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(54) **Locking device of the articulated lever type**

Spanneinrichtung mit einem Gelenkhebel

Dispositif de serrage à leviers articulés

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Description

[0001] The present invention refers to a locking device of the articulated lever type provided with a clamping arm which can swing in order to allow to clamp workpieces with respect to the body of the device.

[0002] A control unit for controlling the angular end-of-stroke positions of the clamping arm of such a device is known from EP-803 331. This document discloses a support member for supporting a pair of sensors, typically micro-switches for example of the inductive or pneumatic type, which are removably associated to the support member in order to allow the adjustment of their mutual distance, which sensors are intended to sense the passing close to them of an appendage extending from a rod which controls the movement of the arm. The angular end-of-stroke positions of the clamping arm can be adjusted by changing the respective position of the sensors on the support member. The support member to which the sensors are associated, can be inserted in a long and narrow slot extending longitudinally at the rear zone of the body of the device, in order to close sealingly the slot with the aim to prevent penetration inside the body of extraneous elements coming from the external environment.

[0003] This solution has however some disadvantages. In fact, it is necessary to remove the support member from the body of the device and to move manually the sensors in order to adjust the respective position of the sensors. This operation involves a high risk both to damage the sensors, which are very delicate and expensive, and to interfere with the wirings associated to them, and therefore to cause a malfunction of the sensors. On the other hand, the removal of the support member from its seat exposes the inside of the device to a risk of contamination by the external environment, and the consecutive steps of removal and reinsertion of the support member in its seat may reduce the effectiveness of the sealing of the member with respect to the edges of the slot.

[0004] A locking device of the articulated lever type as per the preamble of claim 1 is known from DE-202 03 790 U1, in which the control rod has a pair of reference means aligned along the axial direction, that move together with the control rod as a result of its sliding movement. A pair of sensors are fixed to the body of the device along an axial direction for sensing the passage of the reference means close to them, in order to stop the movement of the rod when it reaches respective preset end-of-stroke positions.

[0005] In order to overcome the disadvantages of the prior art,

[0006] the subject of the invention is a locking device having the features indicated in the claim 1.

[0007] In particular, the locking device of the invention, in addition to have a simple and reliable structure, allows to adjust the end-of-stroke positions of the clamping arm without any need to remove the sensor support member, so that the sensors are not exposed to any risk of dam-

aging and no effect is produced on the sealing exerted by the support member with respect to the edges of the opening of the body in which it is inserted, which makes therefore the adjusting operation of the end-of-stroke of the swing of the arm at the same time much faster and simple. Moreover, the opening in correspondence of which the support member is arranged does not have an elongated shape such as to affect a large zone of a face of the body of the device, but can have a more compact shape the extension of which is considerably smaller than that of the entire support member, so that the influence of the opening on the design requirements of the body of the device is reduced.

[0008] Further characteristics and advantages of the invention will become more clearly evident from the reading of the detailed description which follows, given purely by way of a non limiting example and referred to the attached drawings, in which:

figure 1 is a side elevational view of a locking device, provided with a control unit, according to the invention,

figure 2 is a side elevational view of the device of the figure 1 in the open condition,

figure 3 is an enlarged perspective view of a portion of the device of figure 2,

figure 4 is a side elevational view similar to figure 2, in which the clamping arm is in the closing position of the device,

figure 5 is an enlarged view similar to figure 4, pointing out a step of the insertion of the support member of the control unit into the body of the device,

figure 6 is an enlarged perspective view of the support member indicated by arrow VI in figure 5,

figure 7 is an enlarged perspective and exploded view of a portion of the control unit indicated by arrow VII in figure 5,

figure 8 is a view similar to figure 4 showing a different adjustment condition of the control unit,

figure 9 is a partial perspective and enlarged view of the device of figure 8 from the direction indicated by arrow IX, and

figure 10 is a rear elevational view sectioned along line X-X of figure 9, in which the body of the device has been removed.

[0009] With initial reference to figures 1 to 7, a locking device of the articulated lever type, which can be used for clamping workpieces, is indicated 1 as a whole. A

generally fork shaped clamping arm 12 is associated to the body 2 of device 1 and is fastened to the square sectioned ends of a shaft 16 by means of U-shaped locking members 14. The arm 12 can swing between a preset opening position (one of which is shown by solid lines in figure 1) and a closing position (shown by dashed lines in the same figure).

[0010] The shaft 16 is provided centrally by a radial control appendage 18 (figure 3) having the function of a crank, which is connected by means of an articulation pin to a pair of connecting rods 23 which are in turn connected to the end of a control rod 20 slidably guided inside the body 2, by means of another articulation pin engaging a hole 20a. The articulated joint serving to connect the shaft 16 with the rod 20, which comprises the pair of connecting the rods 23 and the control appendage 18, forms an articulated toggle joint of the device 1, of a type per se known and indicated as a whole by the reference numeral 22.

[0011] The sliding of the rod 20 is usually controlled by automatic drive means which, in the most common case, comprise a fluid-driven double acting cylinder 4, typically pneumatic, which is fixed at the bottom of the body 2.

[0012] Inside the body 2, which is formed by two symmetrical half-shells coupled to each other, a coaxial sleeve 28 is slidably mounted outside the rod 20. A pin-shaped appendage 32 extends from the sleeve 28 towards a rear wall 3 of the body 2, transversely to the axis of the sleeve 28. Preferably, the pin 32 is removably mounted on the sleeve 28, for example by means of a threaded connection, allowing therefore to modify the extension of its portion projecting from the sleeve itself.

[0013] On a side of the sleeve 28 an axial through slit 30 is provided, in which another appendage 34 connected to the rod 20 and also having the shape of a pin, is guided. The pin 34, which is parallel to the pin 32, is preferably mounted radially and removably on the rod 20, for example by means of a threaded connection, in order to allow to change its extension with respect to the rod 20.

[0014] The sleeve 28 is provided with fastening means adapted to fasten it selectively in a plurality of positions axially spaced along the rod 20. These fastening means preferably comprise a pair of threaded through holes 36, transverse to the axis of the sleeve 28 and formed at diametrically opposite zones with respect to the rod 20. A locking dowel screw 38, having an end provided with a hexagonal hollow seat 38a, can be engaged in each one of the holes 36. The seat 38a is intended to be engaged by a corresponding control wrench (not shown in the figures) which can be inserted through an opening 52 of each half-shell forming the body 2, in order to selectively fasten the sleeve 28 in one of a plurality of axial positions along the rod 20, for the purposes which will be explained in greater detail in the following. Conveniently, the openings 52 are closed by means of easy removable plugs (not shown), for example of plastic material, which can be inserted by pressure.

