

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11)

EP 0 890 694 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
09.04.2003 Bulletin 2003/15

(51) Int Cl.7: **E05B 27/00**

(21) Application number: **98305305.9**

(22) Date of filing: **03.07.1998**

(54) **Cylinder lock and associated turning flat key**

Zylinderschloss und zugehöriger drehbarer Flachschlüssel

Serrure cylindrique et clef plate tournante associée

(84) Designated Contracting States:
AT BE CH DE ES FR GB IT LI LU NL

• **Hauser, Herbert**
50189 Elsdorf-Heffendorf (DE)

(30) Priority: **09.07.1997 DE 19729234**

(74) Representative: **Haar, Lucas H., Dipl.-Ing. et al**
Patentanwälte Haar & Schwarz-Haar,
Karlstrasse 23
61231 Bad Nauheim (DE)

(43) Date of publication of application:
13.01.1999 Bulletin 1999/02

(73) Proprietor: **DOM Sicherheitstechnik GmbH & Co**
KG
D-50321 Bruehl (DE)

(56) References cited:
EP-A- 0 416 500 **FR-A- 2 647 841**
US-A- 1 567 979 **US-A- 1 735 868**

(72) Inventors:
• **Sieg, Giselher**
40878 Ratingen (DE)

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 0 890 694 B1

Description

[0001] The invention relates to an improved cylinder lock and to an associated flat key.

[0002] Such a locking device, comprising a cylinder lock and a key, is known from US Patent No 1 735 868. The flat key, which is disclosed there and does not take the form of a turning key, has in its bit plane a recess in the form of an opening. Seated in said recess is a two-armed pivoted lever, of which the arm directed towards the tip of the key forms a lifting arm with a lifting flank which, when the key is fully inserted into the key channel of the cylinder lock, displaces a supplementary tumbler pin out of a locking position into the release position. Said displacement is effected as a result of a swivelling motion of the lever. The lever has, for said purpose, a control flank, which is associated with the lifting arm and is disposed at the opposite side of the key to the lifting flank. With said control flank the pivoted lever acts upon a peripheral cam, which is provided in the key channel of the cylinder lock and hence brings about the swivelling motion. The pivoted lever has its greatest broadside extension in the region of its bearing axis. When the key is inserted into the key channel, the lifting flank is aligned with the edges of the opening, in which the pivoted lever is supported. The second arm of the pivoted lever is likewise aligned with the edges of the opening and so defines a starting position for the pivoted lever before it acts upon the cam.

[0003] EP-A1 0 416 500 discloses a cylinder lock with an associated flat key, which likewise has a pivoted lever pivotally supported in a key bit recess. Said pivoted lever is, however, of a one-armed design.

[0004] A key having a movable locking element is moreover disclosed by EP 0 029 498.

[0005] US 1,567,979 discloses a cylinder lock system having a flat key which comprises all the features in the pre-characterising part of claim 1. The flat key comprises a lever pivotally mounted within the key bit and which is capable of pivoting about an axis extending at right angles to the insertion direction of the bit into the cylinder. When the bit is inserted into the cylinder one arm of the lever first engages with the shoulder portions mounted within the cylinder, rotating the lever through 90°, the two ends of the lever engaging two pins. The arrangement in US 1,567,979 results in two pins which are mounted within the cylinder with their longitudinal axes perpendicular to each other. The longitudinal axis of one of the pins is parallel to that of the cylinder.

[0006] It is an object of the present invention to provide a cylinder lock system of the type described, and a flat key of the type described, with increased locking security.

[0007] According to the first aspect of the present invention, there is provided a system comprising a cylinder lock with flat key for insertion into the key channel of the cylinder lock, into which key channel tumbler pins and at least one supplementary tumbler pin project and

the supplementary tumbler pin when the key is fully inserted is displaceable into a release position by a lifting flank of a two-armed pivoted lever, which is disposed in an opening of and supported by the key bit and is capable of swivelling about an axis extending at right angles to the insertion direction, the swivelling of the pivoted lever being effected by the action of a control flank of the pivoted lever upon a cam of the cylinder lock, wherein the lifting flank and the control flank are associated with different arms of said lever characterised in that the supplementary tumbler pin and the cam are associated with the same key channel wall and that the pivoted lever is dumbbell-shaped.

[0008] According to the second aspect of the present invention, there is provided a flat turning key for a cylinder lock, having a bow adjoined by a key bit, in which a two-armed pivoted lever is supported by and is capable of swivelling in an opening of the key bit about an axis extending at right angles to the insertion direction, wherein the first arm forms a lifting flank for displacing a supplementary tumbler pin into a release position when the key is fully inserted in a cylinder lock, and the second arm forms a control flank for effecting the swivelling of the pivoted lever by encountering a cam of the cylinder lock, characterised in that the pivoted lever is dumbbell-shaped and that the control flank and the lifting flank are disposed on the same broadside plane of the key and the lifting flank projects out beyond the opening edges at the broadside of the key when the control flank is moved in a position of alignment with the said opening edges or is moved into a position projecting beyond said opening edges.

[0009] By virtue of the cylinder lock and the flat key according to the invention a locking device is provided which is incompatible with the known cylinder locks and flat keys, with the result that the total number of possible lock combinations is increased. The invention further provides a locking system of increased operational reliability since, according to the invention, the control flank and the lifting flank are spatially associated with two different lever arms. Peripheral cam and cylinder pin project from the same key channel wall. The control flank and the lifting flank are disposed on the same broadside plane of the key in such a way that an adequate forward motion of the lifting flank is provided when the control flank is aligned with the edges of the broadside opening of the key bit. The cam is preferably formed by a projection protruding into the key channel. Said projection may be connected uniformly in terms of material to the one half of the cylinder core. The reaming of the cylinder core which forms the key channel may then be effected from both sides of the locking cylinder. The cam engages preferably into a profiled groove of the key. Upon insertion of the key into the key channel, preferably the first arm projecting towards the tip of the key may travel over the cam so that, in the fully inserted position of the key, the second arm projecting towards the bow comes to lie upon the cam. The cam may alternatively

