OPIC
Office de la propriété intellectuelle du Canada

CIPO
Canadian Intellectual Property Office

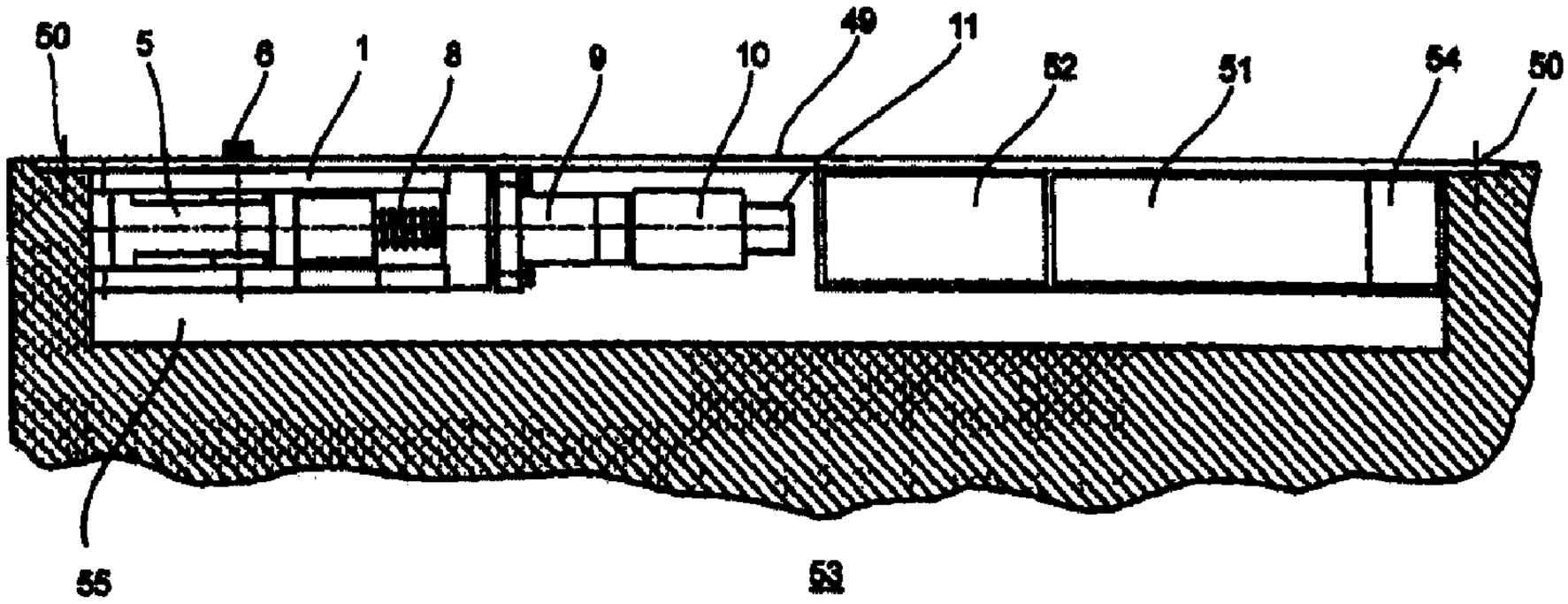
(12) (19) (CA) **Demande-Application**

(21) (A1) **2,282,273**
(86) 1998/12/16
(87) 1999/07/01

(72) MOLL, OLIVER, DE
(71) DORMA GMBH & CO. KG, DE

(51) Int.Cl.[6] E05F 15/12
(30) 1997/12/19 (197 56 496.8) DE

(54) **SYSTEME D'ENTRAINEMENT POUR PORTE A TAMBOUR**
(54) **REVOLVING DOOR DRIVE MECHANISM**



(57) L'invention concerne un système d'entraînement pour porte à tambour, comportant une commande électronique qui renferme au moins une mémoire et un microprocesseur, pour une porte comportant au moins un vantail. Ce dernier comprend une unité d'entraînement électromécanique assurant les fonctions d'ouverture et de fermeture, qui comporte principalement un moteur d'entraînement (10) avec une transmission (9) et une unité de transfert d'énergie (5-8) pour la porte (53) connectée. L'unité de transmission d'énergie présente un arbre primaire (22), raccordé à une des extrémités (6) d'un levier d'actionnement. L'unité d'entraînement est montée invisible dans un vantail de la porte ou dans une huisserie de porte. L'unité d'entraînement comprend une broche (8) avec un écrou (7) qui l'enserre au moins en partie par dessus et est relié à une crémaillère par liaison de force et de forme, l'arbre primaire (22) s'engrenant par sa denture avec une denture (23) de la crémaillère.

(57) The invention relates to a revolving door drive mechanism with an electronic controlling means containing at least one storage device and one microprocessor. The invention is provided for a door having at least one leaf. The door leaf is comprised of an electromechanical drive unit which operates the opening and closing functions. The drive unit is provided for the connected door (53) and is essentially comprised of a drive motor (10) with a transmission (9) and a load transmitting unit (5-8) connected thereto. The load transmitting unit contains a drive axle (22) which is connected to an end (6) of an actuating lever, and the drive unit is installed inside a door leaf (53) or inside a door frame such that it cannot be seen. The load transmitting unit comprised of a spindle (8) is connected to a spindle nut (7) which partially overlaps said unit. The spindle nut is connected to a rack (5) in a non-positive and positive manner, whereby the drive axle (22) engages with the gearing thereof inside a gearing (23) of the rack.

PCT

WELTORGANISATION FÜR GEISTIGES EIGENTUM
Internationales Büro

INTERNATIONALE ANMELDUNG VERÖFFENTLICHT NACH DEM VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES PATENTWESENS (PCT)

(51) Internationale Patentklassifikation [6] : **E05F 15/12**	**A1**	**(11) Internationale Veröffentlichungsnummer: WO 99/32748** **(43) Internationales Veröffentlichungsdatum:** 1. Juli 1999 (01.07.99)

(21) Internationales Aktenzeichen: PCT/EP98/08236

(22) Internationales Anmeldedatum: 16. Dezember 1998 (16.12.98)

(30) Prioritätsdaten:
197 56 496.8 19. Dezember 1997 (19.12.97) DE

(71) Anmelder *(für alle Bestimmungsstaaten ausser US)*: DORMA GMBH & CO. KG [DE/DE]; Breckerfelder Strasse 42–48, D–58256 Ennepetal (DE).

(72) Erfinder; und
(75) Erfinder/Anmelder *(nur für US)*: MOLL, Oliver [DE/DE]; Merscheider Strasse 70, D–42699 Solingen (DE).

