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⑤④ **MULTI-POINT LOCK.**

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Description

The present invention relates to a multi-point lock of the type described in the introduction to the claim.

Such multi-point locks are known to have the unlocking and locking movements controlled by equally large, but oppositely acting handle motions from a neutral position which is, normally, horizontal.

The most natural handle position at the moment of unlocking is known to be 26°. In prior art locks the result is that the handle position at the moment of locking is also 26°, but, of course, in the direction opposite to the neutral position. The result is handle operating problems because the forces to be used to make locking rollers engage with the relevant striker plate are hard to overcome by rotating the handle through 26° only.

EP—A—0021820 discloses a multi-point lock by which the handle is turned for unlocking in one direction through an angle of 30° and in the opposite direction for locking through an angle of 90°. This dead lock position is released by a key-mechanism.

The object of the invention is to provide a lock of the said type where the optimum angle at the moment of unlocking (26°) is obtained without the handle rotation for overcoming the locking forces especially during the last movement of the locking means becoming too small in order to cause a high attraction. This is obtained according to the invention by the design specified in the claim.

In the following the invention is explained further in connection with the drawing where

Fig. 1 shows an "X-ray picture" of a multi-point lock according to the invention, as seen from one side,

Fig. 2 the lock viewed from one side in neutral condition after locking; in addition to which four movable main components are also shown in the correct angular positions outside the lock casing,

Fig. 3 the same view, but after unlocking,

Fig. 4 the same view, in the neutral condition after unlocking

Fig. 5 the same view, after locking,

Fig. 6 the four movable main components of the lock, viewed in perspective and mutually separated, and

Fig. 7 illustrates the connection between locking movement and rotation of the lock handle.

The multi-point lock shown on the drawing comprises a lock casing 11, not specified further, which is designed for insertion in a door leaf. The lock casing 11 contains a main guide — rotary part 1 — which can turn on an axle 20 at right angles to the plane of the drawing.

The rotary part 1 comprises two guide pins 21, 31 of which pin 21 is projecting into a first recess 23 of a main driver 2 which is vertically to and fro movable perpendicular to axle 20 which is extending through a second recess 27 in main driver 2. The dimensions of this recess are larger than that of axle 20 in order to allow linear

movement of driver 2 perpendicular to axle 20. This is clearly shown in the drawing.

The other guide pin 31 of rotary part 1 interacts with a recess 33 of a latch lever 4 that can be turned on said axle 20 and which is connected to a latch bolt 5 projecting from the lock casing 11 such that by turning the latch lever 4 the latch bolt 5 can be drawn into the lock casing 11 counteracting the force of a spring 6.

Further, the lock comprises a draw bar drive 3 which can be turned on another axle 30 at right angles to the plane of the drawing. The draw bar drive 3 is provided with a pin 29 projecting into a hole 28 of the main driver 2 provided with a third recess 26 allowing its linear movement in respect to axle 30.

The arrangement of these parts (especially shown in Fig. 6) is so chosen that by turning the rotary part 1 the main driver 2 is moved linearly effected by the interaction of guide pin 21 and the periphery of recess 23. The linear movement of the main driver 2 causes a rotation of draw bar drive 3 since pin 29 of bar drive 3 engages hole 28 of main driver 2. The draw bar drive 3 has a serration engaging a draw bar 7 which reciprocates when the draw bar drive 3 is turned.

At one or both of its ends axle 20 of rotary part 1 is provided with a handle (not shown) for operating the lock. The rotary part 1 is biased by a main spring 10 which tends to hold rotary part 1 in the neutral position shown in Figs. 2 and 4.

In the following the mode of operation is explained with reference to Figs. 2—5.

In Fig. 2 the rotary part 1 is in the neutral position after locking of the lock, in this condition main driver 2 and therewith draw bar 7 being in their respective lower position.

The lock is unlocked by turning rotary part 1 through 26° as shown in Fig. 3. This turn will cause guide pin 21 of the rotary part 1 to come into contact with the upper portion of the peripheral edge 24 of recess 23 and forces main driver 2 upwards. The pin 29 of draw bar drive 3 engaging hole 28 of the main driver 2 then causes the draw bar drive 3 to turn clockwise so that the draw bar 7 is moved upwards. The other guide pin 31 of rotary part 1 will at the same time engage recess 33 of latch lever 4 and turn it clockwise. The latch bolt 5 is thereby drawn into the lock casing 11 against the effect of spring 6 so that the lock is unlocked. When the handle is released, main spring 10 will move rotary part 1 to the neutral position as shown in Fig. 4, and spring 6 will force latch bolt 5 outwards.