be formed by the front end of a further pin, e.g. a rigid pin or a tumbler pin. If the further pin were to be movable as a tumbler pin, which is at present not preferred, it would have to be provided with a stronger pressure spring than the pressure spring associated with the supplementary tumbler pin acted upon by the lifting arm. The pivoted lever is dumbbell-shaped. The cross-sectional profiles of the ends of the arms are greater or thicker than the cross-sectional profile in the region of the bearing point of the pivoted lever. In a preferred variant, the pivoted lever is formed by two balls seated on the ends of a steel needle. The balls have radial bores, into which the ends of the steel needle are inserted. The steel needle may be pivotally supported in a central web of the opening. Said pivot bearing may be formed by a groove indented into the edge. The pivot bearing is preferably formed asymmetrically so that the length of the lifting arm is greater than the length of the control arm. In a further variant it is provided that the pivoted lever is capable of swivelling about a transversely positioned spindle in the form of a needle. In a further embodiment, however, the pivoted lever may alternatively have an axial bore, which tapers from both ends towards the middle and situated in which is a needle, which extends in the longitudinal direction of the key and is fastened at both ends to the key bit. When the key is not inserted, the end face of the supplementary tumbler pin preferably projects only as far as into the surface, which is associated with the bottom surface of the profiled groove and lies parallel to the key channel wall. The release position is preferably achieved when the end face of the supplementary tumbler pin is aligned with the key insertion channel wall.

[0010] Three embodiments of a cylinder lock with a flat key will now be described with reference to the accompanying drawings, in which:

Figure 1 is a first embodiment of a key;
 Figure 2 shows the key according to Figure 1 during insertion into an associated locking cylinder;
 Figure 2a is an enlarged view of a sub-region in Figure 2;
 Figure 3 is a sequential view of Figure 2;
 Figure 4 is a sequential view of Figure 3 with the key fully inserted;
 Figure 5 is a section according to the line V-V in Figure 2;
 Figure 6 is a section according to the line VI-VI in Figure 2;
 Figure 7 is a section according to the line VII-VII in Figure 3;
 Figure 8 is a section according to the line VIII-VIII in Figure 3;
 Figure 9 is a section according to the line IX-IX in Figure 4;
 Figure 10 is a section according to the line X-X in Figure 4;
 Figure 11 is a second embodiment of a key;

Figure 12 is a section according to the line XII-XII of Figure 11;

Figure 13 is a detail view of the key according to Figure 11;

Figure 14 is a section according to the line XIV-XIV in Figure 13;

Figure 15 is a view according to Figure 4 of a further embodiment and

Figure 16 is a section according to the line XVI-XVI in Figure 15.

[0011] The embodiment illustrated in Figures 1 to 10 comprises a cylinder lock and a key 1. The key 1 has a bow 2 adjoined by a bit 3. The bit 3 has an opening 24, in the present embodiment approximately in the front region. Inserted in said opening 24 is a pivoted lever 4. The opening has a central web 25 for supporting the pivoted lever 4.

[0012] In this embodiment, the pivoted lever 4 is dumbbell-shaped. The two ends are formed by balls 17 having radial openings, into which the ends of a steel needle 10 are inserted. The diameters of the balls 17 are greater than the material thickness in the region of the opening 24 of the bit so that in every swivel position at least one ball projects beyond a respective one of the broadside surfaces of said region of the bit 3.

[0013] The ball 17, which is directed towards the tip of the key, with the associated portion of the needle forms a lifting arm. The opposite arm forms a control arm. The control arm 7 forms a control flank 7' and the lifting arm 8 forms a lifting flank 8'.

[0014] The steel needle 10 connecting the two balls 17 is supported in a groove provided in the central web of the opening 24. A bearing bush 25 which widens towards the two openings is located in the groove, so that the crown of the groove forms a bearing point 16. The groove is closed in the form of indentations 15. The bearing point 16 is disposed asymmetrically so that the lifting arm 8 is longer than the control arm 7.

[0015] Provided in the associated cylinder of a cylinder lock is a key channel 14, into which the key bit 3 is insertable. A projection 13 which is connected uniformly in terms of material to the associated half of the locking cylinder projects from one of the channel walls 14'. The projection 13 engages in this embodiment into a profiled groove 6 of the key. The profiled groove 6 of the key lies adjacent to profiled recesses 5 and in the longitudinal centre plane of the bit 3.

[0016] When there is no key inserted into the key channel 14, the supplementary tumbler pin 9 projects only in sections into the key channel 14. Its end face lies approximately in the region of the bottom of the profiled groove 6 of the key, from which the lifting flank 8' projects. Upon insertion of the key into the key channel 14, first the ball directed towards the tip of the key runs with its lifting flank 8' over the projection 13 provided with run-on bevels (cf. Figure 2). When the front ball has surmounted the projection 13, the rear ball 17 encounters

the projection 13 (Figure 3). When the key is fully inserted (Figure 4), the rear ball, which is associated with the control arm 7, is seated with its control flank 7' on the projection 13 and holds the pivoted lever 4 in a swivelled position so that the lifting flank 8' of the lifting arm 8 may displace a cylinder pin 9 outwards in relation to the cylinder counter to the pressure of a spring 12 so that the housing pin 11 is shifted into a release position. In the release position, the end face of the supplementary tumbler pin 9 is aligned with the key insertion channel wall 14'.

[0017] In the embodiment illustrated in Figures 11 and 12, a steel needle 21 is fastened in the key bit in the longitudinal direction of the key, penetrating the opening 24 in the longitudinal direction approximately in its centre. In so doing, the steel needle 21 penetrates two axial openings 22, 23, which taper towards the middle, of a dumbbell-shaped pivoted lever, the shape of which is similar to that of the first embodiment.

[0018] In the embodiment illustrated in Figures 13 to 16, a dumbbell-shaped pivoted lever 4 is capable of swivelling about a steel needle 20, which is supported at right angles to the key insertion direction in the key bit.

[0019] In this embodiment also, the geometric dimensions of the pivoted lever cross section are selected so that the lifting flank 8' is in a forward position when the control flank 7' is aligned with the edges 24' of the opening 24.

[0020] There is accordingly a swivel position, in which both lifting flank 8' and control flank 7' project beyond the edges of the opening towards the same broadside of the key. In Figures 15 and 16 a variant of the cam is illustrated using the embodiment according to Figure 14 as an example. The cam is now formed by the end face 18' of a further tumbler pin 18. The spring used to press the tumbler pin 18 inwards in relation to the cylinder is stronger than the spring of the cylinder pin 9, with the result that reliable adjustment of the control setting is guaranteed. The cam may alternatively take the form of a rigid pin.