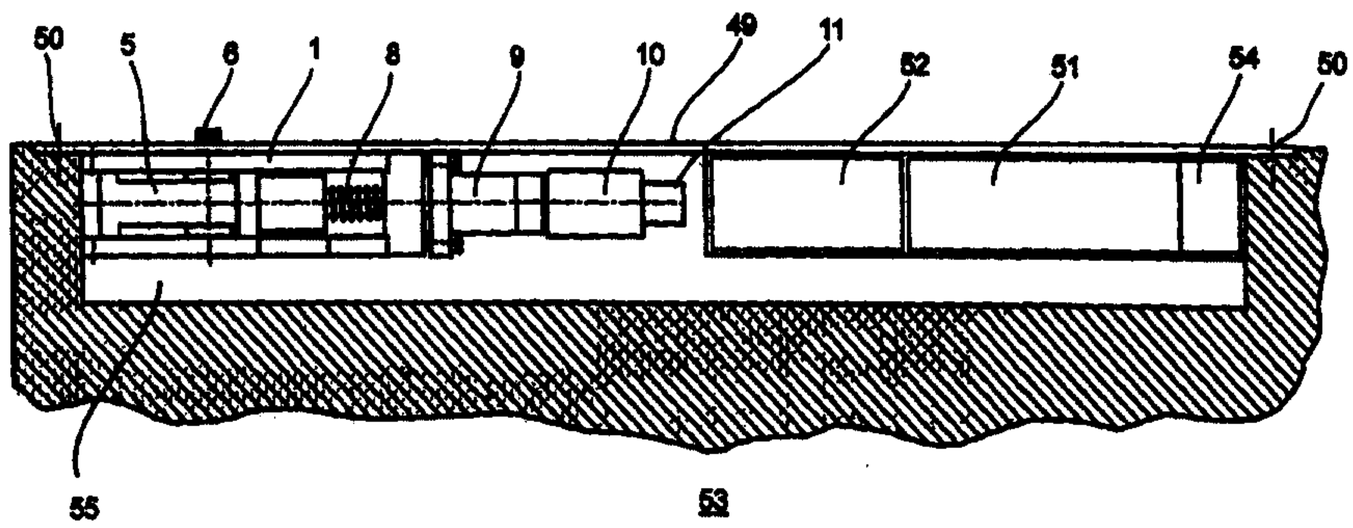
(74) Gemeinsamer Vertreter: DORMA GMBH & CO. KG; Breckerfelder Strasse 42–48, D–58256 Ennepetal (DE).

(81) Bestimmungsstaaten: AU, CA, CN, HU, IN, NO, PL, US, europäisches Patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

Veröffentlicht
Mit internationalem Recherchenbericht.
Vor Ablauf der für Änderungen der Ansprüche zugelassenen Frist; Veröffentlichung wird wiederholt falls Änderungen eintreffen.

(54) Title: REVOLVING DOOR DRIVE MECHANISM

(54) Bezeichnung: DREHTÜRANTRIEB



(57) Abstract

The invention relates to a revolving door drive mechanism with an electronic controlling means containing at least one storage device and one microprocessor. The invention is provided for a door having at least one leaf. The door leaf is comprised of an electromechanical drive unit which operates the opening and closing functions. The drive unit is provided for the connected door (53) and is essentially comprised of a drive motor (10) with a transmission (9) and a load transmitting unit (5–8) connected thereto. The load transmitting unit contains a drive axle (22) which is connected to an end (6) of an actuating lever, and the drive unit is installed inside a door leaf (53) or inside a door frame such that it cannot be seen. The load transmitting unit comprised of a spindle (8) is connected to a spindle nut (7) which partially overlaps said unit. The spindle nut is connected to a rack (5) in a non–positive and positive manner, whereby the drive axle (22) engages with the gearing thereof inside a gearing (23) of the rack.

Title: Drive For A Revolving Door

Description

This invention relates to a concealed drive system for a pivot-hung door with an electronic control and/or regulation system that contains at least one memory and one microprocessor, for an at least single-panel door, the door panel of which is driven by an electro-mechanical drive unit that acts in the opening and closing directions, whereby the drive unit consists essentially of a drive motor with a force transmission unit connected to it, and the force transmission unit has a drive shaft that is connected with one end of an actuator lever, and the entire pivot-hung door drive system is installed in a concealed manner inside a door panel or inside a casing.

The purpose of automatic door drive systems is to make it easier to open and close the doors. Such automatic door drive systems are gaining importance not only in buildings used for public and business purposes, such as, for example, office buildings, hospitals and residential facilities for older people, but automatic door drive systems are also being installed with increasing frequency in homes and apartments that are equipped for access by the physically disabled. For this purpose, the door drive systems are always mounted on the door panel or above the door frame or casing.

DE 42 31 984 A discloses an electro-mechanical pivot-hung door drive system that is equipped with a data processing unit for optimal operation. Connected with the data processing unit is a motor control unit that transmits its output signal to a geared motor. The process of opening such a pivot-hung door is thereby initiated by means of a sensor signal, and is automatically executed by the drive system. Simultaneous with the opening, an energy storage device is supplied with the necessary energy so that such a door can be returned to a secure closed position without the input of additional electrical energy. In the event of a failure of the motor control unit, it is thereby also possible to close the driven door panel securely even in the absence of outside power.

DE 296 04 692 U1 discloses a device for the actuation of a window panel. For this purpose, chain elements are embedded in the panel, and are moved by a worm gear of a motor provided with a gear train.

German Utility Model 295 21 068 describes a drive system for a pivot-hung door installed in emergency escape routes. In this case, a drive system is used that moves only in the direction of opening the pivot-hung door, and thereby simultaneously supplies a power storage mechanism in the form of a spring element with the necessary energy, so that following the opening process, including the potential length of time the pivot-hung door is held open, the door can be properly closed again without additional energy. The entire drive unit is thereby installed in a concealed manner above the pivot-hung door and inside the frame. The pivot-hung door is driven either directly by the drive shaft of the drive system, or by means of an actuator arm inside the profile of the door, which interacts with a sliding piece that can move in a slide rail.

On the drive system there is also a device that makes it possible, by applying a manual force, to uncouple the pivot-hung door from the drive system beyond the closed position. This device is a mechanical coupling that transmits force only in one direction. The coupling thereby consists of a locking pin that is attached positively and non-positively to the drive shaft, and at least one locking notch in the locking pin. Inside the locking notch there is a pin that is spring-loaded and is provided with a continuously adjustable force. The force adjustment capability makes it possible to adjust the release force continuously.

In an additional embodiment, it is also possible that the upper crossbar of the pivot-hung door can be provided with two hook-shaped support arms that are engaged with each other. The support arms are thereby engaged with each other so that the pivot-hung door can also be uncoupled from the drive system only in one direction, namely in the direction of the emergency escape route.

The problem with such door drive systems, however, is that plans for the incorporation of such drive systems must be made as early as during the design of the building, because otherwise it is impossible to have the required passage height.

The object of the invention is to create an automatic drive system that is very small for a pivot-hung door, and the appearance of which does not adversely affect the architectonic appearance of a door. It must also be possible to manufacture such a pivot-hung door drive system economically and to operate it with little or no maintenance.

The invention teaches that this object can be accomplished by the teaching of Claim 1. The subclaims disclose appropriate refinements of the invention.