As shown in any of the Figs. 2—5 the recess 23 of the main driver 2 comprises sufficient space such that rotary part 1 can turn back in the neutral position without carrying the main driver 2 downwards.

The latch bolt 5 can be drawn in again by the rotary part 1 being turned through 26° (Fig. 3). The guide pin 21 on the rotary part 1 will then only be shifted ineffectively in the recess 23 of the main driver 2.

Locking is effected by turning rotary part 1

through 45° starting from the neutral position in the opposite direction (Fig. 5). During this turn guide pin 21 comes in contact with the lower portion 25 of the periphery of recess 23 thereby carrying main driver 2 downwards. This downward movement is transmitted to the draw bar 7 via draw bar drive 3 pin 29 of which engages the hole 28 of main driver 2.

When the handle is released, the rotary part 1 will be moved by main spring 10 to the neutral position shown in Fig. 2.

As said before, recess 23 of the main driver 2 is designed so that rotary part 1 can turn back in the neutral position without carrying the main driver upwards.

Further it is shown in the Figs. 2—5 that the recesses 26 and 27 of the main driver 2 being crossed by axles 30 and 20 respectively are dimensioned such that the to and fro movement of the main driver 2 is not hindered by these axles.

Fig. 7 is a graphic representation of the relation between the movement of draw bar 7 and the turn of the rotary part 1 during locking. The attraction itself will take place when the draw bar has moved through 64% of the total movement. With a normal prior art lock it corresponds to a 28° rotation of the rotary part 1 as shown on curve I. With the prior art lock completion of the locking movement requires an extra turn through 45°—28° = 17°. Because of the increased ratio during the locking phase of the lock shown (curve II) a draw bar movement of 64% is obtained already after the rotary part 1 has turned through 21°. To complete the locking movement the rotary part 1 of the lock in question, therefore, has to be turned through another 45°—21° = 24°. The result is an easier movement of the handle and a higher attraction.

Claim

A multi-point lock comprising a draw bar (7) which can be moved reciprocally between a locking position (as seen in Fig. 5) and an unlocking position (as seen in Fig. 3) by rotation of a draw bar drive (3) and a handle which operates the lock, characterized in that a rotary part (1) which can be turned on an axis (20) by the handle, comprises a guide pin (21) projecting in a recess (23) of a linearly movable main driver (2) so that a rotation of the rotary part (1) causes a reciprocating of said main driver (2) which is provided with a tappet hole (28) engaged by a pin (29) which is attached on said draw bar drive (3) so that the reciprocating of said main driver (2) causes a rotation of the draw bar drive (3) and that said recess (23) of said main driver (2) is so dimensioned that a turn of the rotary part (1) through a predetermined angle (45°) from a neutral position will move the main driver (2) in one extreme position (as seen in Fig. 5) and a turn of the rotary part (1) through another predetermined angle (26°) which is considerably smaller than the first mentioned predetermined angle from the neutral

position in the other direction will move the main driver (2) in the opposite extreme position (as seen in Fig. 3).

Patentanspruch

Mehrfachschloß mit einer Zugstange (7), die zwischen einer Verschlussposition (sh. Fig. 5) und einer Offenposition (sh. Fig. 3) durch Drehung eines Zugstangenantriebs (3) hin- und herbewegt werden kann, und einem Handgriff zum Betätigen des Schlosses, dadurch gekennzeichnet, daß ein Drehteil (1), das mittels des Handgriffes um eine Achse (20) gedreht werden kann, einen Führungsstift (21) aufweist, der in eine Aussparung (23) eines linear bewegbaren Hauptmitnehmers (2) eingreift, so daß eine Drehung des Drehteils (1) ein Hin- und Herbewegen des Hauptmitnehmers (2) bewirkt, der mit einer Mitnehmerbohrung (28) versehen ist, in welche ein Stift (29) eingreift, der auf dem Zugstangenantrieb (3) angebracht ist, so daß die Hin- und Herbewegung des Hauptmitnehmers (2) eine Drehung des Zugstangenantriebs (3) bewirkt, wobei die Aussparung (23) des Hauptmitnehmers (2) so bemessen ist, daß eine Drehung des Drehteils (1) um einen vorbestimmten Winkel (45°) von einer neutralen Position den Hauptmitnehmer in eine extreme Position (sh. Fig. 5) bewegt und eine Drehung des Drehteils (1) um einen anderen vorbestimmten Winkel (26°), der erheblich kleiner als der erstgenannte vorbestimmte Winkel ist, von der neutralen Position in die andere Richtung den Hauptmitnehmer (2) in die entgegengesetzte extreme Position (sh. Fig. 3) bewegt.