[0015] Respective axial rows of seats are formed on diametrically opposite sides of the rod 20, each seat being constituted by a blind hole 40 which can be engaged by the end of the dowel screw 38 opposite to its hexagonal seat 38a, the holes 40 on a side of the rod 20 being axially offset with respect to the holes 40 of the opposite side. In particular, the consecutive holes 40 formed both on a side and on the opposite side of the rod 20 are axially spaced of a constant pitch, for example corresponding to a rotation of 10° of the clamping arm 12.

[0016] A support member, indicated as a whole with the reference numeral 5, is associated to the body 2 of the device 1. The support member supports a pair of fixed sensors 48, 50, typically consisting of microswitches for example of the inductive, magnetic or pneumatic type, which are adapted to sense the passage in their proximity of the pins 32 and 34 as a result of the sliding of the rod 20 and the sleeve 28, in order to control the stopping of the axial sliding of the rod 20 when it reaches the end-of-stroke positions corresponding to the preset angular end-of-stroke positions of the arm 12. The member 5 can be fixed to the body 2 at a rectangular opening 5a formed in a rear wall 3 of the body 2 of the device 1.

[0017] In particular, the sensors 48 and 50 are rigidly connected to a substantially L-shaped support post 46. The end of the less extended branch of the post 46 is fixed to a cover plate 42 having a shape corresponding to that of the opening 5a and intended to close sealingly such an opening in the assembled condition of the member 5. The plate 42 supports a case 42a containing the electronic control elements of the sensors 48 and 50 and, usually, a series of external LEDs for the visual signaling of their operative condition. An electrical connector extends from the case 42a, provided with wirings 7 to transmit pulses for controlling the operation of the cylinder 4 as a result of the operative condition of the sensors 48, 50. The plate is usually provided with holes 44 adapted to be engaged by locking screws (not shown) in order to allow the fixing of the plate 42 to the body 2.

[0018] The sensors 48 and 50 are arranged on the post 46 according to positions outset sideways to each other, so that they face the directions of the axial movement of the free ends of the respective pins 32 and 36 following to the sliding of the rod 20 inside the body 2.

[0019] Preferably, the extension of the cover plate 42 in the axial direction of the rod 20 is considerably smaller of the extension of the entire support member 5, and therefore the opening 5a of the body 2 can be kept small and not much extended axially so as to affect only a small portion of the rear wall 3 of the body 2.

[0020] In order to couple the support member 5 together with the respective sensors 48 and 50 to the body 2, as shown in figure 5, the end of the post 46 opposite to the plate 42 is initially introduced in the opening 5a and, by applying a small rotation to the member 5, the post 46 is brought into a position adjacent to the wall 3 which separates it from the external environment, and the plate 42 is simultaneously arranged at the edge of the opening

5a so as to close it sealingly.

[0021] In the operation of equipment 1, when the arm 12 is in the open position (figures 2 and 3) the pin 34 projecting from the sleeve 28 faces the sensor 50. In this condition, the sensor 50 generates a control signal for stopping and/or switching the operation of the cylinder 4. When the cylinder 4 starts again its operation so as to control the sliding of the rod 20 in order to cause the closing of the arm 12, the pin 32 reaches a position facing the sensor 48 as a result of this sliding, in which the sensor 48 sense the passage of the pin 32 and generates a new signal for stopping and/or switching the operation of the cylinder 4.

[0022] When it is necessary to modify the excursion of the angular swing of the arm 12, for example in order to adapt the device 1 to a different operative condition, it is sufficient to remove the locking dowel screw 38 from the sleeve 20, acting through one of the openings 52 of the body 2, to bring the arm 12 in the new opening position and to cause the sleeve 28 to slide along the rod 20 until it abuts against the bottom of the body 2 at the side of the cylinder 4. In this position, the transverse holes 36 of the sleeve 28 are aligned with the openings 52 of the half-shells of the body 2. It is therefore possible to introduce the locking dowel screw 38 in the hole 36 which is aligned also with one of the holes 40 of the rod 20, and to act so as to rotate it by means of the control wrench until the sleeve 28 is fastened to the rod 20 in the newly reached position. In this new adjustment condition, as more clearly shown in figures 8 to 10, the position of the pin 32 will remain unchanged, therefore allowing to control through the sensor 48 the attainment of the closing position of the arm 12, as before, while the position of the pin 34 which has been changed with respect to the rod 20 will allow to sense the new opening position of the arm 12 when the pin 34 will pass close to the sensor 50.

Claims

1. Locking device of the articulated lever type including a control unit for controlling the angular end-of-stroke positions of a clamping arm, said arm (12) being fastened on a shaft (16) rotatably mounted about an axis of rotation and being controlled into rotation through an articulated toggle joint unit (22) as a result of the axial sliding of a control rod (20) with respect to the body (2) of the device (1), the control unit comprising a member (5) for supporting a pair of sensors (48, 50) adapted to sense the passage close to them of reference means (32, 34) connected to the control rod (20), with the aim of controlling the stop of the axial sliding of the rod (20) in its directions of sliding when it reaches respective preset angular end-of-stroke positions of the arm (12), the support member (5) being adapted to be fixed to the body (2) of the device at an opening (5a) formed in the rear zone (3) of the device (1), wherein said sensors (48, 50)

are rigidly connected to the support member (5) and the reference means comprise a pair of appendages (32, 34) that are axially separated and connected to the rod (20), at least (34) one of the appendages (32, 34) being associated to adjustable fastening means (28, 36, 38, 40) in order to allow to fasten it in one of a plurality of positions along the control rod (20), **characterized in that** said sensors (48, 50) are arranged according to positions offset sideways to each other, and **in that** each of said appendages (32, 34) is arranged in such a manner as to move along a direction of movement facing the respective sensor (48, 50), as a result of the sliding of the rod (20).

2. Locking device according to claim 1, **characterized in that** said appendages are removable pins (32, 34) associated with the rod (20), each of which has a free end directed in the direction of the respective sensor (48, 50).

3. Locking device according to claim 1 or 2, **characterized in that** said pair of appendages comprises a first appendage (32) extending from the rod (20) and a second appendage (34) extending from a sleeve (28), which sleeve (28) is arranged coaxially outside the rod (20) and slidably with respect to it, has an axial slit (30) adapted to be crossed by the first appendage (32) and comprises fastening means (36, 38) for selectively fastening it in one of a plurality of axial positions with respect to the rod (20).

4. Locking device according to claim 3, **characterized in that** said fastening means for fastening the sleeve include a counter member (38) which can be moved transverse to the rod (20) and which has an end intended to engage selectively one of a plurality of seats (40) formed in the rod (20).