Claims

1. System comprising a cylinder lock and a flat key (1) for insertion into the key channel (14) of the cylinder lock, into which key channel (14) tumbler pins and at least one supplementary tumbler pin (9) project and the supplementary tumbler pin (9) when the key (1) is fully inserted is displaceable into a release position by a lifting flank (8') of a two-armed pivoted lever (4), which is disposed in an opening (24) of and supported by the key bit (3) and is capable of swivelling about an axis extending at right angles to the insertion direction, the swivelling of the pivoted lever (4) being effected by the action of a control flank (7') of the pivoted lever (4) upon a cam (13, 18') of the cylinder lock, wherein the lifting flank (8')

and the control flank (7') are associated with different arms (7, 8) of said lever (4) **characterised in that** the supplementary tumbler pin (9) and the cam (13, 18') are associated with the same key channel wall (14') and that the pivoted lever (4) is dumbbell-shaped.

2. System according to claim 1 **characterised in that** the cam is formed by a projection (13) protruding into the key channel (14).
3. System according to claim 1 or claim 2, **characterised in that** the cam engages into a profiled groove (6) of the key.
4. System according to any of claims 1 to 3, **characterised in that** the first arm (8) projecting towards the tip of the key comprises the lifting flank (8'). and upon insertion travels over the cam (13, 18').
5. System according to any of claims 1 to 4, **characterised in that** the cam is formed by the front end (18') of a tumbler pin (18).
6. Flat turning key for a cylinder lock, having a bow (2) adjoined by a key bit (3), in which a two-armed pivoted lever (4) is supported by and is capable of swivelling in an opening (24) of the key bit (3) about an axis extending at right angles to the insertion direction, wherein the first arm (8) forms a lifting flank (8') for displacing a supplementary tumbler pin (9) into a release position when the key (1) is fully inserted in a cylinder lock, and the second arm (7) forms a control flank (7') for effecting the swivelling of the pivoted lever (4) by encountering a cam (13, 18') of the cylinder lock, **characterised in that** the pivoted lever (4) is dumbbell-shaped and that the control flank (7') and the lifting flank (8') are disposed on the same broadside plane of the key (1) and the lifting flank (8') projects out beyond the opening edges (24') at the broadside of the key (1) when the control flank (7') is moved in a position of alignment with the said opening edges (24') or is moved into a position projecting beyond said opening edges (24').
7. System or flat turning key according to any of claims 1 to 6, **characterised in that** the first arm (8) having the lifting flank (8') is longer than the control arm (7) having the control flank (7').
8. System or flat turning key according to any of claims 1 to 7, **characterised in that** the first arm (8) projects towards the tip of the key (1).
9. System or flat turning key according to claim 8, **characterised in that** the two ends of the dumbbell-shape pivoted lever (4) are formed by balls the diameters of which are greater than the material thick-

ness in the region of the opening (24) of the bit(3).

10. System or flat turning key according to any of claims 1 to 9, **characterised in that** the pivoted lever (4) is formed by two balls (17) seated on the ends of a steel needle (10). 5
11. System or flat turning key according to claim 10, **characterised in that** the steel needle (10) is pivotally supported in a groove provided in a central web of the opening (24). 10
12. System or flat turning key according to claim 11, **characterised in that** a bearing bush (25) is seated in the groove which bearing bush (25) widens towards the two openings so that the crown of the groove forms a bearing point (16). 15
13. System or flat turning key according to claim 11, **characterised in that** the groove is closed in the form of indentations (15). 20
14. System or flat turning key according to claim 13, **characterised in that** the bearing point (16) is disposed asymmetrically so that the lifting arm (8) is longer than the control arm (7). 25
15. System or flat turning key according to any of claims 1 to 10, **characterised in that** the pivoted lever (4) is supported about a bearing axis (20) lying in the swivelling axis. 30
16. System or flat turning key according to any of claims 1 to 9, **characterised in that** the pivoted lever (4) has an axial cavity (22, 23), which tapers from both ends towards the middle and situated in which is a needle (21), which extends in longitudinal direction of the key and is fastened to the key bit. 35

Patentansprüche

1. System enthaltend ein Zylinderschloß und einen Flachs Schlüssel (1) zum Einstecken in den Schlüsselkanal (14) des Zylinderschlosses, in welchen Schlüsselkanal (14) Zuhaltungsstifte und mindestens ein Ergänzungszuhaltungsstift (9) ragen und der Ergänzungszuhaltungsstift (9) bei vollständig eingestecktem Schlüssel (1) durch eine Hubflanke (8') eines zweiarmigen Schwenkhebels (4) in eine Freigabestellung verlagerbar ist, welcher in einer Öffnung (24) des Schlüsselbarts (3) angeordnet und durch diesen gelagert ist und um eine im rechten Winkel zur Einschubrichtung verlaufende Achse schwenkbar ist, wobei das Verschwenken des Schwenkhebels (4) durch die Einwirkung einer Steuerflanke (7') des Schwenkhebels (4) auf einen Nocken (13, 18') des Zylinderschlosses bewirkt 40

wird, wobei die Hubflanke (8') und die Steuerflanke (7') verschiedenen Armen (7, 8) des Steuerhebels (4) zugeordnet sind, **dadurch gekennzeichnet, daß** der Ergänzungszuhaltungsstift (9) und der Nocken (13, 18') derselben Schlüsselkanalwand (14') zugeordnet sind und daß der Schwenkhebel (4) hantelförmig ausgebildet ist.

