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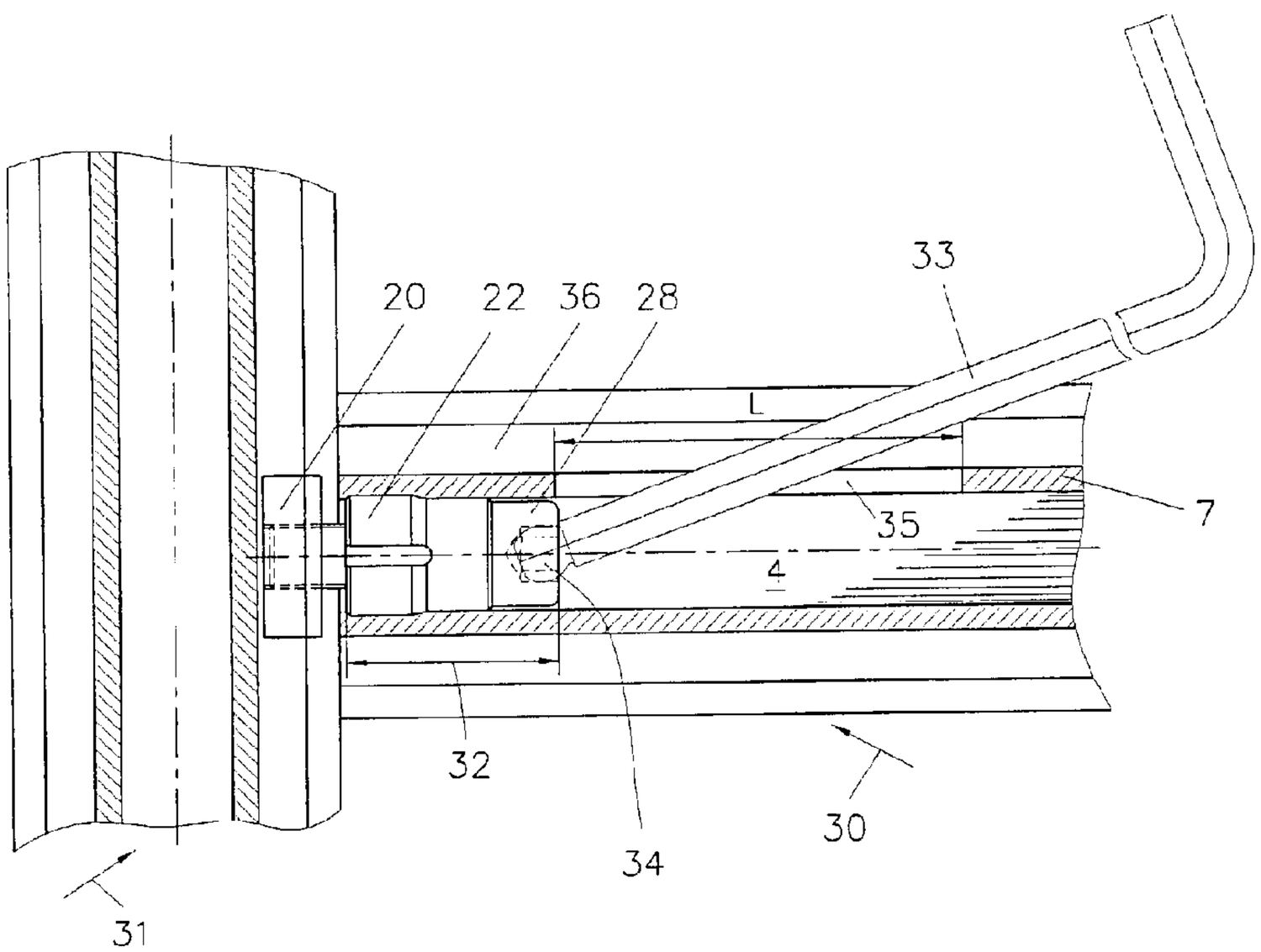


(57) Abrégé/Abstract:
The invention relates to a profile connecting system, comprising profile bars and connecting elements. The profile bars (30, 31) nave at least one axial elongated hole (4) and on the profile outer sides slots for nut block connections. In order to be able to assemble profile connections with minimal material and labour expenditure and in order to be able to avoid premachining operations on profile bars using machine tools and at the same time be able to transmit large forces, it is proposed to insert and fix an abutment, for example a threaded insert (22), in a self-cutting manner into the bore of an axial elongated hole (4) in a first profile bar (30). Adjacent to the installation length (32) of the threaded insert (22) and of the head of a screw (28), an axially running wrench opening (35) is to be provided in the tubular body (7) of the axial elongated hole (4). The length and width of the wrench opening (35) is to permit guidance therethrough of a socket wrench (33), with joints or with a substantially spherical socket wrench head (34) with flats, at an insertion angle to the longitudinal axis of the profile bar (30) and the coupling of the socket wrench to the head of the screw (28).

Abstract

The invention relates to a profile connecting system, comprising profile bars and connecting elements. The profile bars (30, 31) have at least one axial elongated hole (4) and on the profile outer sides slots for nut block connections. In order to be able to assemble profile connections with minimal material and labour expenditure and in order to be able to avoid premachining operations on profile bars using machine tools and at the same time be able to transmit large forces, it is proposed to insert and fix an abutment, for example a threaded insert (22), in a self-cutting manner into the bore of an axial elongated hole (4) in a first profile bar (30). Adjacent to the installation length (32) of the threaded insert (22) and of the head of a screw (28), an axially running wrench opening (35) is to be provided in the tubular body (7) of the axial elongated hole (4). The length and width of the wrench opening (35) is to permit guidance therethrough of a socket wrench (33), with joints or with a substantially spherical socket wrench head (34) with flats, at an insertion angle to the longitudinal axis of the profile bar (30) and the coupling of the socket wrench to the head of the screw (28).

Profile connecting system

The invention relates to a profile connecting system, comprising profile bars and connecting elements according to the precharacterising clause of Claim 1, and to a method for connecting profile bars.

Profile connecting systems having profile bars made of hot-pressed aluminium or of plastic with a wide variety of connecting elements are known.