5. Locking device according to claim 4, **characterized in that** said fastening means for fastening the sleeve (28) comprise a counter member (38) which can be arranged at opposite sides of the sleeve (28) with respect to the rod (20), and **in that** the rod (20) has respective series of seats (40) at positions corresponding to those in which the counter member (38) may be arranged on the sleeve (28), each seat (40) being selectively engageable by an end of the counter member (38), the seats (40) of each of said series of seats (40) being axially offset along the rod (20) with respect to the seats (40) the other series of seats (40).

6. Locking device according to claim 4 or 5, **characterized in that** the counter member (38) can be controlled from the outside of the body (2) of the device (1) through a respective side opening (52) of the body (2).

7. Locking device according to claim 6, **characterized in that** the counter member is a locking dowel screw (38) adapted to engage a corresponding through threaded hole (36) formed transversely in the sleeve (28) and having an hexagonal hollow seat (38a) at its end opposite to the rod (20), for the engagement by a corresponding control wrench which can be inserted through a respective slit (52) of the body (2).
8. Locking device according to any one of claims 1 to 7, **characterized in that** the support member (5) for supporting the sensors (48, 50) includes a cover plate (42) intended to close sealingly said opening (5a) formed in the rear zone (3) of the body (2) of the device (1), and **in that** a post (46) for supporting the sensors (48, 50) extends from the cover plate (42).
9. Locking device according to claim 8, **characterized in that** the support post (46) is substantially L-shaped.
10. Locking device according to claim 8 or 9, **characterized in that** the extension of the cover plate (42) in the axial direction of the rod (20) is considerably smaller than the extension of the support member (5), and **in that** the connection of the support member (5) with the body (2) of the device (1) comprises a first step in which the post (46) is inserted into the opening (5a) of the rear zone (3) of the body (2) of the device (1), and a second step in which the support member (5) is subject to a rotation until the cover plate (42) reaches a position in which it sealingly closes the opening (5a).

Patentansprüche

1. Spannvorrichtung vom Gelenkhebel-Typ, enthaltend eine Steuereinheit zum Steuern der Hubende-Winkelpositionen eines Spannarms, wobei der Arm (12) an einem Schaft (16) befestigt ist, welcher um eine Drehachse drehbar montiert ist, und durch eine bewegliche Gelenkhebeleinheit (22) in eine Drehung gesteuert wird als Ergebnis des axialen Gleitens einer Steuerstange (20) in Bezug zum Körper (2) der Vorrichtung (1), wobei die Steuereinheit ein Element (5) zum Tragen eines Paares von Sensoren (48, 50) enthält, welche dazu ausgelegt sind, das nah an ihnen erfolgende Passieren von mit der Steuerstange (20) verbundenen Referenzvorrichtungen (32, 34) zu erkennen, mit dem Ziel, das Stoppen des axialen Gleitens der Stange (20) in ihre Gleitrichtungen zu steuern, wenn sie entsprechende vorgegebene Hubende-Winkelpositionen des Arms (12) erreicht, wobei das Trägerelement (5) dazu ausgelegt ist, am Körper (2) der Vorrichtung an einer im hinteren Bereich (3) der Vorrichtung (1) ausgebildeten Öffnung

(5a) fixiert zu werden, wobei die Sensoren (48, 50) starr mit dem Trägerelement (5) verbunden sind und die Referenzvorrichtungen ein Paar von Fortsätzen (32, 34) enthalten, die axial getrennt und mit der Stange (20) verbunden sind, wobei wenigstens (34) einer der Fortsätze (32, 34) mit einer einstellbaren Befestigungsvorrichtung (28, 36, 38, 40) verbunden ist, um ihn in einer von einer Vielzahl von Positionen entlang der Steuerstange (20) befestigen zu können, **dadurch gekennzeichnet, dass** die Sensoren (48, 50) entsprechend seitlich gegeneinander versetzten Positionen angeordnet sind, und dass jeder der Fortsätze (32, 34) derart angeordnet ist, dass er sich als Ergebnis des Gleitens der Stange (20) entlang einer dem jeweiligen Sensor (48, 50) zugewandten Bewegungsrichtung bewegt.

2. Spannvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Fortsätze mit der Stange (20) verbundene entfernbare Stifte (32, 34) sind, von welchen jeder ein freies Ende hat, das in die Richtung des jeweiligen Sensors (48, 50) gerichtet ist.
3. Spannvorrichtung nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** das Paar von Fortsätzen einen sich von der Stange (20) erstreckenden ersten Fortsatz (32) und sich einen von einer Hülse (28) erstreckenden zweiten Fortsatz (34) umfasst, wobei die Hülse (28) coaxial außerhalb der Stange (20) und in Bezug zu dieser verschiebbar angeordnet ist, einen axialen Schlitz (30) hat, der dazu ausgelegt ist, vom ersten Fortsatz (32) durchlaufen zu werden und eine Befestigungsvorrichtung (36, 38) enthält, um sie selektiv in einer von einer Vielzahl von axialen Positionen in Bezug zur Stange (20) befestigen zu können.
4. Spannvorrichtung nach Anspruch 3, **dadurch gekennzeichnet, dass** die Befestigungsvorrichtung zur Befestigung der Hülse ein Gegenstück (38) enthält, das quer zur Stange (20) bewegt werden kann und das ein Ende hat, das dazu ausgelegt ist, selektiv in einen von einer Vielzahl von in der Stange (20) ausgebildeten Sitzen (40) einzugreifen.
5. Spannvorrichtung nach Anspruch 4, **dadurch gekennzeichnet, dass** die Befestigungsvorrichtung zur Befestigung der Hülse (28) ein Gegenstück (38) enthält, das an entgegengesetzten Seiten der Hülse (28) in Bezug zur Stange (20) angeordnet werden kann, und dass die Stange (20) jeweilige Serien von Sitzen (40) an Positionen hat, die denen entsprechen, an welchen das Gegenstück (38) an der Hülse (28) angeordnet werden kann, wobei in jeden Sitz (40) selektiv durch ein Ende des Gegenstücks (38) eingegriffen werden kann, wobei die Sitze (40) von jeder der Serien von Sitzen (40) axial entlang der Stange in Bezug zu den Sitzen (40) der anderen Se-

rie von Sitzen (40) versetzt sind.