Revendication

Serrure à points multiples comportant une tirette (7) que l'on peut déplacer alternativement entre une position verrouillée (visible sur la figure 5) et une position deverrouillée (visible sur la figure 3), en faisant tourner une pièce d'entraînement (3) de la tirette et une poignée qui actionne la serrure, caractérisée en ce qu'elle comporte une pièce tournante (1) qui peut tourner sur un axe (20) sous l'effet de la poignée et qui est pourvue d'un téton de guidage (21) engagé dans une cavité (23) d'un coulisseau principal (2) mobile en translation linéaire, de telle manière qu'une rotation de la pièce tournante (1) provoque un mouvement de va-et-vient du coulisseau principal (2) qui est pourvu d'un trou d'actionnement (28) dans lequel est engagé un téton (29) de ladite pièce d'entraînement (3) de la tirette, si bien que le mouvement de va-et-vient dudit coulisseau principal (2) provoque une rotation de la pièce d'entraînement (3) de la tirette, les dimensions de la cavité (23) et du coulisseau principal (2) étant choisies de telle manière qu'une rotation de la pièce tournante (1) d'une amplitude angulaire prédéterminée (45°) à partir d'une position neutre amène le coulisseau principal (2) dans une position extrême (visible sur la figure 5), et qu'une rotation de la pièce tournante (1) dans l'autre sens

et d'une autre amplitude angulaire prédéterminée (26°) qui est bien plus faible que l'amplitude angulaire mentionnée en premier lieu, à partir de

la position neutre, amène le coulisseau principal (2) dans la position extrême opposée (visible sur la figure 3).

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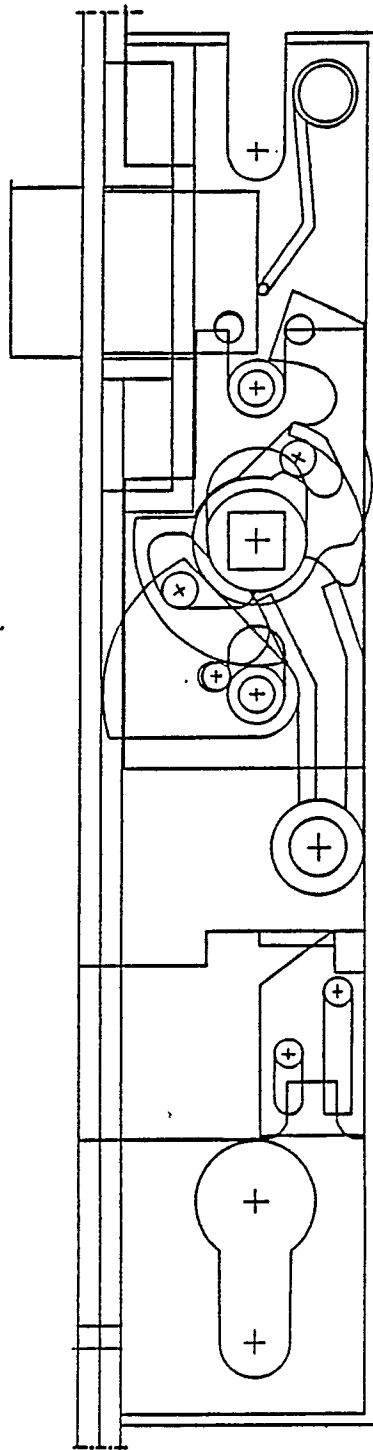