An additional objective in the design of a compact pivot-hung door drive system was the ability to install the drive system in a concealed manner, which means that the pivot-hung door drive system can be embedded inside a door or casing. Modifications to the building, e.g. holes in the floor or walls, thereby become unnecessary. The prior art discloses door-closers, e.g. the "DORMA ITS 96", that are concealed inside doors or door frames. The torque is introduced into the door by means of a lever that is supported in a sliding rail. As a result of the transmission action of the sliding rail, in combination with this door closer, which has a reciprocating control cam, there is a decreasing opening moment. By means of the realization of the cam profile, it thereby becomes possible to design an almost unrestricted configuration of the torque curve.

To create a simple, economical drive system for a pivot-hung door, the invention uses a toothed rack with gear teeth that have a large modulus that is capable of transmitting the torques that occur on pivot-hung doors of this type. These gear teeth are realized in a toothed rack that has a polygonal cross section, and is preferably mounted non-rotationally between two plates. The toothed rack is thereby connected in a driving connection with a drive shaft that has identical corresponding

gear teeth and is mounted in the cover plates. As a result of the sliding motion of the toothed rack, the stationary drive shaft is rotated, and as a result of the connected lever, in connection with a slide that is movably mounted in a slide rail, that causes the movements of the door. A screw or spindle nut is positively and non-positively connected with the toothed rack for the movement in translation. Inside the screw nut a screw, preferably a recirculating ball screw, is guided on one end, whereby the other end of the screw is held in a mounting. The screw is thereby driven by a drive shaft that extends out of a transmission. The transmission is thereby connected with a drive motor. To detect the position of the connected pivot-hung door, there is a distance sensor on the pivot-hung door drive system, which sensor can preferably be an incremental sensor or a potentiometer. The motor is actuated by a control system that contains a microprocessor and a memory and can be realized in the form of an SPS control (self-programming control) system. The control information is thereby transmitted, for example, in the form of a sensor signal, by a transmitter that is inside the sensor, to a receiver that is embedded inside the control system and thus inside the door panel. The pivot-hung door drive system is preferably equipped with a corresponding battery pack or a storage battery so that it can operate independently or in the absence of external power. In one application of the teaching of the invention, however, it is also possible for the power supply of the control system to be provided by means of corresponding feed lines that are realized in the form of cables and fed with the necessary energy. In such a case, the connection between the sensor and the control can also be realized by a cable, whereby the sensor can also be a switch.

For the sake of completeness, it should also be noted that such pivot-hung door drive systems work in connection with a sliding rail or runner which is also concealed, either in the casing or frame above the door or, if the pivot-hung door drive system is located inside the casing, the sliding rail system can be placed inside the door panel. The connection between the drive shaft and the sliding piece guided in the sliding rail is provided by a lever arm.

If the control is then activated by the sensor signal, the screw rotates and thus causes a forced movement of the toothed rack, which in turn causes a forced movement as a result of the coupling by means of the lever, which is movably mounted on the other end on the slide piece. As a result of the pre-determined opening width, the door remains stopped at the angle determined by the drive system, and the door panel is simultaneously held in this position. This can be accomplished, for example, by using an irreversible transmission. It is also possible, however, with an appropriate regulation of the control system, for the drive motor to hold the door in the open position, and to automatically return it to the closed position after an adjustable length of time, although that entails a higher energy consumption. Using the motor to keep the door open generates a corresponding amount of waste heat, which can result in an increase in the temperature of the motor. It is also possible to generate a holding moment by means of an electromagnetically switched coupling or by means of a brake.

To also be able to operate the door manually, e.g. by disabling the drive system, a corresponding tuning between the motor and transmission is necessary. The friction torque of the motor thereby acts against the movement of the door. However, if the combination of the gear drive and recirculating ball screw are effectively tuned, such a door can also be opened manually without requiring the application of a large amount of force.

The task of the control system in particular is to regulate the motor current or the motor voltage as a function of the position of the door and the demand signal, e.g. the signal from a sensor. In this case, the motor can be short-circuited when the door is closed, thereby making available an additional closing moment. If an opening signal is emitted, the motor current is regulated along the motor moment characteristic. After the specified maximum speed of rotation has been reached, the motor speed is kept constant on the basis of the data from the distance sensor in connection with a programmable sequence of operations which was defined when the door was first opened by a learning program, up to a braking point. When the door decelerates, the motor current must be limited to a lower level

than during acceleration. To close the door, this process is repeated in the reverse direction. When the allowable motor current is increased, e.g. if the door encounters an obstacle, the control system correspondingly deactivates the drive, or moves the door into the reversing position. The limit positions of the door and the deceleration points of the control system are also determined as part of the learning phase.

To make it easy to operate the overall pivot-hung door drive system unit, both the drive unit, which consists in particular of the toothed rack, the screw with the nut, the transmission, motor and distance sensor, and the control system as well as the power supply are fastened to a cover. With such a system, i.e. when all the components of the pivot-hung door drive system lie in a line one behind the other and have been realized in the form of replaceable modules, a pivot-hung door drive system has been created that can be installed invisibly inside doors, frames etc. The pivot-hung door drive system thereby has a maximum installed width of 35 mm.

The invention is explained in greater detail below with reference to one possible exemplary embodiment which is illustrated in the accompanying drawings, in which:

Figure 1 shows a partial section through a door with an installed pivot-hung door drive system,
Figure 2 shows a pivot-hung door drive system in a side view,
Figure 3 shows a pivot-hung door drive system in an overhead view,
Figure 4 shows a pivot-hung door drive system in a side view in a longitudinal and partial section,
Figure 5 shows a pivot-hung door drive system in an overhead view with a partial section through the cover plate,
Figure 6 shows a toothed rack in a head-on view,
Figure 7 shows a toothed rack in a side view,
Figure 8 shows a toothed rack in an overhead view,
Figure 9 shows a drive shaft in a head-on view,

Figure 10 shows a drive shaft in an overhead view.

Figure 1 shows a pivot-hung door drive system which is installed in a door 53 inside a recess 55. In the exemplary embodiment, the door in question is a wooden door. As a result of its intentionally small size, however, the pivot-hung door drive system can also be installed inside the frame of a profile door. It is also possible not to install the pivot-hung door drive system as illustrated in Figure 1 inside a door 53, but in a casing above the door or in the door frame, which locations are not illustrated in the exemplary embodiment. The exemplary embodiment also does not include the attachment of the door 53 by means of belts, nor the actuator arm which can slide back and forth with the sliding rail and its sliding piece located above it, nor the connection between the pivot-hung door drive system (door) and the stationary part, namely the casing. The recess 55 must be sized so that a cover 49 can be flush-mounted inside a depression, whereby both the pivot-hung door drive system and its drive unit, as well as a power supply 52 for a control unit 51 and a signal transmission device in the form of a receiver, if one is used, can be mounted on the cover 49. All the components are arranged in a line, i.e. one behind the other. The overall pivot-hung door drive system is positively and non-positively connected with the door 53 by means of the cover 49 and by means of threaded fasteners 50 that run through the cover 49.