2. System nach Anspruch 1, **dadurch gekennzeichnet, daß** der Nocken von einem in den Schlüsselkanal (14) ragenden Vorsprung (13) ausgebildet ist.
3. System nach Anspruch 1 oder 2, **dadurch gekennzeichnet, daß** der Nocken in eine Profilnut (6) des Schlüssels eingreift.
4. System nach einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, daß** der zur Schlüsselspitze ragende erste Arm (8) die Hubflanke (8') umfaßt und beim Einschub den Nocken (13, 18') überfährt.
5. System nach einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, daß** der Nocken von dem Stirnende (18') eines Zuhaltungsstifts (18) ausgebildet ist.
6. Drehbarer Flachs Schlüssel für ein Zylinderschloß mit einer Reide (2) und einem sich daran anschließenden Schlüsselbart (3), in welchem ein zweiarmiger Schwenkhebel (4) gelagert und in einer Öffnung (24) des Schlüsselbarts (3) um eine im rechten Winkel zur Einschubrichtung verlaufende Achse schwenkbar ist, wobei der erste Arm (8) eine Hubflanke (8') bildet, um einen Ergänzungszuhaltungsstift (9) bei vollständig in ein Zylinderschloß eingestecktem Schlüssel in eine Freigabestellung zu verlagern, und der zweite Arm (7) eine Steuerflanke (7') bildet, um das Verschwenken des Schwenkarms (4) durch Treffen auf einen Nocken (13, 18') des Zylinderschlosses zu bewirken, **dadurch gekennzeichnet, daß** der Schwenkhebel (4) hantelförmig ausgebildet ist und daß die Steuerflanke (7') und die Hubflanke (8') auf derselben Breitseiten-ebene des Schlüssels (1) angeordnet sind und die Hubflanke (8') über die Ränder (24') der Öffnung an der Breitseite des Schlüssels (1) hinausragt, wenn die Steuerflanke (7') in eine axiale Position zu den offenen Rändern (24') bewegt wird oder in eine über die Ränder (24') der Öffnung hinausragende Position bewegt wird. 45
7. System oder drehbarer Flachs Schlüssel nach einem der Ansprüche 1 bis 6, **dadurch gekennzeichnet, daß** der erste, die Hubflanke (8') aufweisende Arm (8) länger ist als der die Steuerflanke (7') aufweisende Steuerarm (7). 50
8. System oder drehbarer Flachs Schlüssel nach einem

der Ansprüche 1 bis 7, **dadurch gekennzeichnet, daß** der erste Arm (8) zur Spitze des Schlüssels (1) ragt.

9. System oder drehbarer Flachs Schlüssel nach Anspruch 8, **dadurch gekennzeichnet, daß** die beiden Enden des hantelförmigen Schwenkhebels (4) durch Kugeln gebildet sind, deren Durchmesser größer ist als die Materialdicke im Bereich der Öffnung (24) des Barts (3). 5
10. System oder drehbarer Flachs Schlüssel nach einem der Ansprüche 1 bis 9, **dadurch gekennzeichnet, daß** der Schwenkhebel (4) durch zwei auf den Enden einer Stahlnadel (10) sitzenden Kugeln (17) geformt ist. 10
11. System oder drehbarer Flachs Schlüssel nach Anspruch 10, **dadurch gekennzeichnet, daß** die Stahlnadel (10) schwenkbar in einer Nut in einem mittleren Steg der Öffnung (24) gelagert ist. 15
12. System oder drehbarer Flachs Schlüssel nach Anspruch 11, **dadurch gekennzeichnet, daß** eine Lagerbüchse (25) in der Nut sitzt, wobei die Lagerbüchse (25) zu den beiden Öffnungen hin erweitert ist, so daß der Scheitel der Nut einen Lagerpunkt (16) bildet. 20
13. System oder drehbarer Flachs Schlüssel nach Anspruch 11, **dadurch gekennzeichnet, daß** die Nut in Form von Eindrückungen (15) verschlossen ist. 25
14. System oder drehbarer Flachs Schlüssel nach Anspruch 13, **dadurch gekennzeichnet, daß** der Lagerpunkt (16) asymmetrisch angeordnet ist, so daß der Hubarm (8) länger ist als der Steuerarm (7). 30
15. System oder drehbarer Flachs Schlüssel nach einem der Ansprüche 1 bis 10, **dadurch gekennzeichnet, daß** der Schwenkhebel (4) um eine Lagerachse (20) gelagert ist, die in der Schwenkachse liegt. 35
16. System oder drehbarer Flachs Schlüssel nach einem der Ansprüche 1 bis 9, **dadurch gekennzeichnet, daß** der Schwenkhebel (4) eine sich von beiden Enden her zur Mitte verjüngende Axialhöhlung (22, 23) aufweist, in welcher sich eine in Längsrichtung des Schlüssels verlaufende und am Schlüsselbart befestigte Nadel (21) befindet. 40

Revendications

1. Système comportant une serrure à cylindre et une clé plate (1) destinée à être insérée dans le canal pour clé (14) de la serrure à cylindre, canal pour clé (14) dans lequel des axes de gâchette et au moins 55

un axe de gâchette supplémentaire (9) font saillie et l'axe de gâchette supplémentaire (9), lorsque la clé (1) est entièrement insérée, peut être déplacé jusqu'à une position de libération par un flanc de levage (8') d'un levier pivotant à deux bras, qui est disposé dans une ouverture (24) du panneton de clé et supporté par celui-ci et peut pivoter autour d'un axe s'étendant à angle droit par rapport à la direction d'insertion, le pivotement du levier pivotant (4) étant effectué par l'action d'un flanc de commande (7') du levier pivotant (4) sur une came (13, 18') de la serrure à cylindre, le flanc de levage (8') et le flanc de commande (7') étant associés avec des bras différents (7, 8) dudit levier, **caractérisé en ce que** l'axe de gâchette supplémentaire (9) et la came (13, 18') sont associés à la même paroi de canal pour clé (14') et **en ce que** le levier pivotant (4) a une forme d'haltère.