Fig. 1

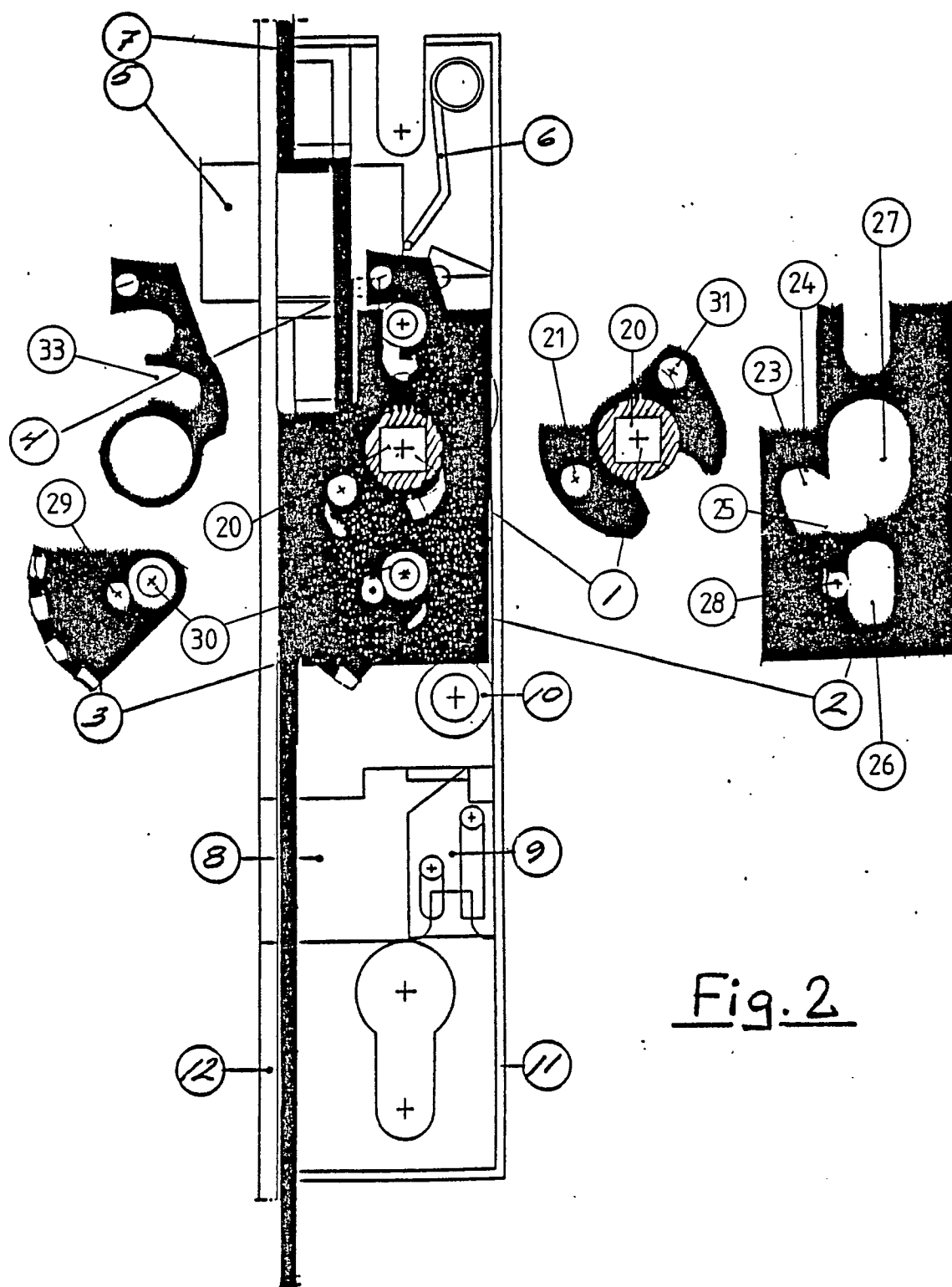
