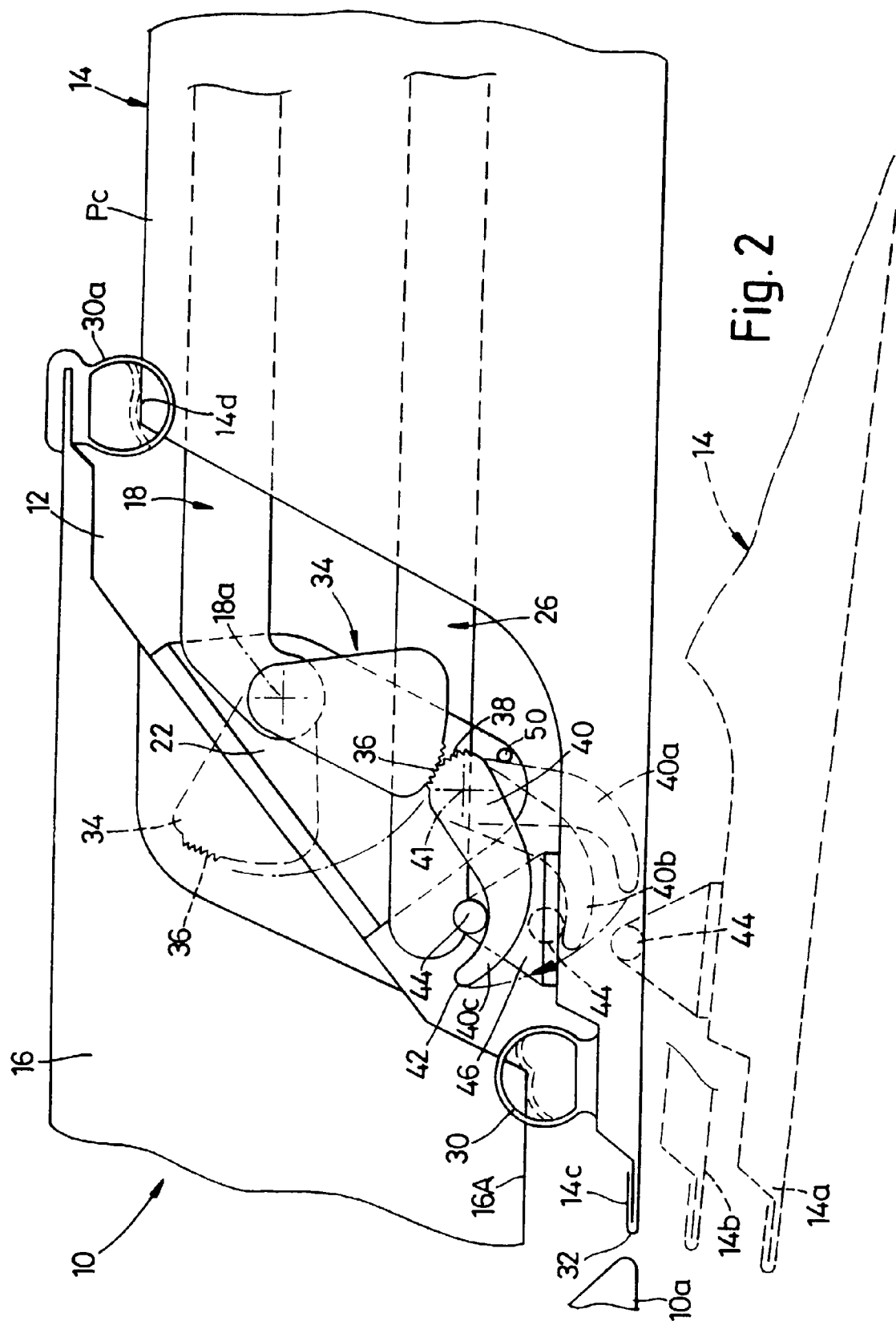


Fig. 2