The majority of profile connecting systems require machining operations in order to fasten the connecting elements to the profile bar ends, in particular precisely placed drilled holes transversely to the longitudinal axis of the profile bars. More recently, threads have also been cut into axial elongated holes of a first profile bar or self-cutting threaded inserts introduced. In the second profile bar, a screw is inserted through a drilled hole and clamped in the threaded insert in the first profile bar. In the event of alterations to and/or extensions of profile bar constructions at their places of use, e.g. at a trade fair, appropriate machinery is, however, in many cases not available. New profile bar constructions, alterations or extensions often have to be erected, however, at their places of use quickly, precisely and in many cases also for great loads using only simple assembly tools, such as for example a hand drilling machine etc.

A profile connecting system with polygonal profile bars, preferably with rectangular cross-sections, is known from EP 0458 069 A1. These profile bars have an axial elongated hole and on the profile outer sides slots for nut block

connections. In two mutually opposite slot chambers of a profile bar, abutments in the form of self-cutting threaded inserts are screwed in from the end side. In the process, each of the two threaded inserts cuts, at both flanges forming a T-slot and at the bottom of the slot chambers, in each case partial circumferential sections of a thread. The threaded inserts furthermore have a bore for inserting therethrough the shank of a screw in the form of a hexagon socket screw which establishes the profile connection with a nut block arranged in the second profile bar. Owing to the fact that the threaded inserts and the hexagon socket screw are arranged in two mutually opposite T-slot chambers of profile bars, at least two threaded inserts and two hexagon socket screws are required on both sides of a force-neutral bending axis to achieve symmetrical force transmission. The cost for in each case at least two threaded inserts, two hexagon socket screws and two nut blocks and in particular the assembly expenditure is correspondingly high for each bar connection. Furthermore, the shearing-off resistance for the threaded inserts in the self-cut short thread circumferential sections in the T-slot chambers is relatively low. In addition, the visible threaded inserts fitted on both sides in the open T-slot chambers restricts the use of the T-slots in their entirety, in particular insertion of planar elements, and also impairs the aesthetics of such profile bar constructions.

The object on which the invention is based is to overcome the disadvantages mentioned in the prior art and to provide a profile connecting system and a method for connecting polygonal profile bars which is cost-effective both from the point of view of material and the assembly expenditure

and enables profile bar connections without premachining operations on the profile bars using machine tools. Furthermore, profile bar connections for great loads are also to be producible. An essential additional objective is to provide, apart from right-angled end side to long side connections, also obtuse- or acute-angled end side to long side connections and mitre connections of approximately 10°-170°, as well as straight and bent end side to end side connections for great loads. Instead of self-cutting threaded inserts, new and modern anchoring systems, such as adhesive bonding, expansion bushes, spot welding etc., for fastening the abutment are also to be usable.

This object is achieved according to the invention by the sum of the features of Device Claim 1 and and/or Method Claim 22.

With the profile connecting system according to the invention and/or the method for connecting polygonal profile bars, it is possible, by means of an insertable abutment and a screw which are arranged in the bore of the elongated hole in the first profile bar, to clamp a tie anchor arranged in the second profile bar without having to perform machining operations on the profile bars by means of machine tools. This makes it possible to design and erect profile bar constructions at the place of use without having to perform costly and time-consuming machining operations in workshops. Furthermore, generally only one each of the necessary connecting elements, comprising abutment, screw and tie anchor, is required per connection. This saves costs on material and labour, as well as time between design and erection of the profile bar construction. Owing to the arrangement of the connecting

elements in the axial elongated hole of the first profile bar, the connection can also absorb high static and/or dynamic forces accordingly. The various fastening options for the abutment in the round bore of the axial elongated hole and the choice of various different tie anchors allows the system according to the invention to be used quickly and cost-effectively for all connections which are frequently employed in practice, such as end side to long side connections, mitre connections and end side to end side connections, at different connecting angles.

The abutment can be introduced and fixed in the round bore of the axial elongated hole in a wide variety of ways. In principle, all currently known fastening techniques, such as adhesive bonding, synthetic resin bonding, expansion bushes, spot welding etc., can be used. According to one exemplary embodiment, the abutment can be designed as a threaded insert with a self-cutting external thread which is inserted into the bore of the axial elongated hole.

Likewise, for the coupling between a socket wrench for clamping a screw, a wide variety of embodiments are known in the prior art. Examples of coupling profiles which may be mentioned are hexagon sockets, hexalobular sockets, cross recesses etc. Furthermore, in the use of the invention, all embodiments of axially rotatable socket wrenches which can be inserted obliquely through the outer slot and through the wrench opening can be employed, such as for example those having a cardan joint, articulation axis etc. According to one exemplary embodiment, it is proposed to use the screw having a cylindrical head with a hexagon socket. Such screws are available at low cost worldwide as standard screws and can be coupled by the

screw head to a hexagon socket wrench with a spherical wrench head, at an angle, preferably of between 15° and 50°, to the longitudinal axis of the profile bar, through the wrench opening.

In the case of square profile cross-sections, the bore of the axial elongated hole is arranged as a central bore and has two force-neutral bending axes. In the case of rectangular cross-sections, generally two or more axial elongated holes are arranged along one force-neutral bending axis of the profile bar, into which holes abutments can be inserted, as required.

The wrench opening can be preformed during the profile production as an open slot or as a tear-open slot. In the prior-art profiles, preformed wrench openings or profile cross-sections with tear-open slots are absent. According to one exemplary embodiment, it is proposed to open the wrench opening using assembly tools over a length of approximately 40-80 mm adjacent to the installation position of the abutment and of the head of the screw in the profile bar.

Tilting of the threaded insert while it is being screwed into axial elongated holes of profile bars can be avoided, in particular with mitred profile bar connections, if the threaded inserts comprise a guide part over approximately 50% of their length with an approximately play-free sliding tolerance with respect to the elongated hole, and a threaded part over approximately 50% of their length.

Cutting edges on the self-cutting threaded part, which is advantageously slightly conically shaped, can be created

for example by at least one clamping slot etc. on the threaded part.

The longitudinal bore in the threaded insert has two tasks to fulfil. On the one hand, it must be large enough for the guidance of the screw therethrough and, on the other hand, it must provide form-fitting access for a clamping tool for screwing the threaded insert into the profile bars. According to one feature of the invention, the longitudinal bore is provided in the threaded insert over a partial length with, for example, a hexagon socket for inserting a hexagon socket wrench etc.