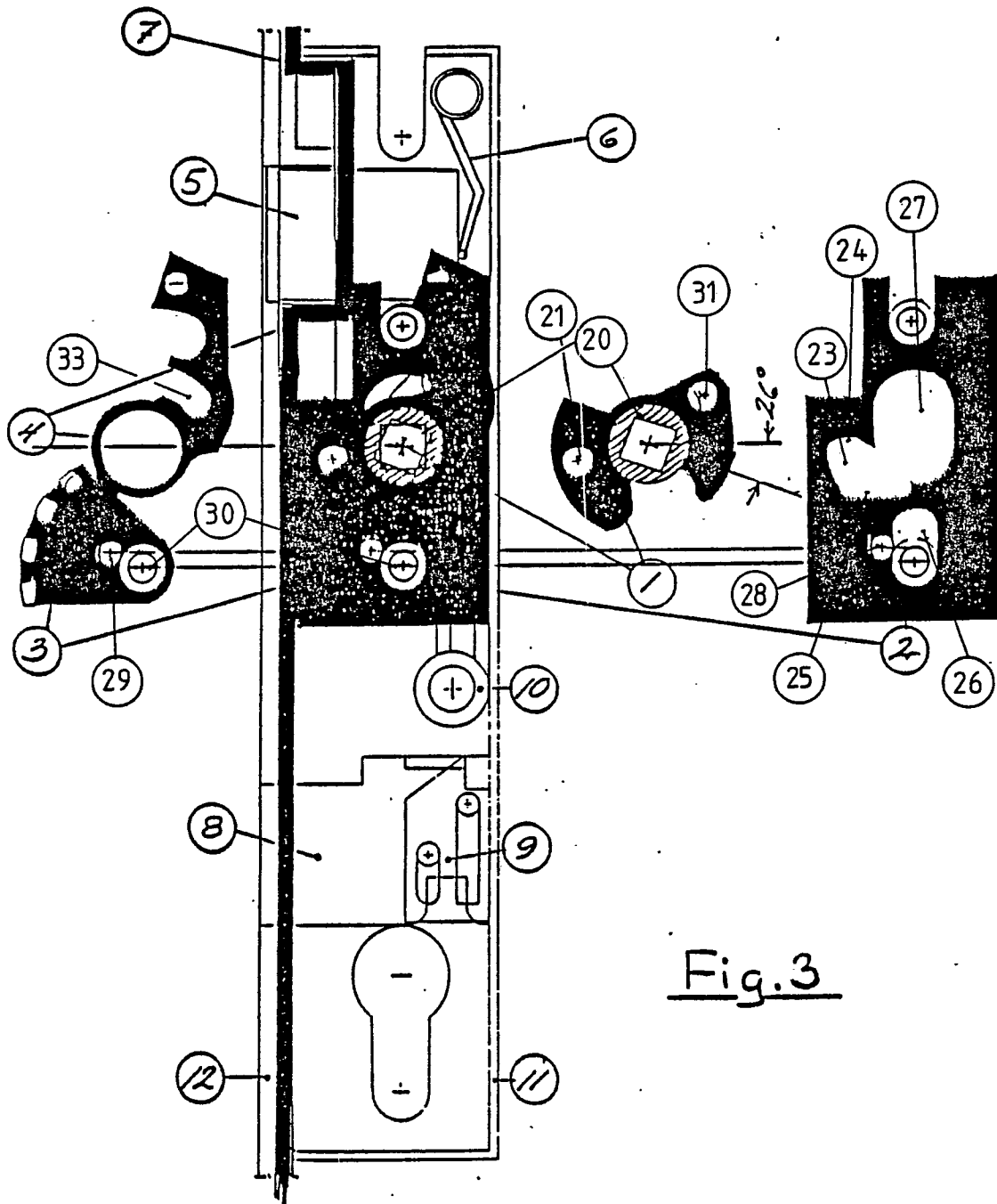