6. Spannvorrichtung nach Anspruch 4 oder 5, **dadurch gekennzeichnet, dass** das Gegenstück (38) von außerhalb des Körpers (2) der Vorrichtung (1) durch eine jeweilige Seitenöffnung (52) des Körpers (2) gesteuert werden kann. 5
7. Spannvorrichtung nach Anspruch 6, **dadurch gekennzeichnet, dass** das Gegenstück eine Verriegelungspassschraube (38) ist, die dazu ausgelegt ist, in ein entsprechendes Gewindedurchgangsloch (36) einzugreifen, das quer in der Hülse (28) gebildet ist und eine sechseckige Hohlaufnahme (38a) an seinem der Stange (20) gegenüberliegenden Ende hat, für den Eingriff eines entsprechenden Steuerschlüssels, der durch einen jeweiligen Schlitz (52) des Körpers (2) eingeführt werden kann. 10
8. Spannvorrichtung nach einem der Ansprüche 1 bis 7, **dadurch gekennzeichnet, dass** das Trägerelement (5) zum Tragen der Sensoren (48, 50) eine Deckplatte (42) enthält, die dazu ausgelegt ist, die im hinteren Bereich (3) des Körpers (2) der Vorrichtung (1) gebildete Öffnung (5a) dichtend zu verschließen, und dass sich von der Deckplatte (42) eine Säule (46) zum Tragen der Sensoren (48, 50) erstreckt. 15
9. Spannvorrichtung nach Anspruch 8, **dadurch gekennzeichnet, dass** die Trägersäule (46) im Wesentlichen L-förmig ist. 20
10. Spannvorrichtung nach Anspruch 8 oder 9, **dadurch gekennzeichnet, dass** die Erstreckung der Deckplatte (42) in axialer Richtung der Stange (20) beträchtlich kleiner ist als die Erstreckung des Trägerelements (5), und dass die Verbindung des Trägerelements (5) mit dem Körper (2) der Vorrichtung (1) einen ersten Schritt umfasst, in welchem die Säule (46) in die Öffnung (5a) des hinteren Bereichs (3) des Körpers (2) der Vorrichtung (1) eingeführt wird, und einen zweiten Schritt, in welchem das Trägerelement (5) gedreht wird bis die Deckplatte (42) eine Position erreicht, in welcher sie die Öffnung (5a) dichtend verschließt. 25

Revendications

1. Dispositif de verrouillage du type à levier articulé, comprenant une unité de commande pour commander les positions angulaires de fin de course d'un bras de serrage, ledit bras (12) étant fixé sur un arbre (16) monté en rotation autour d'un axe de rotation et étant commandé en rotation par un ensemble articulé à genouillère (22) par l'effet d'un coulisement axial de la tige de commande (20) par rapport au 30

corps (2) du dispositif (1), l'unité de commande comprenant un organe (5) destiné à supporter une paire de capteurs (48, 50) adaptés pour détecter le passage près d'eux de moyens de référence (32, 34) reliés à la tige de commande (20), dans le but de commander l'arrêt du coulisement axial de la tige (20) dans ses directions de coulisement lorsqu'elle atteint des positions angulaires prédéterminées de fin de course du bras (12), l'organe de support (5) étant adapté à être fixé au corps (2) du dispositif au niveau d'une ouverture (5a) aménagée dans la zone arrière (3) du dispositif (1), lesdits capteurs (48, 50) étant reliés rigidement à l'organe de support (5) et les moyens de référence comprenant une paire d'appendices (32, 34) qui sont séparés axialement et reliés à la tige (20), au moins l'un (34) des appendices (32, 34) étant associés à des moyens de fixation réglables (28, 36, 38, 40) afin de permettre de le fixer dans une parmi une pluralité de positions le long de la tige de commande (20), **caractérisé en ce que** lesdits capteurs (48, 50) sont agencés selon des positions décalées latéralement les uns les autres, et **en ce que** chacun desdits appendices (32, 34) est agencé d'une manière telle qu'il se déplace le long d'une direction de déplacement faisant face au capteur respectif (48, 50), sous l'effet du coulisement de la tige (20). 35

2. Dispositif de verrouillage selon la revendication 1, **caractérisé en ce que** lesdits appendices sont des broches amovibles (32, 34) associées à la tige (20), dont chacune présente une extrémité libre dirigée dans la direction de son capteur respectif (48, 50). 40
3. Dispositif de verrouillage selon la revendication 1 ou la revendication 2, **caractérisé en ce que** ladite paire d'appendices comprend un premier appendice (32) s'étendant depuis la tige (20) et un deuxième appendice (34) s'étendant depuis un manchon (28), lequel manchon (28) est agencé coaxialement à l'extérieur de la tige (20) et est couissant par rapport à celle-ci, présente une fente axiale (30) apte à être traversée par le premier appendice (32) et comprend des moyens de fixation (36, 38) pour sa fixation sélective dans une position axiale par rapport à la tige (20), faisant partie d'une pluralité de telles positions. 45
4. Dispositif de verrouillage selon la revendication 3, **caractérisé en ce que** lesdits moyens de fixation pour la fixation du manchon comprennent un organe formant compteur (38) qui peut être déplacé transversalement à la tige (20) et qui présente une extrémité destinée à venir en engagement de manière sélective avec un siège (40) aménagé dans la tige (20), faisant partie d'une pluralité de tels sièges (40). 50
5. Dispositif de verrouillage selon la revendication 4, **caractérisé en ce que** lesdits moyens de fixation 55

pour fixer le manchon (28) comprennent un organe formant compteur (38) qui peut être agencé sur des côtés opposés du manchon (28) par rapport à la tige (20), et **en ce que** la tige (20) présente des séries respectives de sièges (40) en des positions correspondant à celles dans lesquelles l'organe formant compteur (38) peut être agencé sur le manchon (28), chaque siège (40) étant apte à être sélectivement mis en prise par une extrémité de l'organe formant compteur (38), les sièges (40) de chacune desdites séries de sièges (40) étant décalés axialement le long de la tige (20) par rapport aux sièges (40) de l'autre série de sièges (40).

dans laquelle il ferme de manière étanche l'ouverture (5a).

6. Dispositif de verrouillage selon la revendication 4 ou la revendication 5, **caractérisé en ce que** l'organe formant compteur (38) est apte à être commandé depuis l'extérieur du corps (2) du dispositif (1) à travers une ouverture latérale (52) respective du corps (2). 5 10 15 20
7. Dispositif de verrouillage selon la revendication 6, **caractérisé en ce que** l'organe formant compteur est une vis à cheville de verrouillage (38) adaptée pour s'engager avec un trou traversant fileté correspondant (36) formé transversalement dans le manchon (28) et ayant un siège hexagonal creux (38a) à son extrémité opposée à la tige (20), pour la mise en prise par une clé de commande correspondant, qui peut être insérée à travers une fente respective (52) du corps (2). 25 30
8. Dispositif de verrouillage selon l'une quelconque des revendications 1 à 7, **caractérisé en ce que** l'organe de support (5) pour supporter les détecteurs (48, 50) comprend une plaque de recouvrement (42) destiné à fermer de manière étanche ladite ouverture (5a) formée à l'arrière zone (3) du corps (2) du dispositif (1), et **en ce qu'**un pilier (46) de support des capteurs (48, 50) s'étend à partir de la plaque de recouvrement (42). 35 40
9. Dispositif de verrouillage selon la revendication 8, **caractérisé en ce que** le montant de support (46) est sensiblement en forme de L. 45
10. Dispositif de verrouillage selon la revendication 8 ou 9, **caractérisé en ce que** l'extension de la plaque de recouvrement (42) dans la direction axiale de la tige (20) est considérablement plus petite que l'extension de l'organe de support (5), et **en ce que** la connexion de l'organe de support (5) avec le corps (2) du dispositif (1) comprend une première étape dans laquelle le pilier (46) est inséré dans l'ouverture (5a) de la zone arrière (3) du corps (2) du dispositif (1), et une seconde étape dans laquelle l'organe de support (5) est soumis à une rotation jusqu'à ce que la plaque de recouvrement (42) atteigne une position 50 55