2. Système selon la revendication 1, **caractérisé en ce que** la came est formée par une saillie (13) faisant saillie dans le canal pour clé (14).
3. Système selon la revendication 1 ou 2, **caractérisé en ce que** la came vient en prise dans une gorge profilée (6) de la clé.
4. Système selon l'une quelconque des revendications 1 à 3, **caractérisé en ce que** le premier bras (8) faisant saillie en direction du bout de la clé comporte le flanc de levage (8') et lors de l'insertion se déplace au-dessus de la came (13, 18').
5. Système selon l'une quelconque des revendications 1 à 4, **caractérisé en ce que** la came est formée par l'extrémité avant (18') d'un axe de gâchette (18).
6. Clé tournante plate pour serrure à cylindre, ayant un anneau (2) contigu à un panneton de clé (3), dans lequel un levier pivotant à deux bras (4) est supporté et peut pivoter dans une ouverture (24) du panneton de clé (3) autour d'un axe s'étendant à angle droit par rapport à la direction d'insertion, le premier bras (8) formant un flanc de levage (8') pour déplacer un axe de gâchette supplémentaire (9) dans une position de libération lorsque la clé (1) est entièrement insérée dans une serrure à cylindre, et le second bras (7) formant un flanc de commande (7') pour effectuer le pivotement du levier pivotant (4) en rencontrant une came (13, 18') de la serrure à cylindre, **caractérisé en ce que** le levier pivotant (4) a une forme d'haltère et **en ce que** le flanc de commande (7') et le flanc de levage (8') sont disposés sur le même plan de côté plat de la clé (1) et le flanc de levage (8') fait saillie au-delà des bords d'ouverture (24') existant au niveau du côté plat de la clé (1) lorsque le flanc de commande (7') est dé-

placé dans une position d'alignement avec lesdits bords d'ouverture (24') ou est déplacé dans une position faisant saillie au-delà desdits bords d'ouverture (24').

7. Système ou clé tournante plate selon l'une quelconque des revendications 1 à 6, **caractérisé en ce que** le premier bras (8) ayant le flanc de levage (8') est plus long que le bras de commande (7) ayant le flanc de commande (7'). 5
10
8. Système ou clé tournante plate selon l'une quelconque des revendications 1 à 7, **caractérisé en ce que** le premier bras (8) fait saillie en direction du bout de la clé (1). 15
9. Système ou clé tournante plate selon la revendication 8, **caractérisé en ce que** les deux extrémités du levier pivotant en forme d'haltère (4) sont formées par des billes dont les diamètres sont plus grands que l'épaisseur de matériau dans la zone de l'ouverture (24) du panneton (3). 20
10. Système ou clé tournante plate selon l'une quelconque des revendications 1 à 9, **caractérisé en ce que** le levier pivotant (4) est formé par deux billes (17) en appui sur les extrémités d'une aiguille en acier (10). 25
11. Système ou clé tournante plate selon la revendication 10, **caractérisé en ce que** l'aiguille en acier (10) est supportée de manière pivotante dans une gorge agencée dans une âme centrale de l'ouverture (24). 30
35
12. Système ou clé tournante plate selon la revendication 11, **caractérisé en ce qu'une** bague formant palier (25) est en appui dans la gorge, laquelle bague formant palier (25) s'élargit en direction des deux ouvertures de sorte que la couronne de la gorge forme un point d'appui (16). 40
13. Système ou clé tournante plate selon la revendication 11, **caractérisé en ce que** la gorge est fermée sous la forme de dentelures (15). 45
14. Système ou clé tournante plate selon la revendication 13, **caractérisé en ce que** le point d'appui (16) est disposé de manière asymétrique de sorte que le bras de levage (8) est plus long que le bras de commande (7). 50
15. Système ou clé tournante plate selon l'une quelconque des revendications 1 à 10, **caractérisé en ce que** le levier pivotant (4) est supporté autour d'un axe de palier (20) situé dans l'axe de pivotement. 55
16. Système ou clé tournante plate selon l'une quelcon-

que des revendications 1 à 9, **caractérisé en ce que** le levier pivotant (4) a une cavité axiale (22, 23), qui se rétrécit à partir des deux extrémités en direction du milieu et dans laquelle est située une aiguille (21), qui s'étend dans la direction longitudinale de la clé et est fixée au panneton de clé.