We shall first consider the mechanical part, namely the construction of the pivot-hung door drive system illustrated in Figure 2. The pivot-hung door drive system is an electro-mechanical pivot-hung door drive system which is designed to move the connected door 53 by means of a drive motor 10 which is connected with a transmission 9. Because the pivot-hung door drive system is installed in a concealed manner inside a door panel or inside the casing, the housing that conventionally encloses the pivot-hung door drive can be eliminated. The housing consequently consists of the structural elements from which the drive unit is preferably fabricated. These structure elements are in particular an upper cover plate 1 and a lower cover plate 24, whereby the cover plate 1 is on top in Figure 2

and the cover plate 24 is on the bottom. The cover plates 1 and 24 are kept at a distance from one another on one end by a terminal piece 4 and on the other end by a bearing mount 2. The terminal piece 4 is thereby positively and non-positively held in place by means of threaded fasteners 20 between the cover pates 1 and 24.

The bearing mount 2 is provided by means of a bearing flange 3, to which the transmission 9 with the drive motor 10 is attached by means of threaded fasteners 19 that run through both the bearing flange 3 and also the bearing mount 2, and are screwed into corresponding threaded holes in the cover plates 1, 24. The The device for the movement of the pivot-hung door drive system in translation thereby consists essentially of a toothed rack 5, a screw nut 7 and a screw 8 that is engaged inside the screw nut.

The toothed rack 5 is thereby prevented from rotating by recesses 25 and 26 that are located in the cover plate 1 and by recesses 34 and 35 that are located in the cover plate 24, in each of which the toothed rack 5 is mounted in molded guide lugs 27, 28 and 32, 33 in the longitudinal direction of the pivot-hung door drive system (See Figures 3 and 4 in particular). Effectively connected to the toothed rack 5 is an output shaft 22 that projects with one end out of the cover plate 1 and has an actuator cam 6, to which the above-mentioned connection for the sliding rail (not shown) is made by means of the actuator arm The connection between the actuator arm and the actuator cam is thereby secured against rotation by means of a threaded fastener that is screwed inside a threaded boring 47.

The toothed rack 5 thus slides with the surfaces 40, 41, 42, 43 located in the vicinity of the guide lugs 27, 28 and 32, 33 between the cover plates 1 and 24. The toothed rack 5 is illustrated in particular in figures 6, 7 and 8, which show individual views of the toothed rack 5. In the middle area of the toothed rack 5 there is a penetration 39 that has gear teeth 23 on one side. The toothed rack 5 also tapers when

viewed in the horizontal axis, namely in the form of recesses 37 and 38. On one of the end walls of the toothed rack 5 there is a screw nut locator 44 that is configured so that the screw nut 7 in this case can be connected positively and non-positively. This connection can be achieved, for example, by means of a thread 36. it is also possible, however, to manufacture the screw nut 7 and the toothed rack 5 in the form of a single piece.

Corresponding gear teeth 56 that have the same modulus and are located on the drive shaft are engaged with the gear teeth 23. This situation is illustrated in Figures 9 and 10. So that the drive shaft 22 can also be guided securely inside the cover plates 1 and 24, there are bearing surfaces 45, 46 on the drive shaft 22.

Figure 4 shows a detailed illustration of the pivot-hung door drive system, in which the pivot-hung door drive system is shown in a side view. Selected areas are also shown in detail in a partial cross section. This figure shows particularly clearly the connection between the screw nut 7 and the toothed rack 5, whereby in this case, the connection selected was by means of the thread 36 on an extension 29 molded onto the screw nut 7. The screw 8 is engaged inside the screw nut 7, which screw 8 can preferably be a recirculating ball screw, to keep the friction losses as low as possible. The end of the screw 8 that does not penetrate the screw nut 7 is held in the bearing mount 2 by means of a bearing extension 13 inside a screw bearing 17. On the bearing extension 13, in the illustrated exemplary embodiment, there is an external thread, on which a screw washer 18 is screwed. This connection can also be in the form of other suitable securing means. Between the bearing mount 2 and the bearing flange 3 there is also a bearing mount 14 for compensation or equalization. The bearing mount 3 and the bearing mount 14 are held by the threaded fasteners 19 that run through them and are engaged inside the cover plates 1 and 24.

Inside the bearing flange 3, the transmission 9 is attached by means of threaded fasteners 21. The transmission 9 thereby has

a drive shaft 15 which in the illustrated exemplary embodiment is inserted inside the bearing neck 13, in this case by means of a square, and thus the screw 8 also rotates when the drive shaft 15 is rotated. Alternatively, however, any other detachable positive and non-positive connection, in particular in the form of a tongue-and-groove connection, can also be used.

The drive shaft 22, as also shown in Figure 4, is guided inside the cover plates 1 and 24 by means of bearings 16. The bearings 16 are thereby located in blind borings 30. With the actuator cam 6, the drive shaft 22 projects out of the cover plate 1. This design ensures that the pivot-hung door drive system can be used both for DIN doors that open to the right and to the left.

If the drive motor is activated by means of the control system 51 in response to a sensor signal, then as a result of the rotation of the motor shaft and the connection via the transmission 9, the screw 8 is set in rotation. The screw nut 7 and thus also the toothed rack 5 in the exemplary embodiments illustrated in Figures 1, 2, 4 and 5 is pulled to the right, which simultaneously means that the drive shaft 22, because it is stationary, rotates and thus ensures an opening as a result of the connection (not shown) between the door panel 53 and the casing. At the same time, however, the angle of rotation of the door panel 53 is measured by a distance sensor 11. It is thereby ensured that the control system 51 is at all times aware of the opening angle of the door 53. Thus the control system 51 is able, after the door has been opened a specified width, to reduce its speed of rotation, and to stop the door 53 when it reaches a specified opening angle. So that the pivot-hung door drive can also operate independently in the event of a power failure, and as in the exemplary embodiment illustrated in Figure 1, a power supply 52 in the form of a storage battery is used to keep the door in operation. If such a door is located in heavily traveled entrances, however, the capacity of a storage battery would not be sufficient, and in this case it is possible to provide the power supply with the operating energy required for the control system 51 and thus the drive motor 10 by means of cables.

When cables are used, the sensor can also be connected by cables, which means that the receiver 54 can be eliminated.

The connected door 53 is damped electrically. Because both the electro-mechanical drive system and the power supply and control system are installed inside the door 53 or the casing, no holes in the wall or the floor are required for installation. The pivot-hung door drive system can also be used for retrofitting existing buildings, because it can also be installed in existing doors, including profile frame doors, in which case it represents an attractive alternative to new doors, in particular for older people, as well as for the physically disabled.