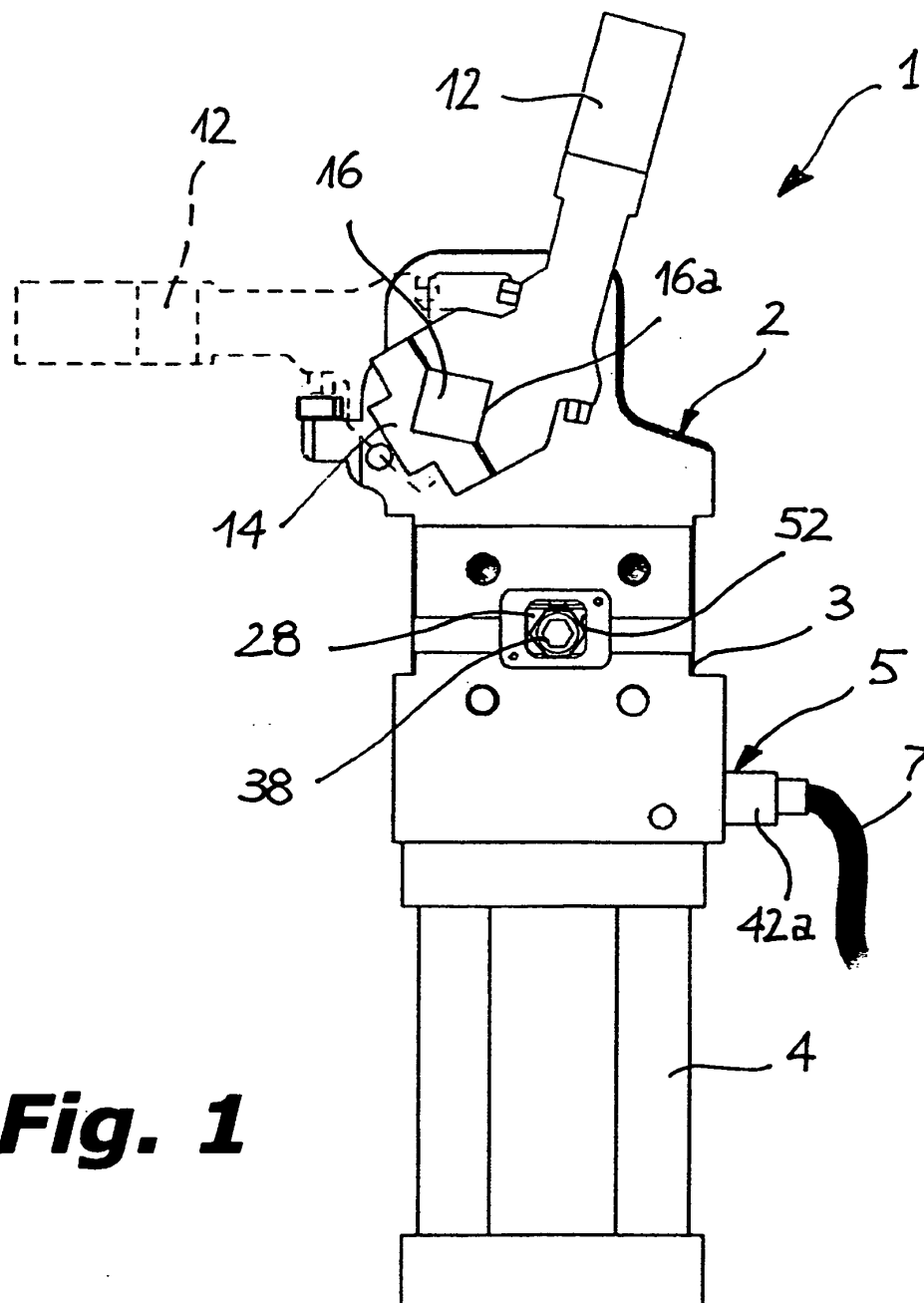
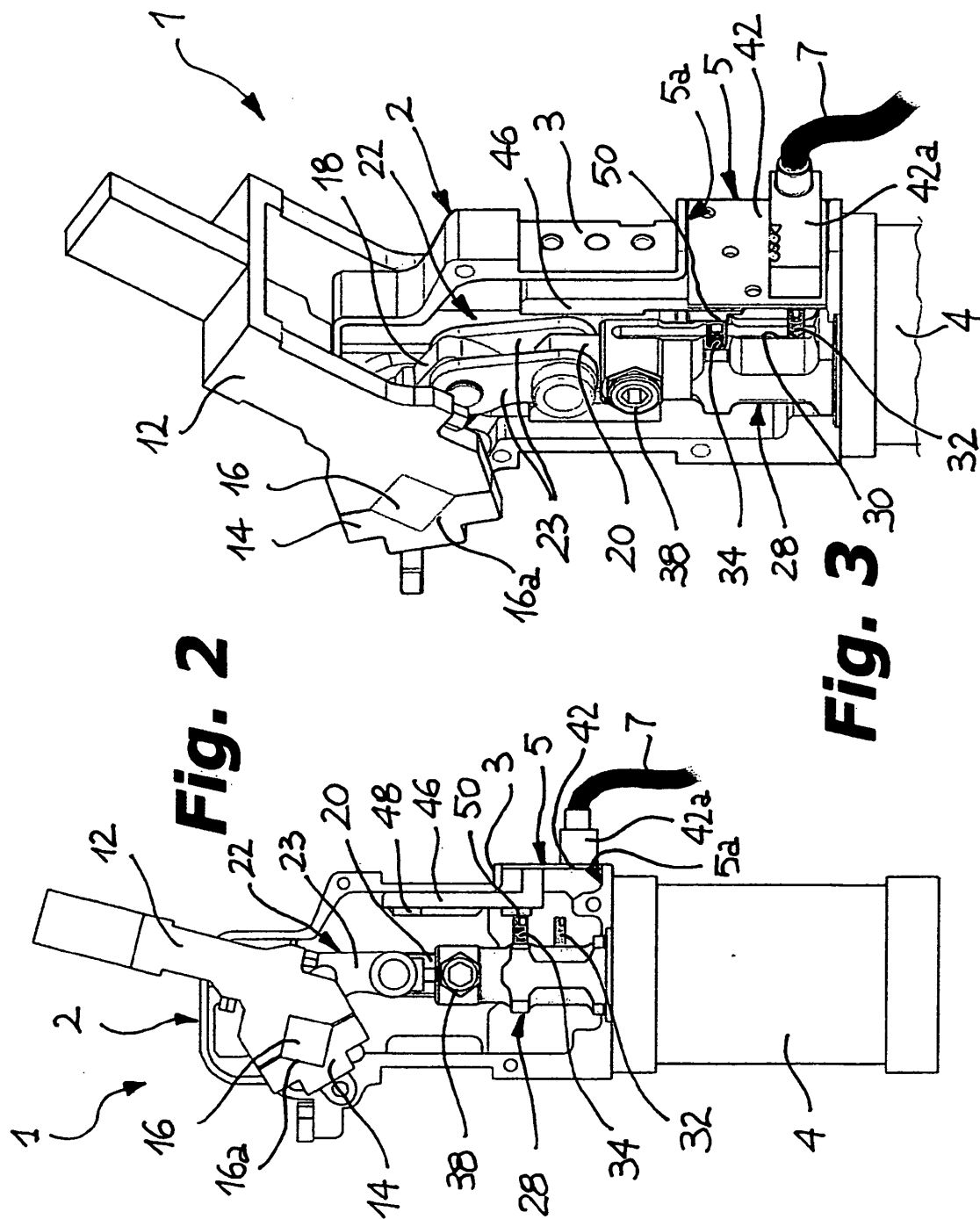