The wrench opening for the guidance of a socket wrench through the tubular body of the axial elongated hole can be produced at the place of use of the profile bar construction with a hand drilling machine, a small hand router, a small cutting disc etc. According to an additional feature of the invention, a tear-open slot for opening the wrench opening over a predetermined length by means of simple assembly tools can be provided in the cross-section of the tubular body forming the axial elongated hole. Such a tear-open slot reduces the erection time of a profile bar construction quite considerably. Furthermore, any damage to the slot flanges at the profile outer sides is avoided, so that the latter are available without restriction for further connections. Devices for covering wrench openings for design reasons can also be dispensed with.

In order to anchor self-cutting threaded inserts in the axial elongated hole without great expenditure of force, according to one exemplary embodiment the axial elongated

hole can be provided along the circumference with axially running ribs. The height of the ribs can be dimensioned somewhat greater than the intended thread depth, and the rib spacing can be dimensioned equal to or greater than the rib width.

Apart from right-angled profile bar connections, there is also often a need for obtuse- or acute-angled mitre connections with angles of between 10°-170° and straight axial connections. Such additional connection examples can be produced with the same clamping elements, comprising insertable abutments or threaded inserts, screws, and tie anchors adapted to the desired connection, using the same clamping method. Apart from the simple nut block with threads cut transversely or obliquely to the slot longitudinal axis, nut blocks having an articulated cylindrical nut with a blind-hole thread for the screw, two cylindrical nuts connected by a joint and each with a blind-hole thread for screws, a cylindrical nut open at both ends and with an internal thread for screws or an abutment with a continuous thread etc. can be used as tie anchors.

For the transmission of large forces, the cylindrical nuts can have, according to one exemplary embodiment, an outside diameter which is smaller by a sliding tolerance than the bore of the axial elongated hole.

Additional security against displacement of a right-angled end side to long side node can be achieved, according to a further exemplary embodiment, if a point with an angle of approximately 90° is made on the shank of the screw and the

length of the shank permits notching in the slot bottom of the second profile bar.

With the connecting system according to the invention, it is possible for the width of the wrench opening to be adapted to or be less than the width of the T-slots arranged at the outer sides of the profile bar. Generally, the width of the wrench opening is adapted to the width of the slot preceding it. This restriction of the width of the wrench opening allows the wrench opening to be provided as a continuous wrench slot in the cross-section of the profile bar during its production and the bending strength, reduced thereby, of the profile bar to be regained by cross-sectional optimisation, if necessary. In the case of a continuous wrench slot, an abutment fixing in the axial elongated hole by adhesive bonding instead of a self-cut threaded can be particularly advantageous.

In the use of the connecting system according to the invention, apart from the low-cost simple connecting elements, the small number of simple method steps which can all be performed at the place of erection or use of the profile bar construction also contribute to the cost-effectiveness.

Depending on the position of the connecting node in the profile bar construction, the introduction and guidance of the screw through the axial elongated hole to the abutment may be time-consuming and difficult. In order to avoid these difficulties, it is proposed according to one exemplary embodiment to arrange an inwardly projecting annular edge in the abutment or in the threaded insert at the end of the longitudinal bore on the side of the guide

part. The annular edge can be dimensioned such that it engages with play in the thread of the screw and loosely holds the screw in the threaded insert.

The invention will be additionally explained below with the aid of examples, in which:

Fig. 1 shows one example of a cross-section of a profile bar,

Fig. 2 shows three connecting elements necessary for a profile bar connection,

Fig. 3 shows a right-angled profile bar connection in the fully assembled state,

Fig. 4 shows a plan view of Fig. 3 with the socket wrench removed,

Fig. 5 shows a further example of a cross-section of a profile bar,

Fig. 6 shows a further example of a right-angled profile bar connection,

Figs. 7 and 7a show further examples of acute-angled profile bar connections,

Fig. 8 shows a further example of a straight axial profile bar connection, and

Fig. 9 shows a further example of a cross-section of a profile bar.

Fig. 1 is a typical square cross-section of a profile bar 2 for profile bar constructions. Such profile bars 2 generally have, on at least one profile outer side, slots 3 for receiving nut blocks. Arranged in the centre of the cross-section is an axial elongated hole 4 which has force-neutral bending axes 5 and 6. In a rectangular cross-section, for example, two axial elongated holes with only

one force-neutral bending axis could be arranged. Situated in a tubular body 7 which encloses the axial elongated hole 4 and which is indicated by a chain line is a wrench opening 8 which has a width approximately equal to that of the slot 3 and is additionally explained in Fig. 3. Axially running ribs in the axial elongated hole 4 are illustrated at 9. Such ribs 9 facilitate the cutting of threads, in particular by means of self-cutting threaded inserts.

In Fig. 2, at 20 a nut block adapted to a slot chamber cross-section is provided with a thread 21. Instead of such nut blocks 20, simple plate-shaped nut blocks may also be employed. A threaded insert 22 with a self-cutting, advantageously conically shaped, externally threaded part 23 and a guide part 24 constitutes one exemplary embodiment of an abutment. Other exemplary embodiments for abutments are adhesive bonding sleeves, expansion bushes, etc. The threaded part and the guide part each take up approximately 50% of the total length of the threaded insert 22. The threaded insert 22 is furthermore provided with a bore 25 for guiding the shank 29 of a hexagon socket screw 28 therethrough. On the side of the threaded part 23 the bore 25 is widened over a partial length to a hexagon socket 26 for inserting a hexagon socket wrench. On the opposite side of the hexagon socket 26, the longitudinal bore 25 may be provided with an inwardly projecting annular edge 41. To produce cutting edges on the external thread 23, at least one clamping slot 27 is provided. The length of the shank 29 of the hexagon socket screw 28 may be determined by the choice of the length and the screwing-in depth of the threaded insert 22 in the profile bar and, if desired, standard shank lengths may be chosen. The head of the hexagon socket screw 28 is provided with a hexagon socket.

Instead of the hexagon socket screw, screws and other coupling profiles for socket wrenches may be chosen. The screw 28 may have on the shank 29 a point 40 with an angle of approximately 90°.