Nomenclature

1 Cover plate
2 Bearing mount
3 Bearing flange
4 Terminal piece
5 Toothed rack
6 Actuator cam
7 Screw nut
8 Screw
9 Transmission
10 Drive motor
11 Distance sensor
13 Bearing extension
14 Bearing mount
15 Drive shaft
16 Bearing
17 Screw bearing
18 Screw washer
19 Threaded fastener
20 Threaded fastener
21 Threaded fastener
22 Drive shaft
23 Gear teeth
24 Cover plate
25 Recess
26 Recess
27 Guide lug
28 Guide lug
29 Extension (Screw nut)
30 Blind boring
32 Guide lug
33 Guide lug
34 Recess
35 Recess
36 Thread

37 Recess
38 Recess
39 Penetration
40 Surface
41 Surface
42 Surface
43 Surface
44 Screw nut locator
45 Bearing surface
46 Bearing surface
47 Threaded boring
48 Thread
49 Cover
50 Threaded fasteners
51 Control system
52 Power supply
53 Door
54 Receiver
55 Recess
56 Gear teeth

Claims

1. Pivot-hung door drive system with an electronic control system that contains at least one memory and one microprocessor, for an at least single-panel door, the door panel of which is driven by an electro-mechanical drive unit that acts in the opening and closing directions, whereby the drive unit consists essentially of a drive motor (10) with a transmission (9) and a power transmission unit for the door connected to it, whereby the power transmission unit consists of a screw (8) with a screw nut (7) that partly surrounds the screw, which screw nut (7) is positively and non-positively connected with a toothed rack (5) and a drive shaft (22) is engaged with its gear teeth (56) in gear teeth (23) of the toothed rack (5), and the drive shaft (22) is connected with one end of an actuator lever and the pivot-hung door drive system is installed inside a door panel or inside a door frame or casing.

2. Pivot-hung door drive system as claimed in Claim 1, characterized by the fact that the toothed rack (5) is secured to prevent it from rotating.

3. Pivot-hung door drive system as claimed in Claim 2, characterized by the fact that the toothed rack (5) is non- rotationally secured by guide lugs (27, 28, 32, 33) that are located on the toothed rack (5), whereby these lugs are engaged in recesses (25, 26, 34, 35) that are located on the plates (1, 24).

4. Pivot-hung door drive system as claimed in one or more of the preceding claims, characterized by the fact that the cover plates (1, 24) are separated on one end by a terminal piece (4) and on the other end by a bearing mount (2), and the toothed rack (5), the screw nut (7) with the screw (8) mounted in it on one end are located between the cover plates (1, 24), and the screw (8) is mounted on the other end in the bearing mount (2).

5. Pivot-hung door drive system as claimed in one or more of the preceding claims, characterized by the fact that positively and non-positively attached to the bearing mount (2) is a bearing flange (3), to which the drive motor (10) is fastened with a transmission (9) and a distance sensor (11).

6. Pivot-hung door drive system as claimed in Claims 1 and 4, characterized by the fact that the transmission (9) is not irreversible (self-locking?).

7. Pivot-hung door drive system as claimed in Claim 5, characterized by the fact that the distance sensor (11) is an incremental sensor.

8. Pivot-hung door drive system as claimed in Claim 4, characterized by the fact that the screw (8) is a recirculating ball screw.

9. Pivot-hung door drive system as claimed in Claims 1, 4, 5 and 8, characterized by the fact that the screw (8) has a locator for a drive shaft (15) of the transmission (9).

10. Pivot-hung door drive system as claimed in the preceding claims, characterized by the fact that the pivot-hung door drive system has a maximum width of 35 mm.

11. Pivot-hung door drive system as claimed in Claim 1, characterized by the fact that the actuator lever is connected with its second end with a sliding block, which can move in a sliding rail, along the sliding rail, installed inside the door or inside the door frame or casing.

12. Pivot-hung door drive system as claimed in Claim 1, characterized by the fact that the screw nut (7) and the toothed rack (5) are one piece.

13. Pivot-hung door drive system as claimed in Claims 1, 4, 5 and 8, characterized by the fact the control system (51) has an independent power supply (52).

14. Pivot-hung door drive system as claimed in Claim 13, characterized by the fact that the power supply (52) is a storage battery.

15. Pivot-hung door drive system as claimed in Claim 1, characterized by the fact the control system (51) contains a receiver (54).

16. Pivot-hung door drive system as claimed in Claim 1, characterized by the fact that the control system (51) is an SPS control system.