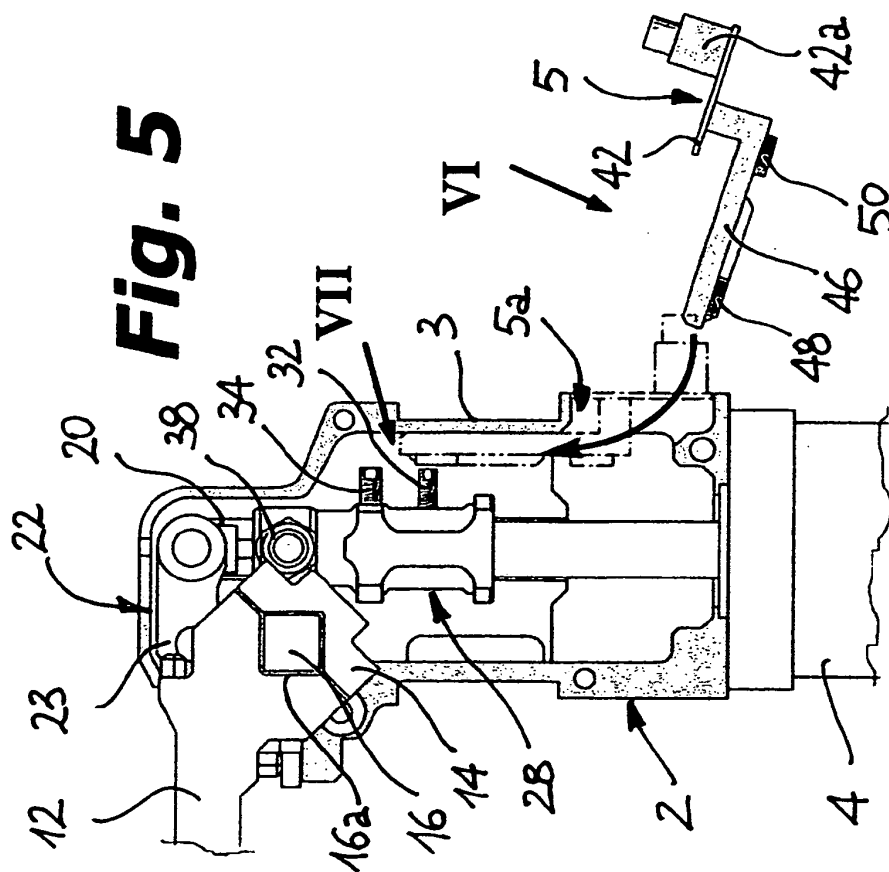
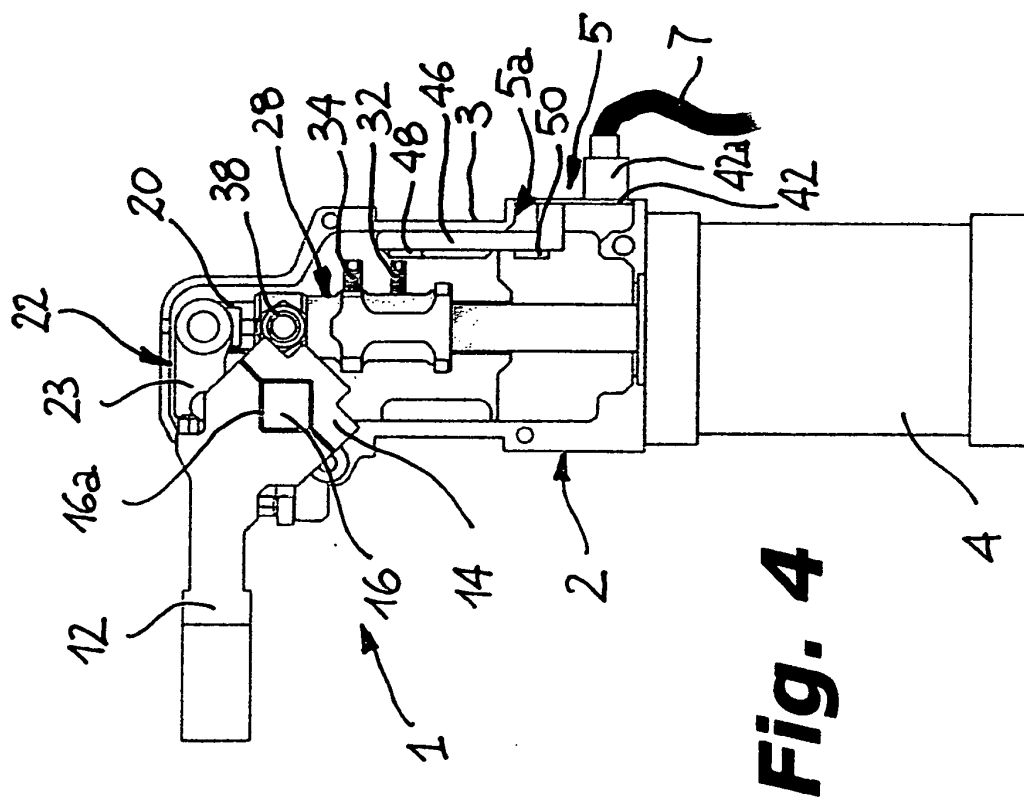