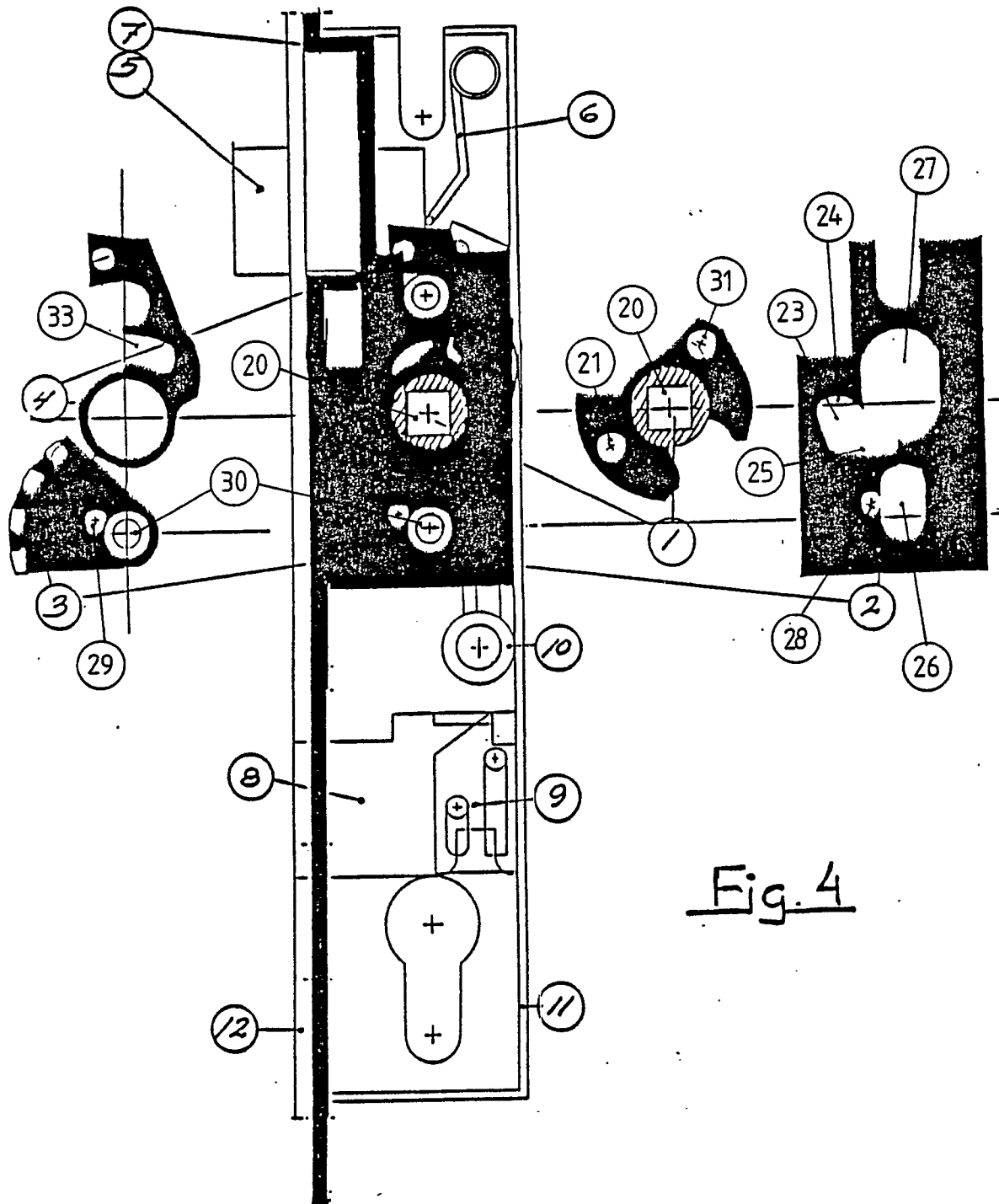