In Figs. 3 and 4, a first profile bar 30 is connected to a second profile bar 31 by the connecting elements illustrated in Fig. 2 and comprising nut block 20, threaded insert 22 and hexagon socket screw 28. A hexagon socket wrench 33 with a spherical hexagon socket wrench head 34 is illustrated still inserted in Fig. 3. The assembly of the connection is effected according to the following method steps. A wrench opening 35 is made, by means of assembly tools, in the first profile bar 30 adjacent to the installation length 32 of the threaded insert 22 and of the hexagon socket screw 28 in the tubular body 7 surrounding the axial elongated hole 4. The length (L) of the wrench opening 35 is chosen so as to be sufficient to insert the hexagon socket wrench 33 or an articulated wrench etc. Subsequently, the self-cutting threaded insert 22 is screwed by means of a hexagon socket wrench into the axial elongated hole 4 in the first profile bar 30 from the end side and in doing so a thread is simultaneously cut in the elongated hole 4. The guide part 24 (Fig. 2) ensures centring of the threaded insert 22 in the elongated hole 4. The hexagon socket screw 28 can now be introduced from the other end of the profile bar 30 into the elongated hole 4 and through the bore 25 (Fig. 2) of the threaded insert 22. The hexagon socket wrench 33 can now be inserted, by its approximately spherical hexagon socket wrench head 34 with flats, obliquely, i.e. at an angle of between approximately 10°-40°, into the hexagon socket in the head of the hexagon socket screw 28 and, after positioning the nut block 20 in

the second profile bar 31, the connection of the two profile bars can be established by means of the hexagon socket screw and the hexagon socket wrench can subsequently be removed. The T-slot chamber 36 above the wrench opening 35 remains undamaged, as can be seen in Fig. 4, and is available for further profile bar connections etc. as required.

In many cases, it is advantageous to be able to introduce the screw into the bore of the axial elongated hole together with the abutment. For this purpose, at the guide-side end in the abutment or in the threaded insert 22, the longitudinal bore 25 (Fig. 2) is provided with an inwardly projecting annular edge 41 which can engage loosely in the thread of the screw 28. The screw can be fastened by its thread to this annular edge 41 and screwed into the profile bar together with the threaded insert. As the screw 28 is being clamped to the tie anchor 20, the annular edge 41 loses the holding function on the end of the thread in the region of the screw head and thus enables correct clamping of the tie anchor.

Fig. 5 illustrates a cross-section of a profile bar 50 according to one exemplary embodiment. An essential difference of this profile bar 50 from the cross-section in Fig. 1 consists in the formation of an axial elongated hole 51. At 53 a tear-open slot has been preformed in a tubular body 52 (indicated by chain lines) during the production of the profile bar 50. Such a tear-open slot 53 has on both sides preformed reduced cross-sections 54, 54' which form predetermined tear-open locations. After a delimiting hole has been drilled into the tear-open slot 53 at each end of an intended wrench opening, the tear-open slot 53 between

the two drilled delimiting holes can be opened by tearing open, by means of a rod-shaped tool, for example a screwdriver, and the intended wrench opening can thereby be made quickly and dimensionally accurately in terms of its width and length. Since the length of the wrench opening is only approximately 5 cm to 8 cm, i.e. is only a small fraction of the profile bar length, the loss in strength as a result of the opened tear-open slot is negligible. Also, the approximately 60°-reduced circumference of the bore of the axial elongated hole 51 available for cutting a thread for a threaded insert or for adhesively bonding an abutment therein is still sufficient to absorb high static and dynamic forces of the profile connection. At 55, axially running ribs along the circumference of the bore of the axial elongated hole 51 are illustrated. The height of the ribs 55 is somewhat greater than an intended thread depth of a threaded insert. A rib spacing 56 is chosen to be approximately equal to or greater than a rib width 57.

Fig. 6 illustrates a mitred profile bar connection 60 at an angle of 90°. The angle could also be less than or greater than 90°, for example 150°. The two profile bars 61 and 62 are cut at the end side at an angle of 45°. In each bar, a threaded insert 22, 22' is screwed into the bore of the elongated holes 4, 4'. A tie anchor 63 comprises two cylindrical nuts 64, 64', each with a blind-hole thread 65, 65' for the hexagon socket screws 28, 28'. On the sides facing away from the blind-hole thread 65, 65', the two cylindrical nuts 64, 64' are connected by a joint 67. Using the two hexagon socket screws 28, 28', the tie anchor 63 is clamped in the profile bars 61, 62 against the threaded inserts 22, 22' and thus the mitre connection is established. The wrench openings are indicated at 35, 35'.

Fig. 7 shows an acute-angled end side to long side connection. The tie anchor 71 comprises a nut block 72 having an articulated cylindrical nut 73 with a blind-hole thread 74 for the hexagon socket screw 28. The wrench opening is indicated at 35. Instead of the nut block 72 having the articulated cylindrical nut 73, it is possible, as illustrated in Fig. 7a, for the hexagon socket screw 28 to engage directly in a nut block 20 with an obliquely arranged thread 21.

Fig. 8 illustrates a straight axial end side to end side connection. A tie anchor 81 in the form of a cylindrical nut 82 open at both ends is provided with an internal thread 83 for the hexagon socket screws 28, 28'. The cylindrical nut 82 is introduced into the bore of the axial elongated hole 4, 4' in the first and second profile bar 84 and 85, respectively, by a partial length in each case and is clamped to the threaded inserts 22, 22' by the hexagon socket screws 28, 28'. The wrench opening is indicated at 35, 35'. In the case of a substantially straight end side to end side connection, in a variant, the use of the cylindrical nut 82 can be dispensed with if one of the two threaded inserts 22, 22' is provided with a nut thread in the through-hole for an elongated screw. The elongated screw can then be directly clamped in the threaded insert of the profile bar to be connected. This variant is not illustrated in Fig. 8.

In Fig. 9, in the cross-section of a profile bar 90, a wrench slot 95 has been formed in the tubular body 91, which forms the axial elongated hole 4, during the pressing of the profile bar. In this example, the width of the

wrench slot 95 corresponds to the width of an outer slot 96. The wrench slot 95 in the tubular body 91 reduces the bending moment of the profile bar 90. By suitably increasing the wall thickness of the tubular body 91, the bending moment of the profile bar 90 can be increased again, if necessary. With such profile bars 90, opening of a wrench opening is no longer necessary and profile bar constructions can be erected at the place of use even more quickly with a minimum of assembly tools. Profile bars 90 with an elongated wrench slot 95 can be used with additional advantage for abutment fastenings using adhesives, synthetic resins etc. The wrench slot 95 in the tubular body 91 can, for example, be filled with the adhesive etc. and closed off over the length of the abutment after installation of the abutment in the profile bar.