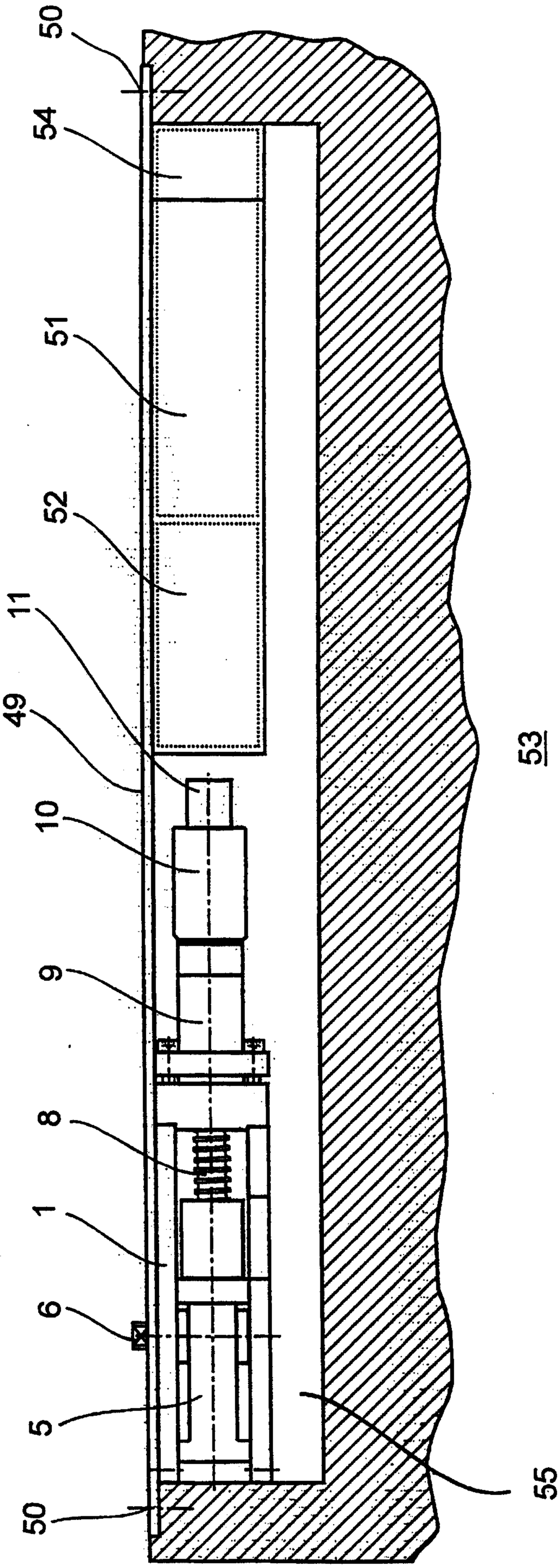


Fig.1

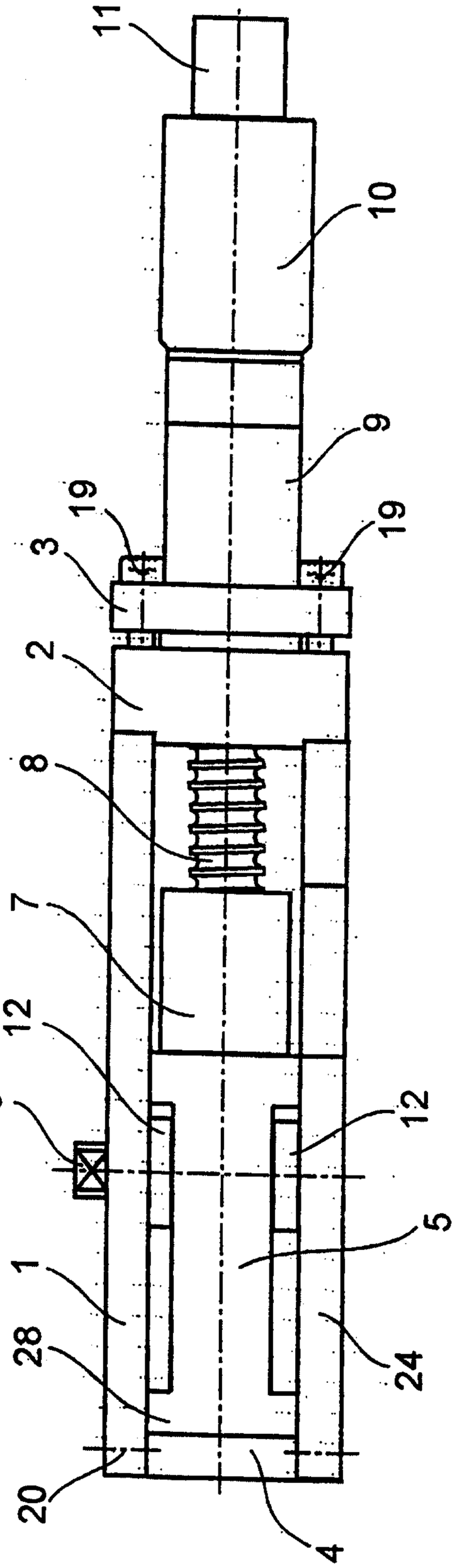

11
10
9
19
19
3
2
8
7
12
6
12
5
1
28
20
24
4

Fig 2

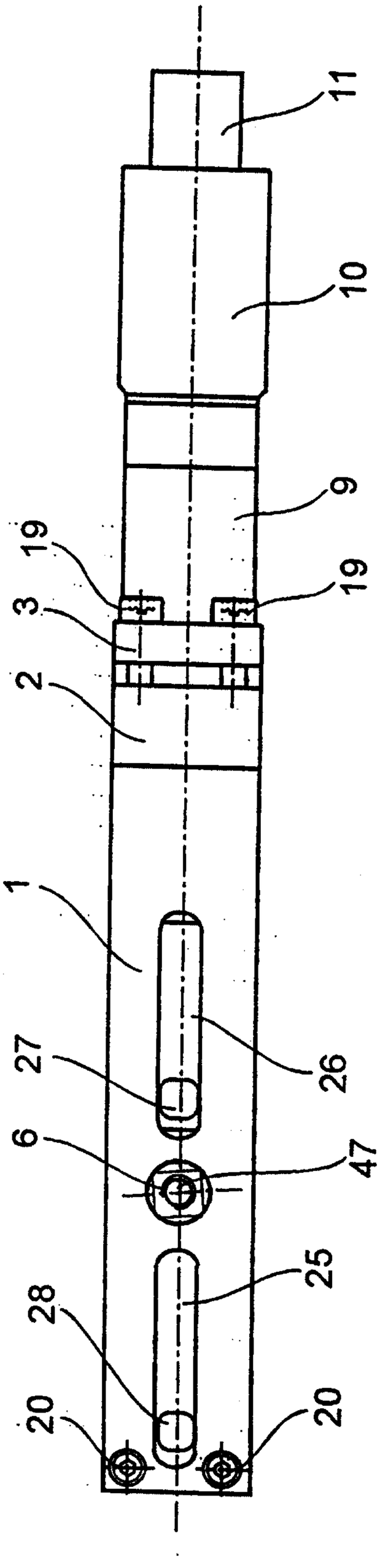

11
10
9
19
19
3
2
1
27
26
6
47
28
25
20
20

Fig 3

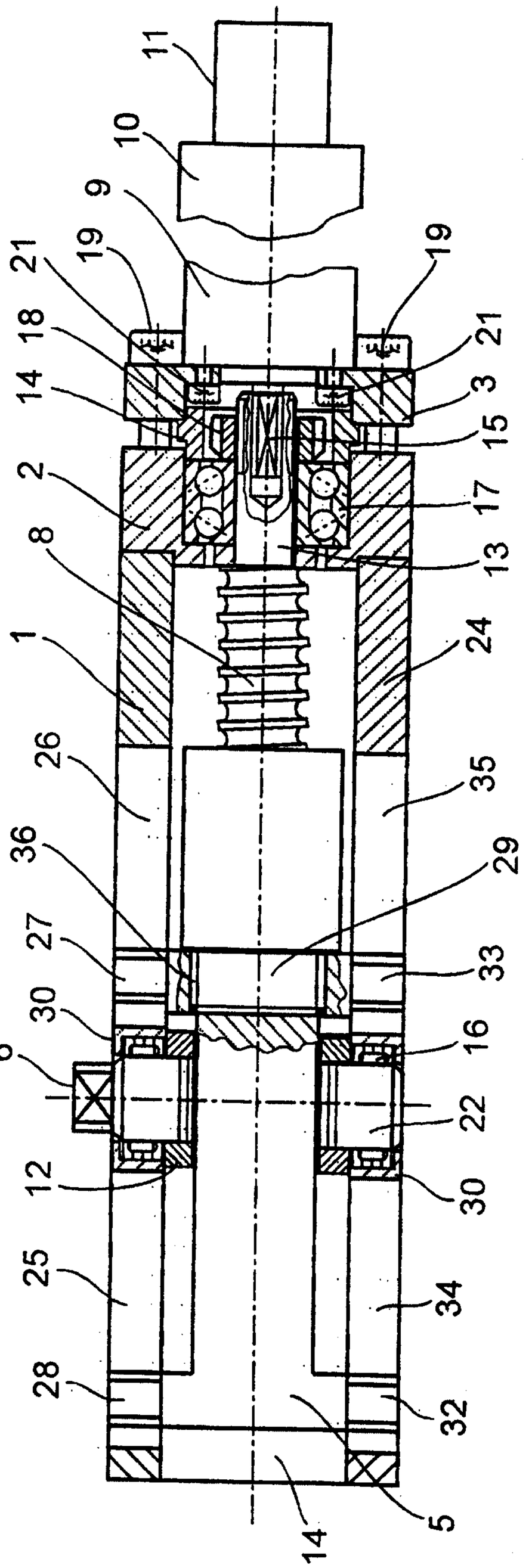

11
10
9
19
19
21
18
14
21
3
15
2
17
8
13
1
24
26
35
36
29
27
33
30
16
6
22
12
30
25
34
28
32
14
5