Fig. 2





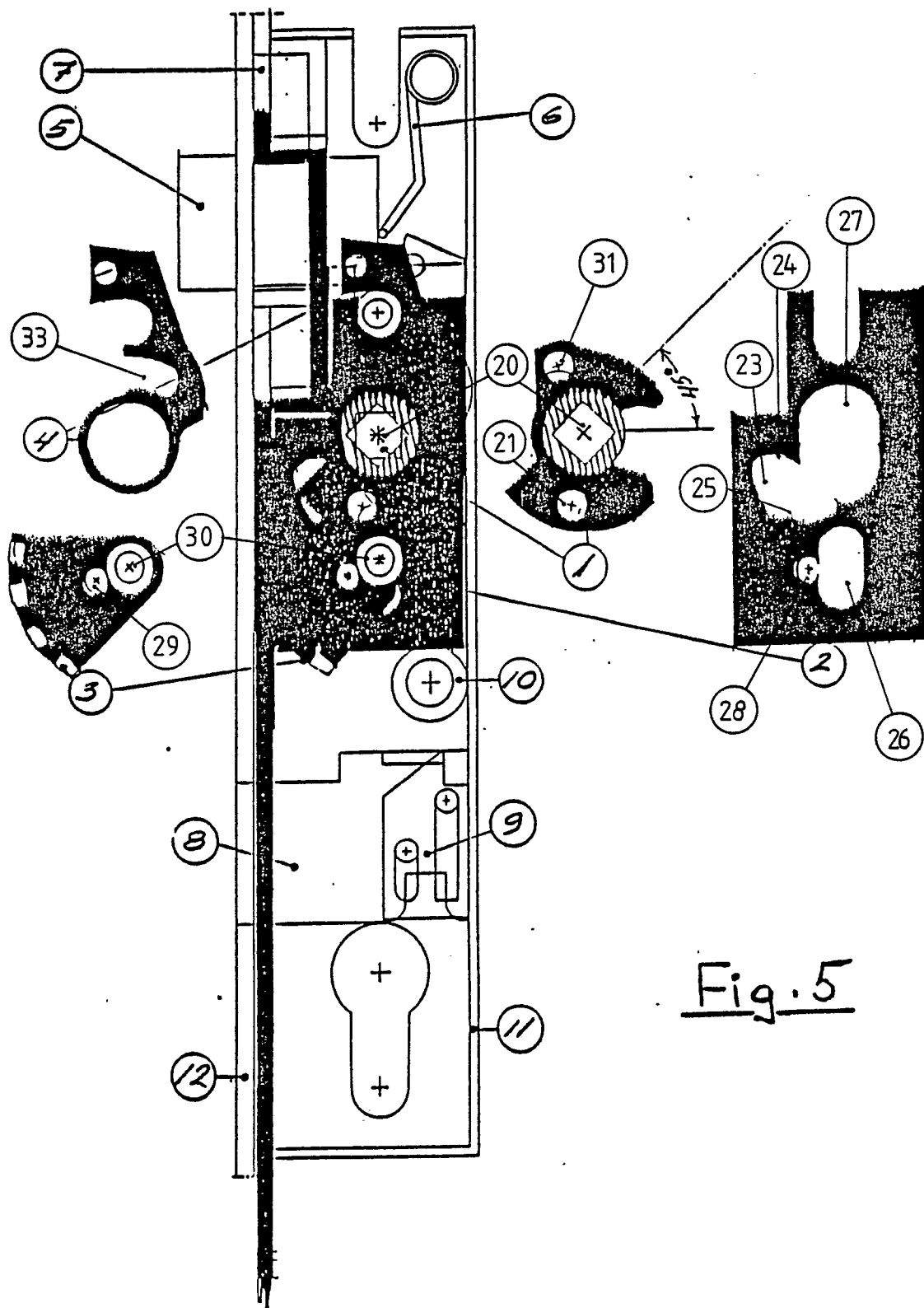


Fig. 5