Claims

1. Profile connecting system, comprising profile bars and connecting elements, the profile bars having a polygonal, preferably a rectangular, cross-section and on the profile outer sides slots (3, 36) for nut block connections and the connecting elements comprising insertable abutments which are axially insertable and fixable in the first profile bar (30), the abutments having through-bores for guiding screws (28) therethrough which are supported on the abutments and clamp tie anchors arranged in the second profile bar (31), characterised in that the abutment is insertable and fixable in a bore of an axial elongated hole (4, 51) and there is provided in a tubular body (7, 52) surrounding the bore an axially running wrench opening (35) which permits guidance therethrough of a socket wrench (33), with joints or with a substantially spherical socket wrench head (34) with flats, at an angle to the longitudinal axis of the profile bar (30) and the coupling of the socket wrench to the head of the screw (28).

2. Profile connecting system according to Claim 1, characterised in that the abutment is designed as a threaded insert (22) with a self-cutting external thread (23) which cuts a thread in the bore of the first profile bar (30).

3. Profile connecting system according to Claim 1 or 2, characterised in that the screw (28) has a cylindrical head with a coupling profile for the socket wrench (33), preferably with a hexagon socket.

4. Profile connecting system according to one of Claims 1 - 3, characterised in that the socket wrench (33) is advanceable to the head of the screw through the gap of a slot (3, 36) on the profile outer side and through the wrench opening (35) at an angle of between 10° and 50°, preferably between 20° and 40°.

5. Profile connecting system according to one of Claims 1 - 4, characterised in that the bore of the axial elongated hole (4, 51) has at least one force-neutral bending axis (5, 6) of the profile bar (30).

6. Profile connecting system according to one of Claims 1 - 5, characterised in that the wrench opening (35) has a length (L) of approximately 40-80 mm adjacent to the installation position (32) of the abutment and of the head of the screw (28) in the profile bar (30).

7. Profile connecting system for a right- or obtuse- or acute-angled end side to long side connection according to one of Claims 1 - 6, characterised in that the tie anchor comprises a nut block (20) with an internally threaded hole (21) for the screw (28), the internally threaded hole (21) is made at right angles (Fig. 2) or obliquely (Fig. 7a) in the nut block (20) and the nut block (20) is arranged in the second profile bar (31) in a T-slot.

8. Profile connecting system for an obtuse- or acute-angled end side to long side connection according to one of Claims 1 - 6, characterised in that the tie anchor (71) comprises a nut block (72) having an

articulated cylindrical nut (73) with a blind-hole thread (74) for the screw (28) and the nut block (72) is arranged in the second profile bar (31) in a T-slot.

9. Profile connecting system for a mitre connection between approximately 10°-170° according to one of Claims 1 - 6, characterised in that the tie anchor (63) comprises two cylindrical nuts (64, 64'), each with a blind-hole thread (65, 65') for screws (28, 28') and connected by means of a joint (67) on the side facing away from the blind-hole thread (65, 65'), and the cylindrical nuts (64 and 64' respectively) are introducible into the bore of the axial elongated hole (4) in the first and in the second profile bar (30 and 31 respectively) and clampable by means of the screws (28, 28').

10. Profile connecting system for straight axial end side to end side connections according to one of Claims 1 - 6, characterised in that the tie anchor (81) comprises a cylindrical nut (82) open at both ends and having an internal thread (83) for the screws (28, 28'), and a partial length of the cylindrical nut (82) is introducible into the bore of the axial elongated hole (4, 4') in the first and in the second profile bar (84, 85 respectively) and clampable by means of the screws (28, 28').

11. Profile connecting system for straight axial end side to end side connections according to one of Claims 1 - 6, characterised in that the threaded insert (22) in one of the two profile bars is provided with an

internal thread and simultaneously performs the function of abutment and tie anchor.

12. Profile connecting system according to one of Claims 8 - 10, characterised in that the cylindrical nuts (64, 64', 73, 81) have an outside diameter which is smaller by a sliding tolerance than the diameter of the bore of the axial elongated hole (4).

13. Profile connecting system according to one of Claims 2 - 12, characterised in that the threaded insert (22) comprises a guide part (24) over approximately 50% of its length and a threaded part (23) over approximately 50% of its length.

14. Profile connecting system according to Claim 13, characterised in that the threaded part (23) is provided with at least one clamping slot (27).

15. Profile connecting system according to one of Claims 2 - 14, characterised in that the longitudinal bore (25) of the threaded insert (22) has over a partial length a hexagon socket (26) for inserting a hexagon socket wrench.

16. Profile connecting system according to one of Claims 1 - 15, characterised in that the screw (28) has on the shank (29) a point (40) with an angle of approximately 90° and the length of the shank (29) permits notching into a slot bottom of the second profile bar.

17. Profile connecting system according to one of Claims 1 - 16, characterised in that the cross-section of the profile bar (50) has, in the tubular body (52) forming the axial elongated hole (51), a tear-open slot (53) with preformed predetermined tear-open locations (54, 54') for opening a wrench opening (35) over a predetermined length (L) by means of assembly tools.

18. Profile connecting system according to one of Claims 1 - 5 and 7 - 16, characterised in that a wrench slot (95) is provided in the cross-section of a profile bar (90) in the tubular body (91) forming the axial elongated hole (4).

19. Profile connecting system according to one of Claims 1 - 18, characterised in that the axial elongated hole (4, 51) is provided along the circumference with axially running ribs (9, 55), the height of which is somewhat greater than an intended threaded depth for the threaded insert (22), and the rib spacing (56) is dimensioned equal to or greater than a rib width (57).

20. Profile connecting system according to one of Claims 1 - 19, characterised in that the width of the wrench opening (95) is equal to or less than the width (96) of the slots (97) on the profile outer side.

21. Profile connecting system according to one of Claims 1 - 20, characterised in that, at the end of the longitudinal bore (25) on the side of the guide part (24) in the abutment or in the threaded insert (22), the longitudinal bore is provided with an inwardly

projecting annular edge (41) for engagement in the thread of the screw.