Fig 4

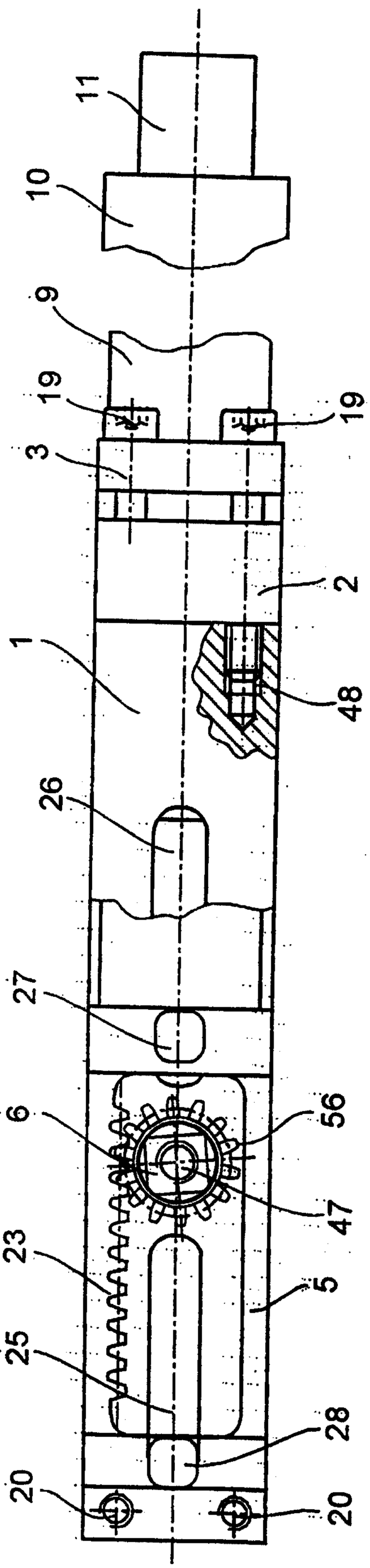


Fig 5

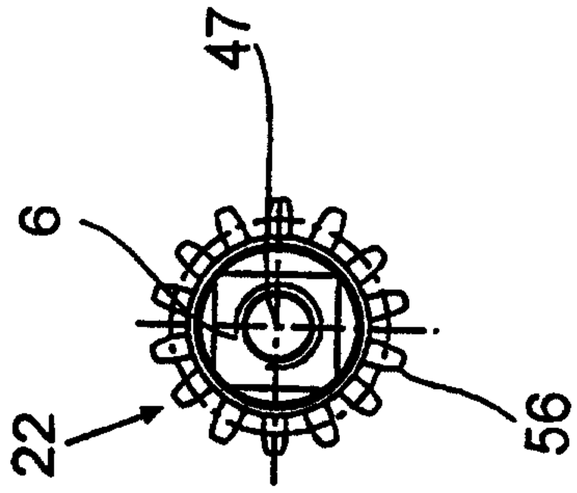


Fig 10

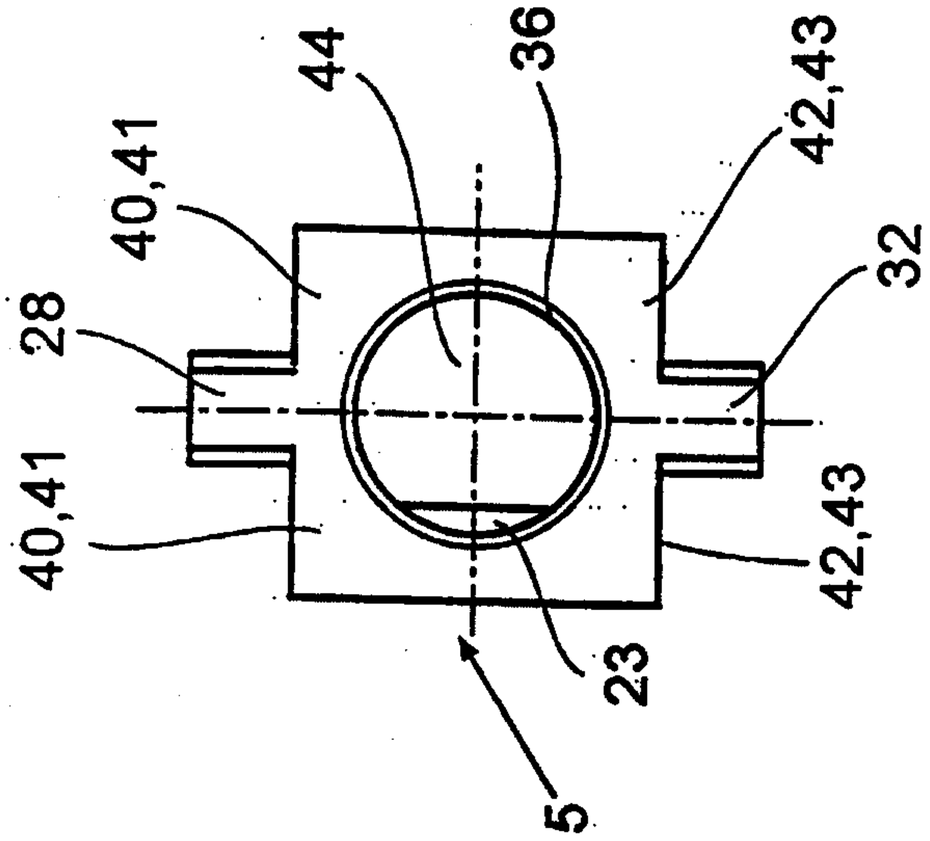