Fig. 1

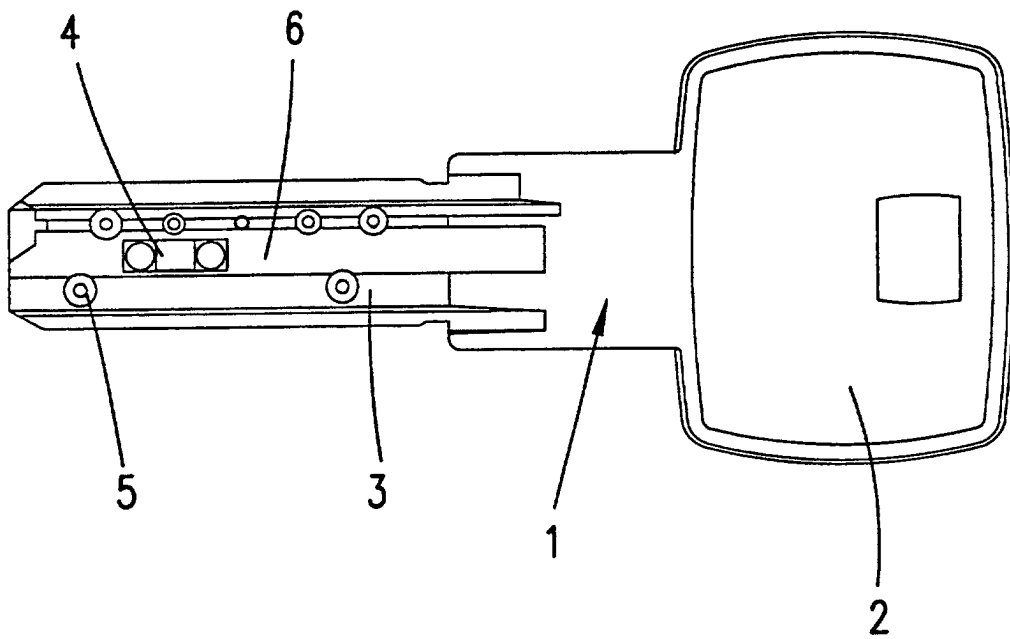


Fig. 2

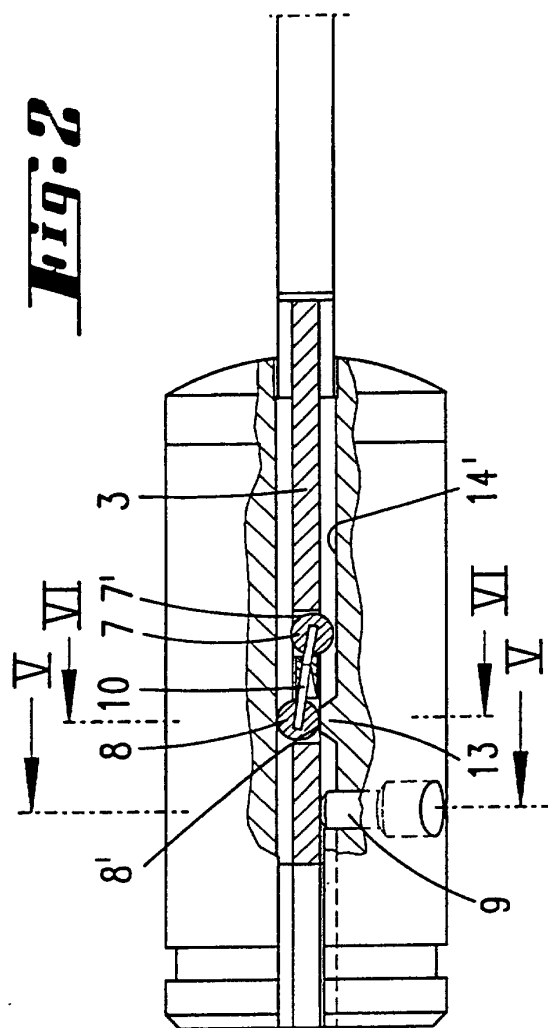


Fig. 3

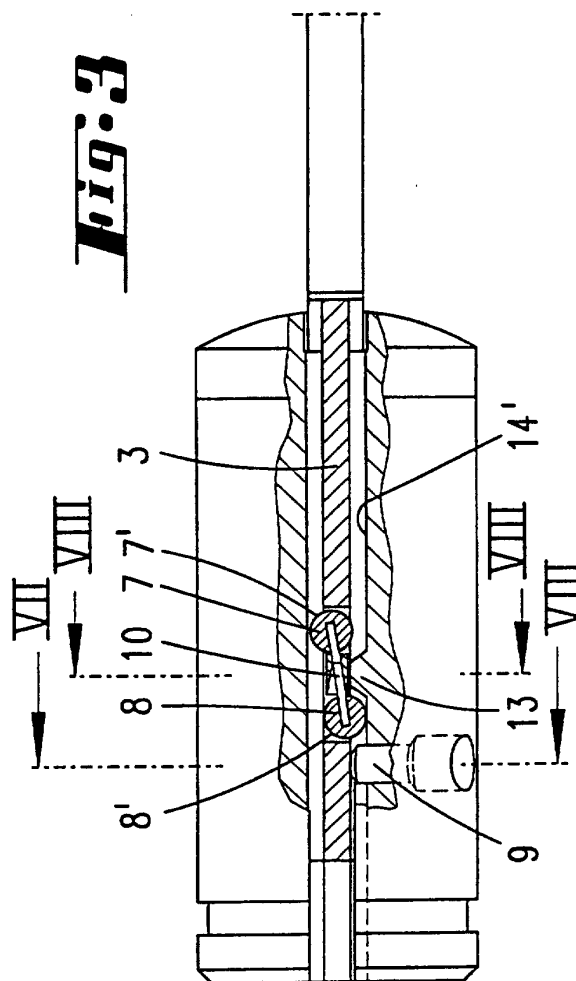


Fig. 6

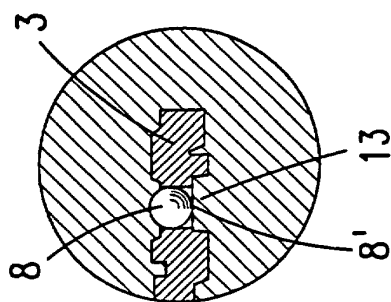


Fig. 8

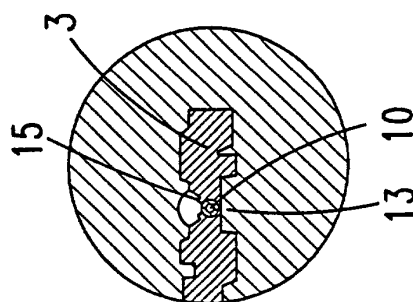


Fig. 5