22. Method for connecting polygonal profile bars according to one of Claims 1 - 21, characterised in that from an end side of the first profile bar (30) the abutment, preferably the self-cutting threaded insert (22), is introduced and fixed, together with the screw, into the bore of the axial elongated hole (4), the socket wrench (33) is inserted, at an insertion angle of between approximately 10° to 40° to the longitudinal axis of the first profile bar (30), through the wrench opening (35) provided in the tubular body (7, 52) into the head of the screw (28), and the tie anchor arranged in the second profile bar (31) is clamped by means of the screw (28).

23. Method according to Claim 22, characterised in that, before or after the introduction and fixing of the abutment, adjacent to the predetermined installation position (32) of the abutment, preferably of the threaded insert (22) and of the head of the screw (28), the wrench opening (35) is opened in the first or in the first and in the second profile bar by drilling, milling etc. by means of assembly tools, such as a hand drilling or hand routing machine etc.

24. Method according to Claim 22, a tear-open slot (53) with preformed predetermined tear-open locations (54, 54') being provided in the profile cross-section in the tubular body (52) surrounding the elongated hole, characterised in that, before or after the introduction and fixing of the abutment, the wrench

opening (35) is opened in the first or in the first and in the second profile bar by means of assembly tools by punching out or tearing open the tear-open slot (53) over a predetermined length (L).