Fig. 1





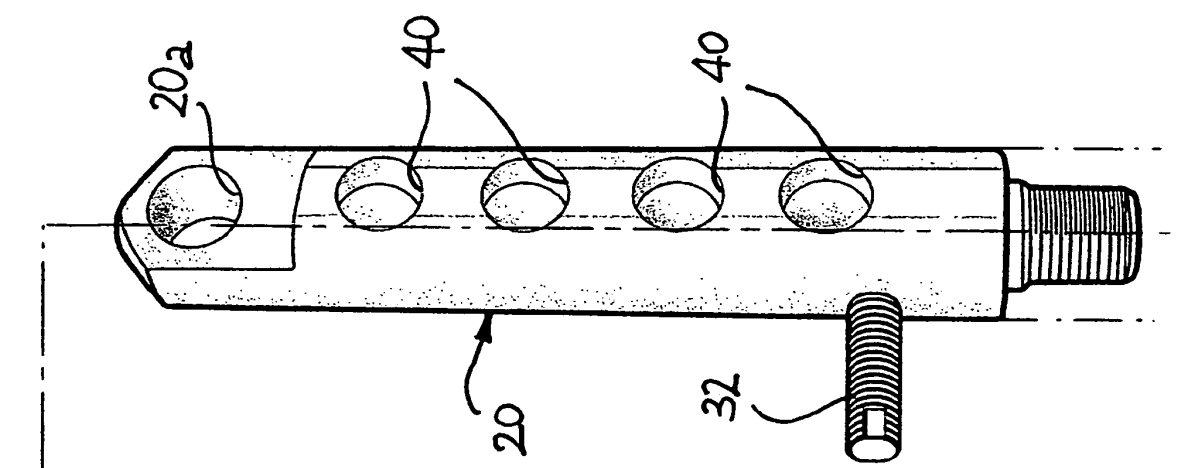


Fig. 7

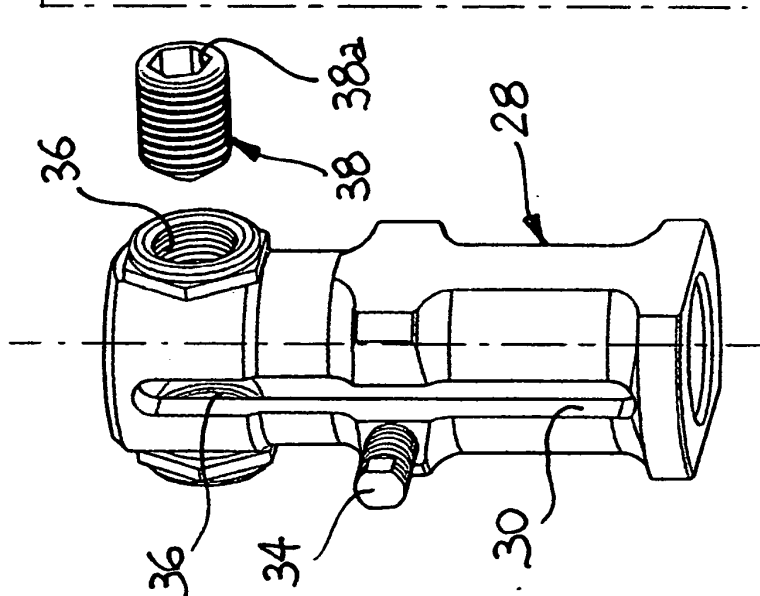
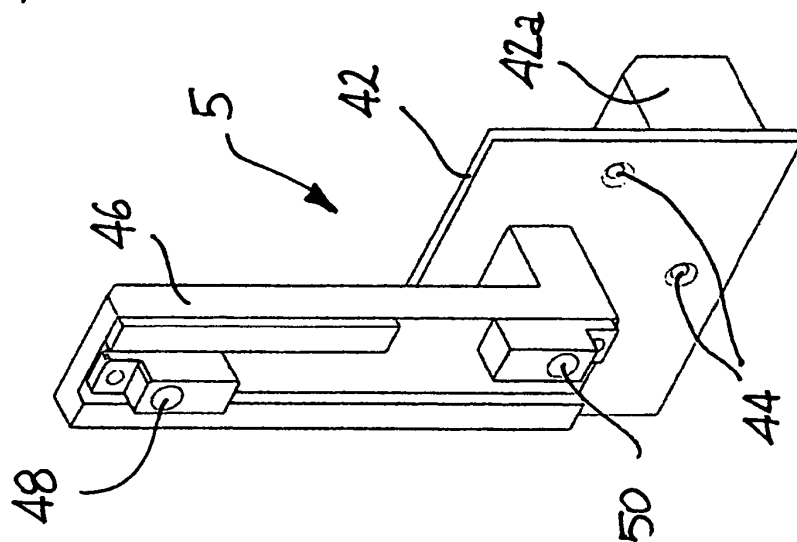
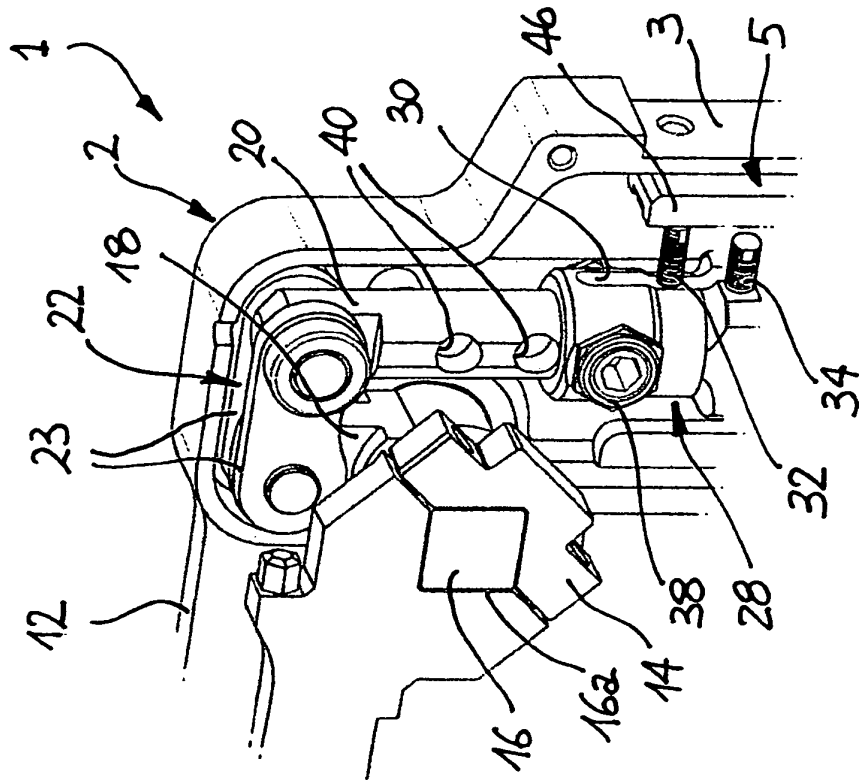
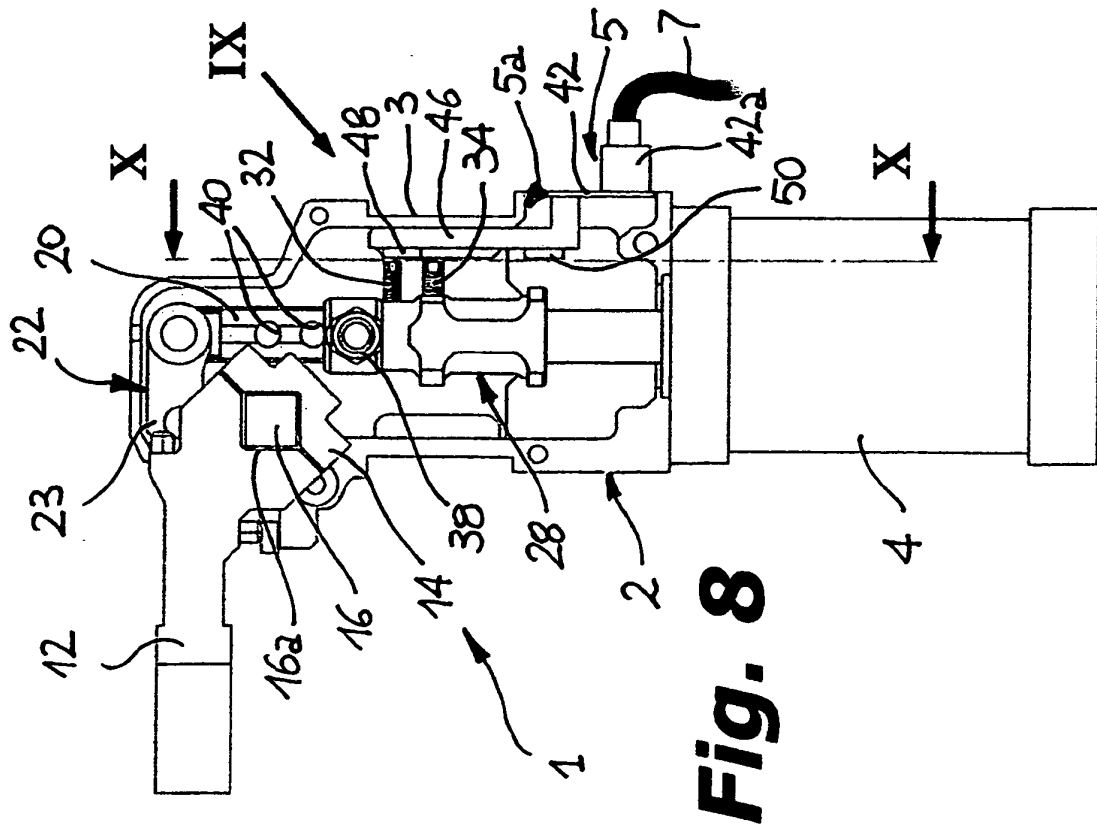