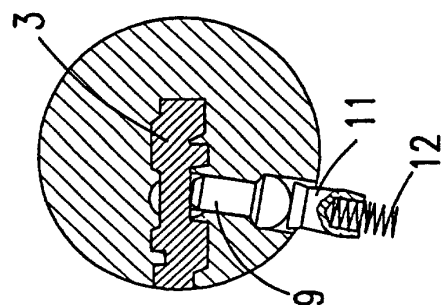


Fig. 7

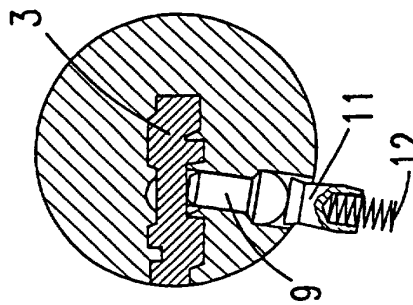


Fig. 2 a

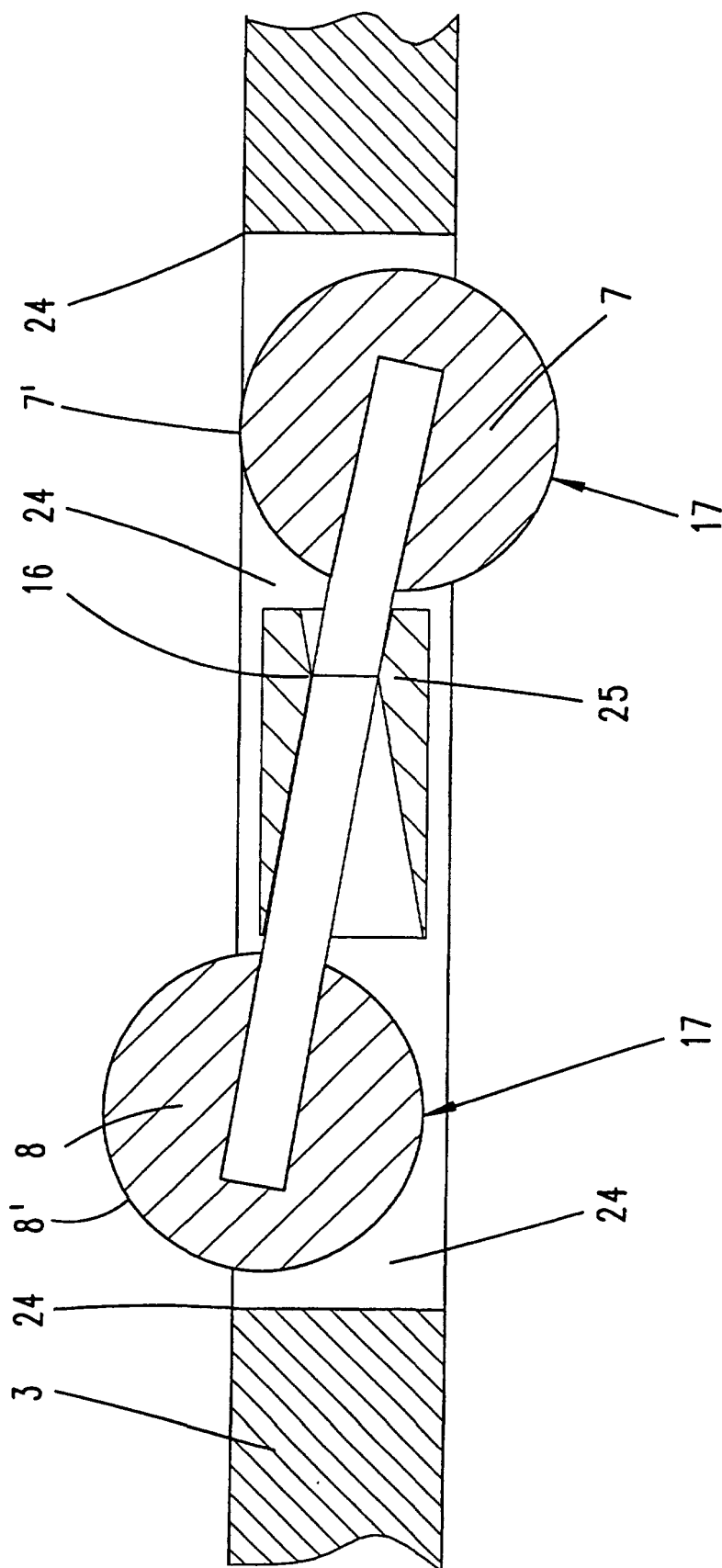


Fig. 4

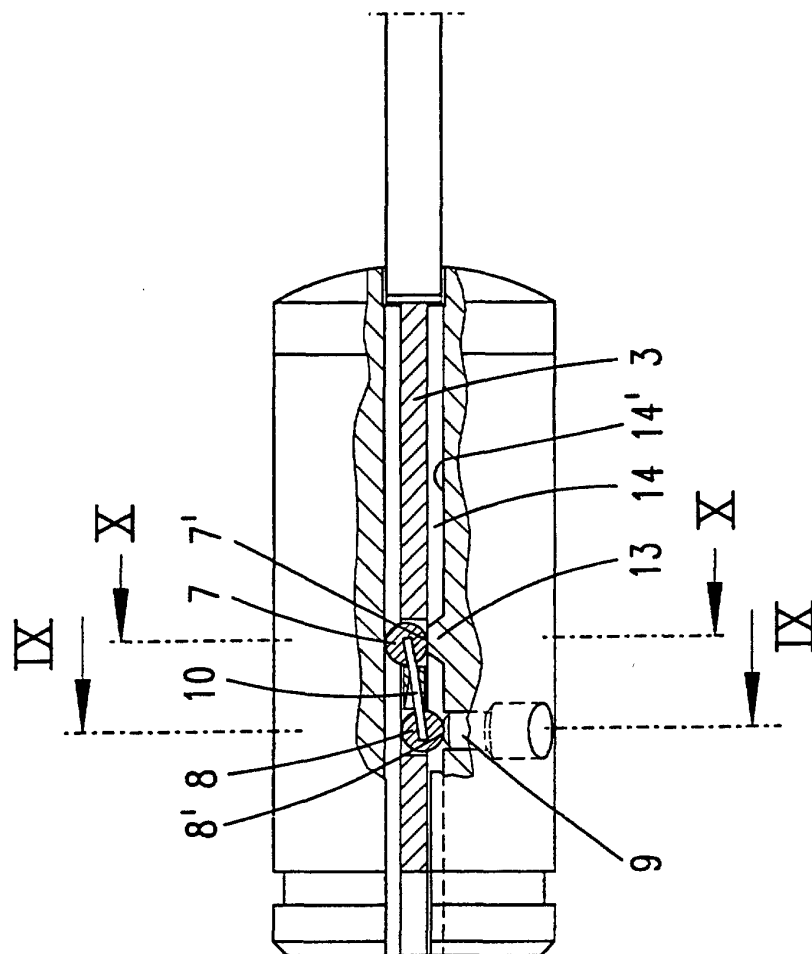


Fig. 9 **Fig. 10**

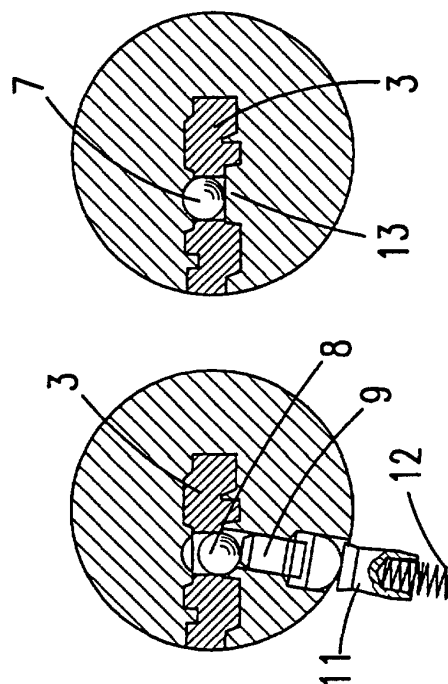


Fig. 11