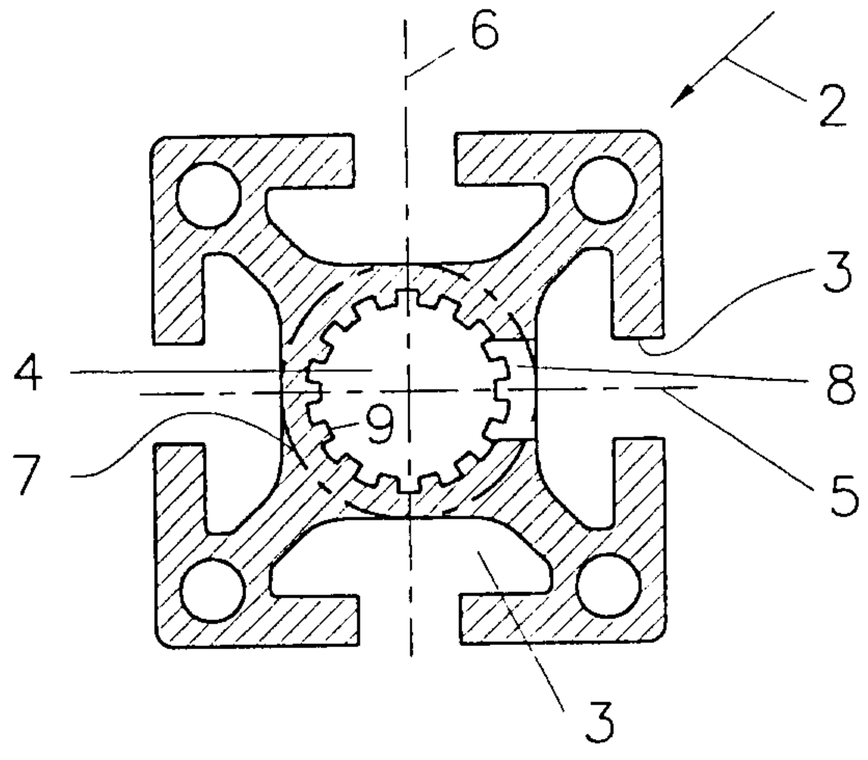


Fig.1

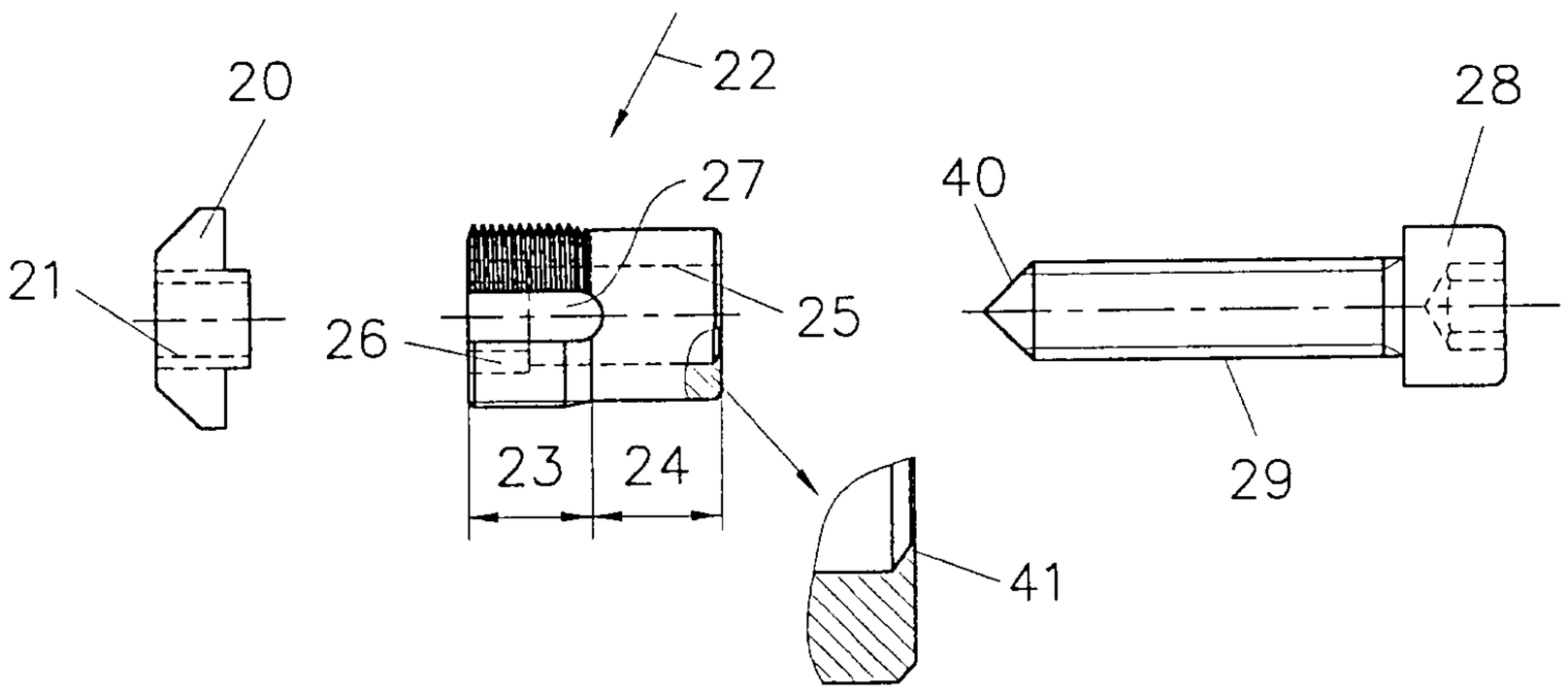


Fig.2

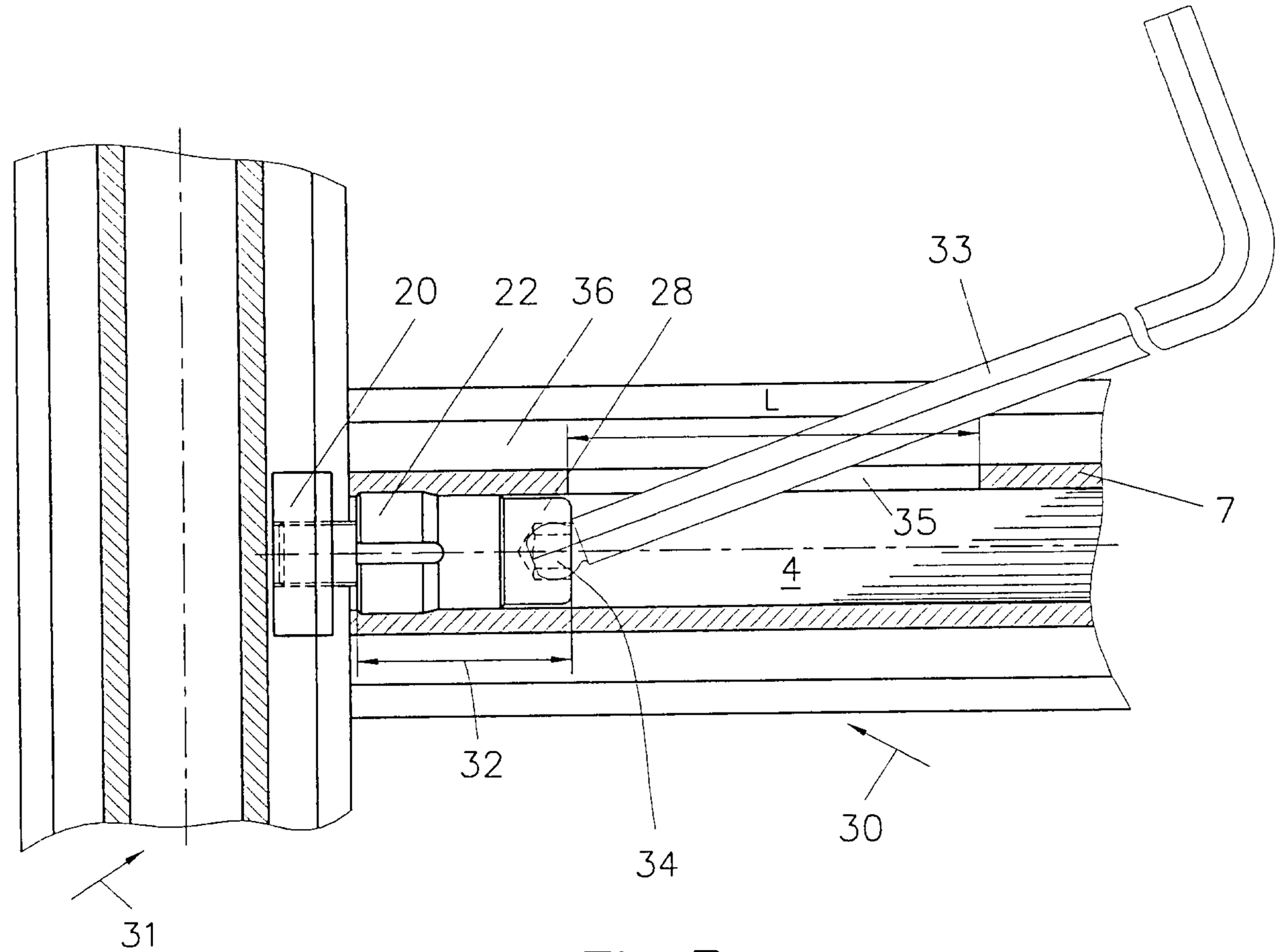