Fig. 6





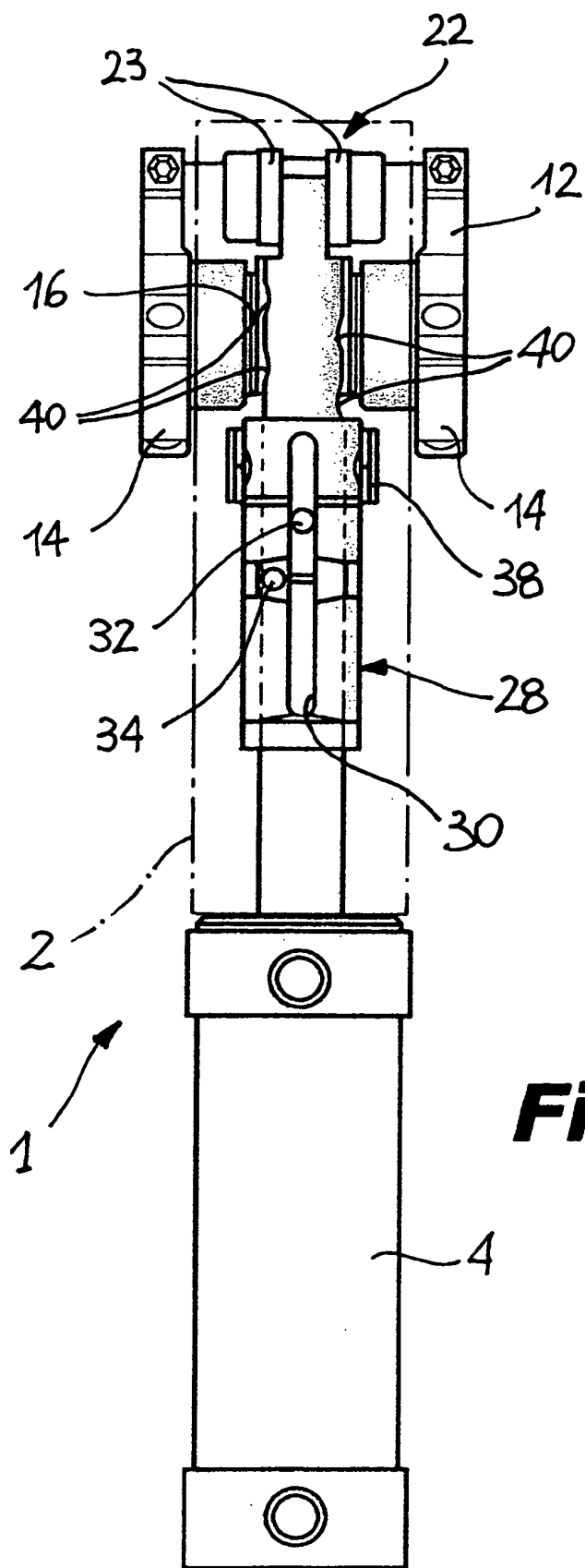


Fig. 10

REFERENCES CITED IN THE DESCRIPTION

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