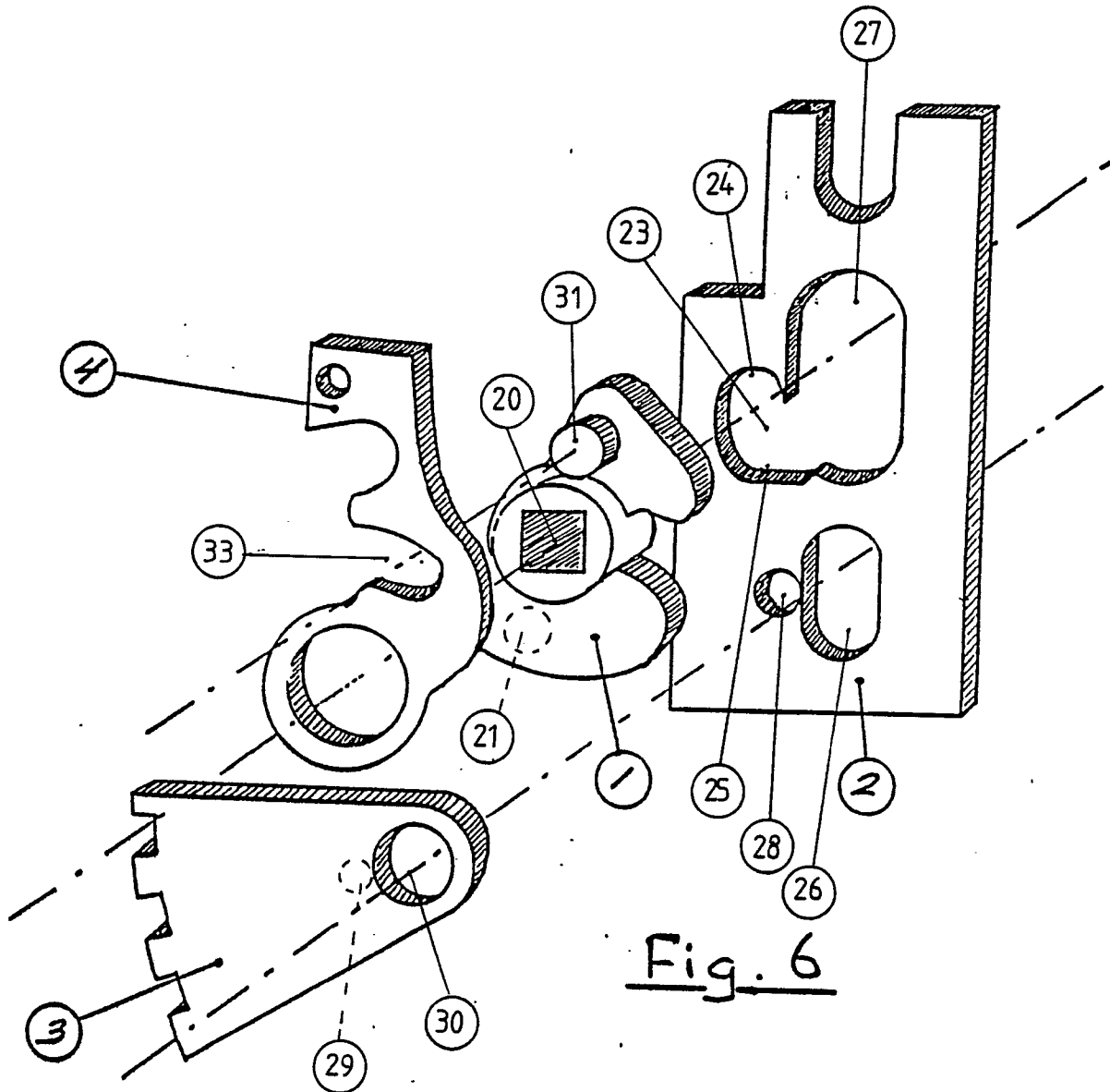


Fig. 6

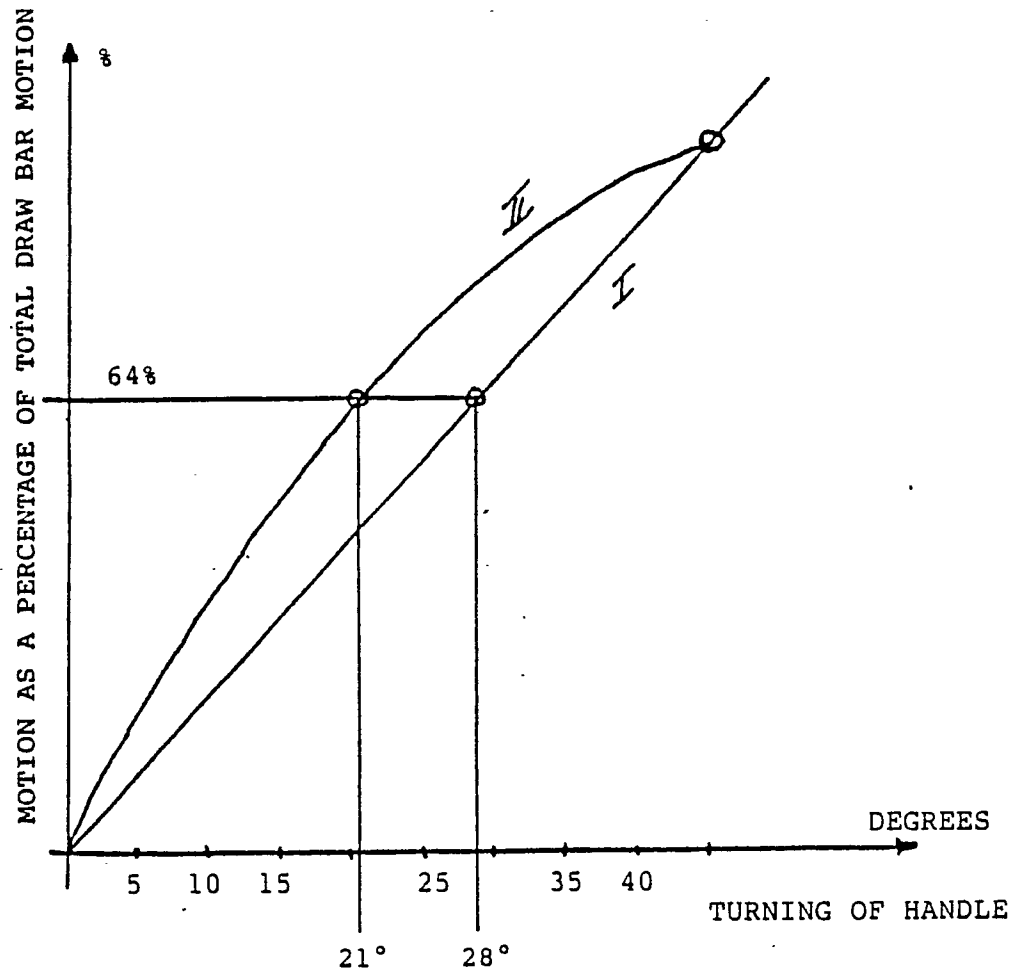


Fig. 7