Fig 7

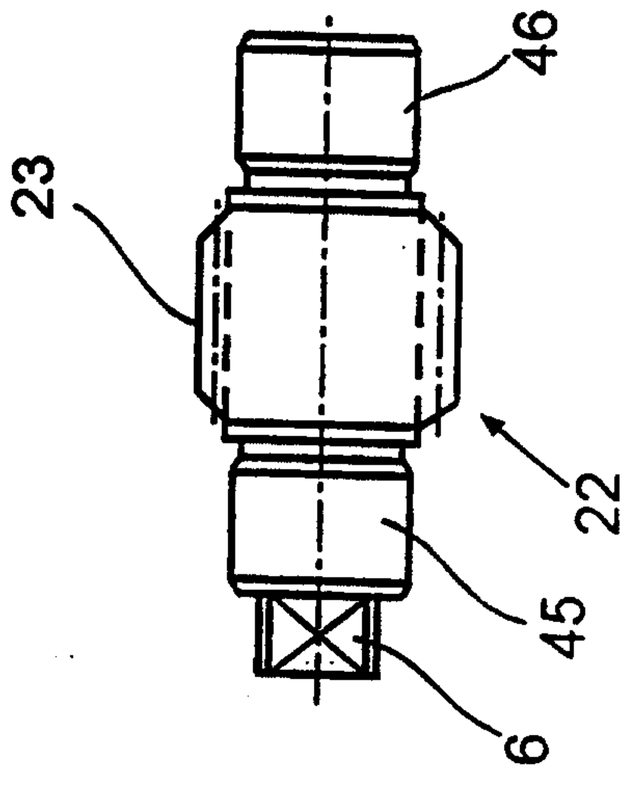


Fig 9

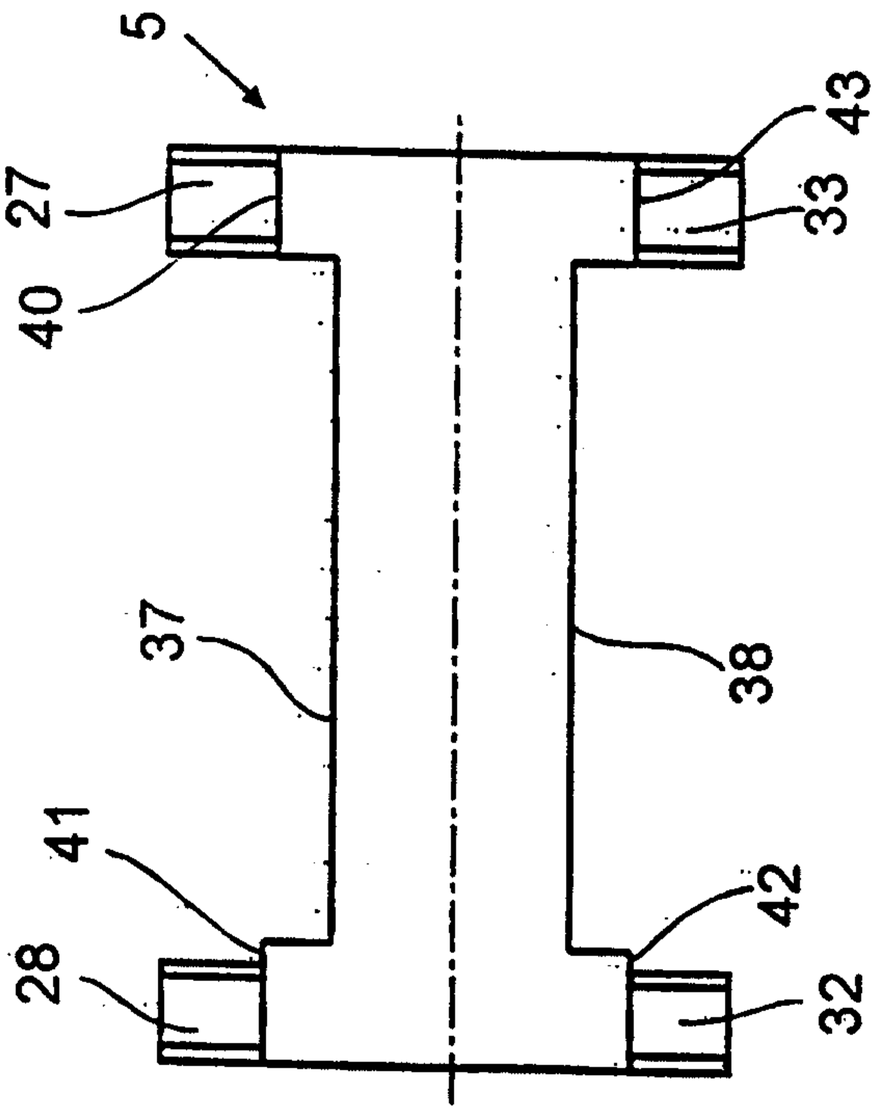


Fig 6

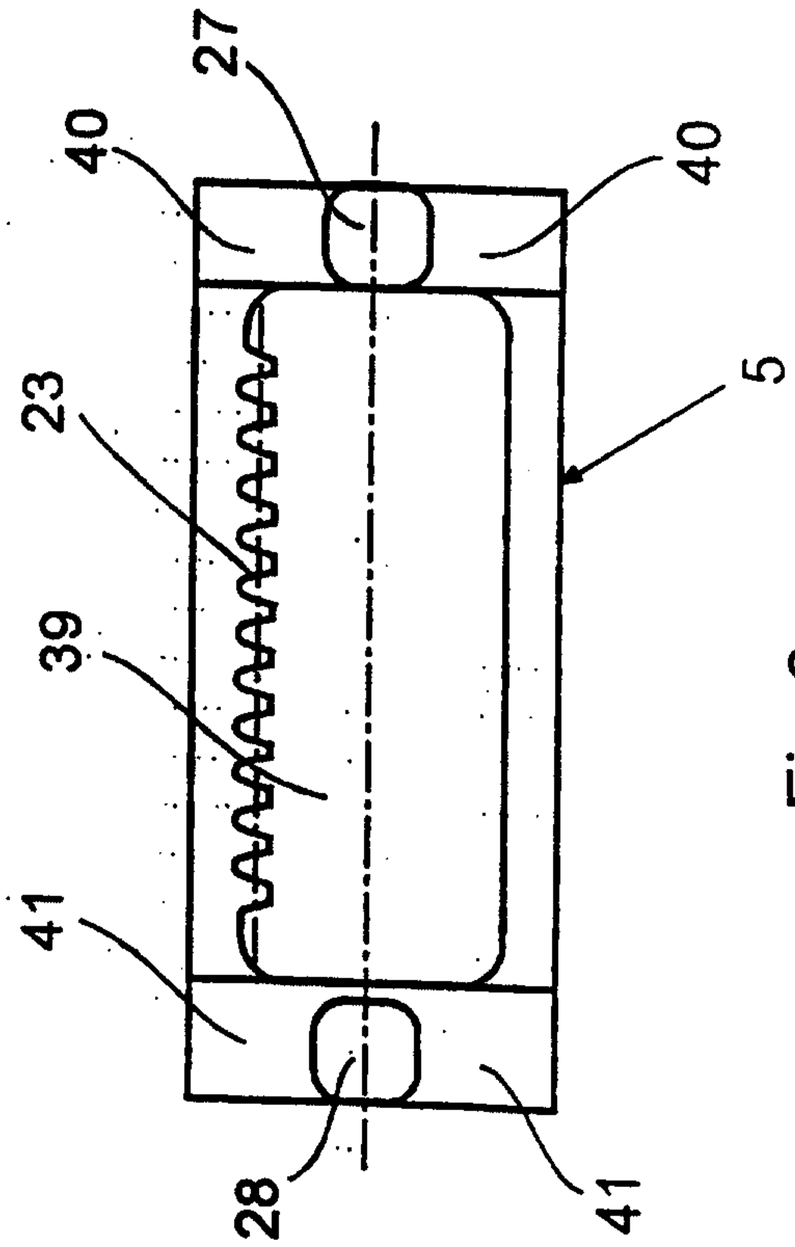


Fig 8