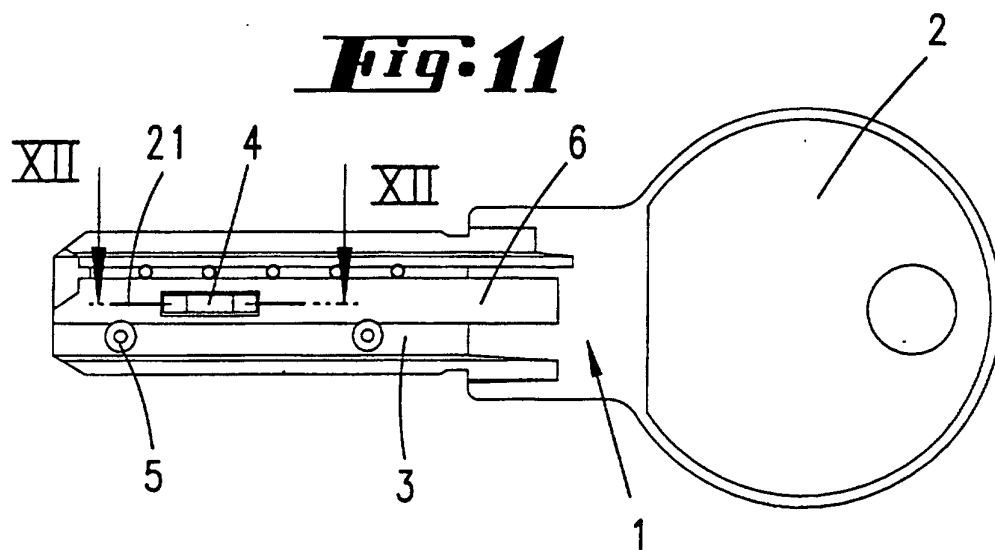


Fig. 12

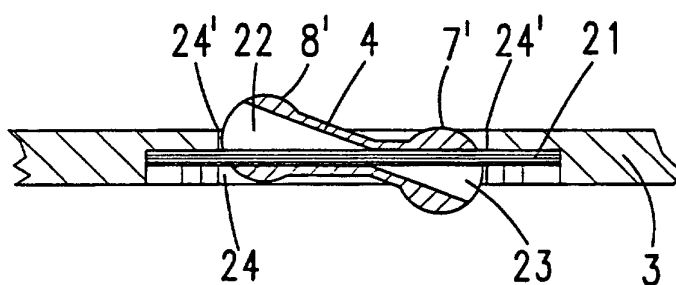


Fig. 13

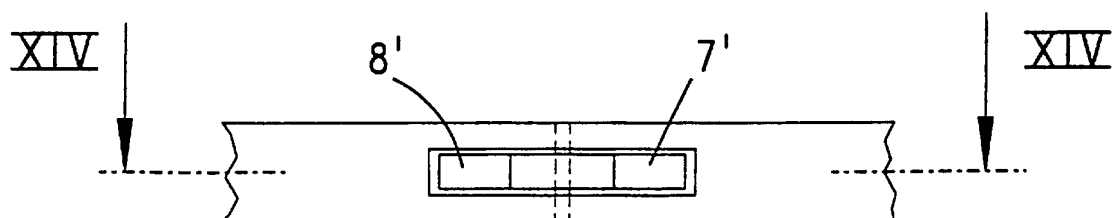


Fig. 14

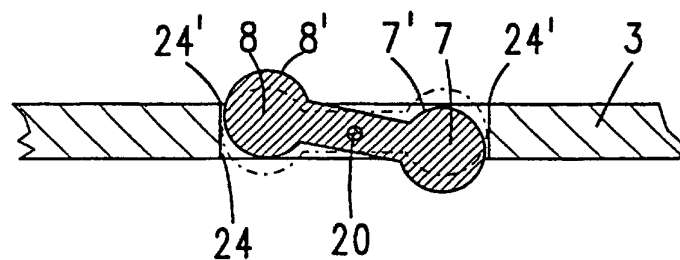


Fig. 15

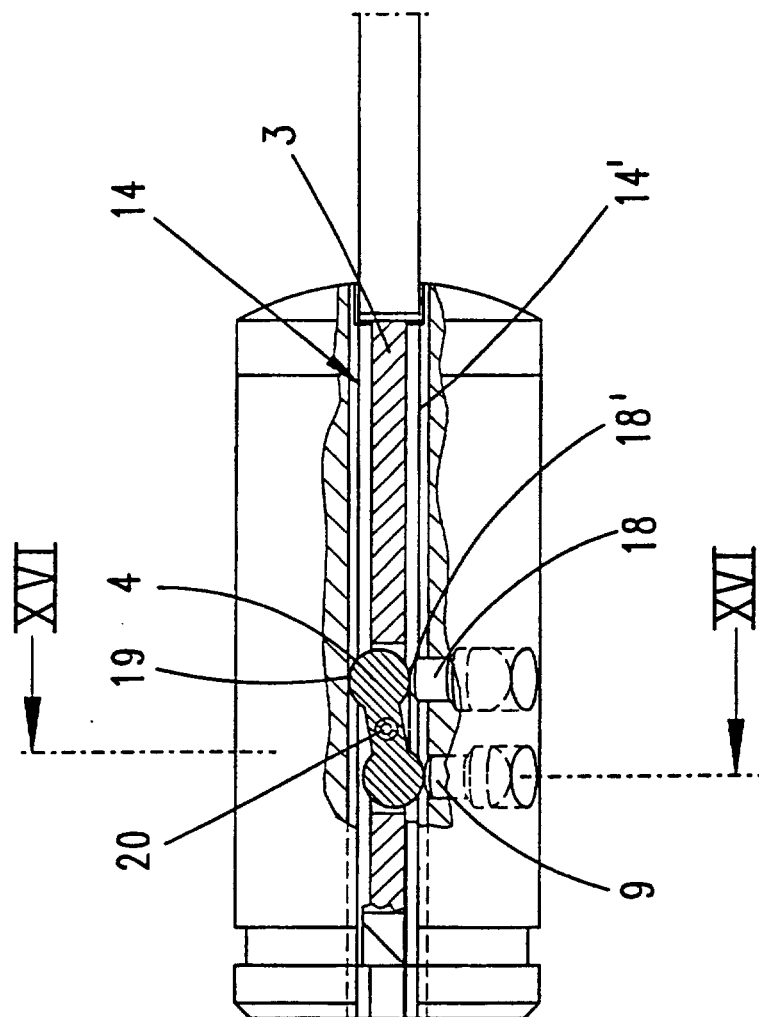


Fig. 16