Fig.3

Fig.4

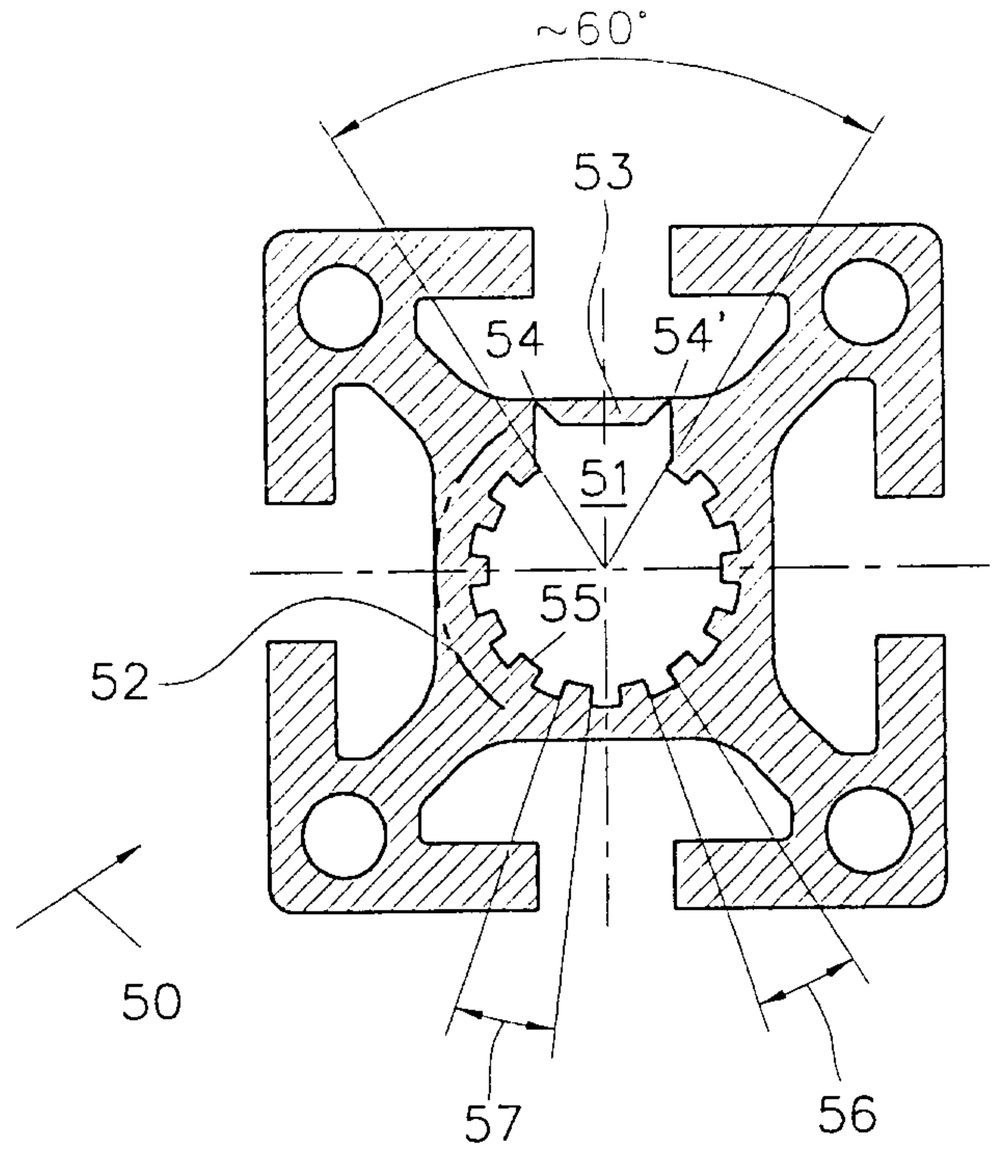

~60°
53
54
54'
51
55'
55
52
50
57
56

Fig.5

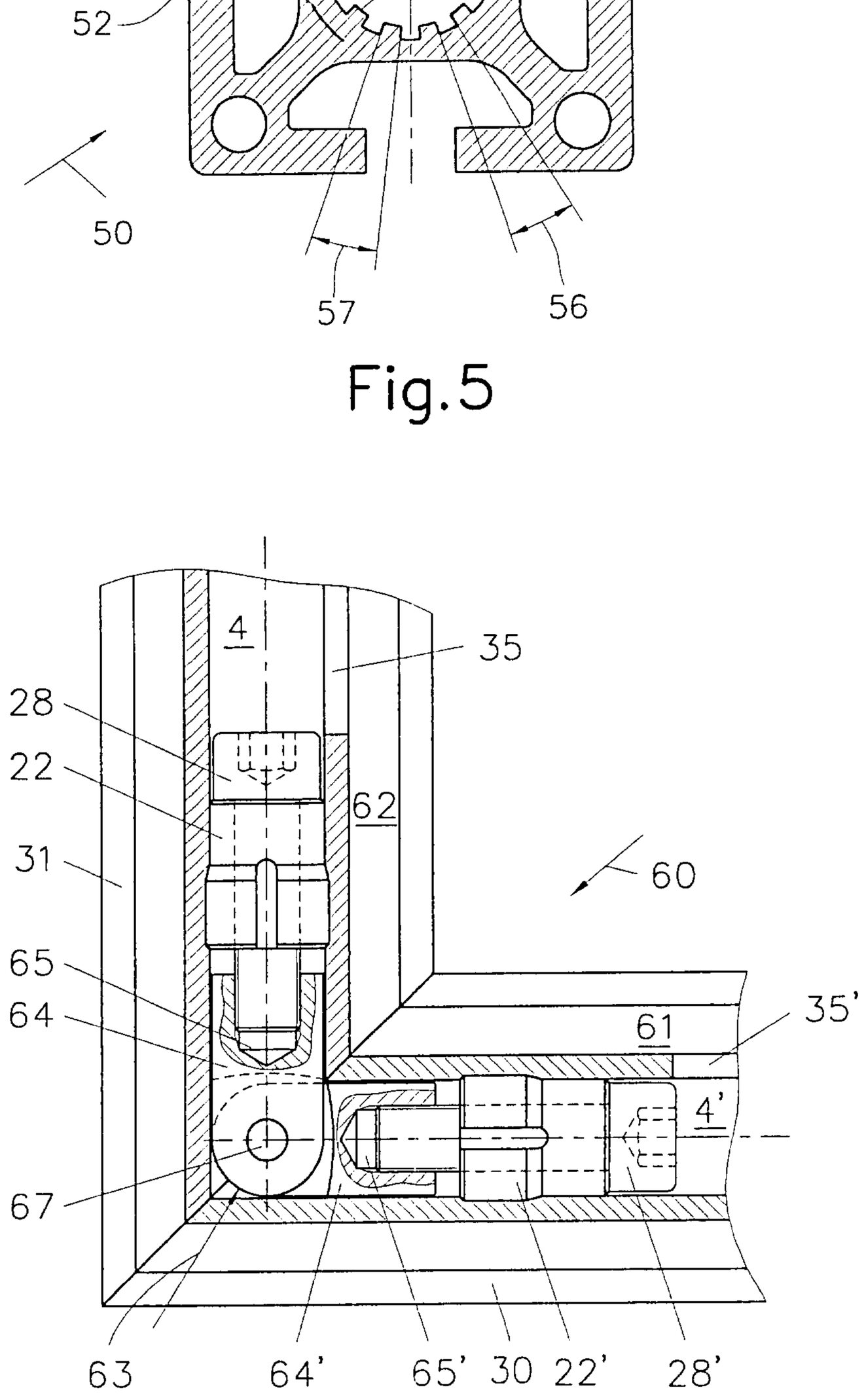
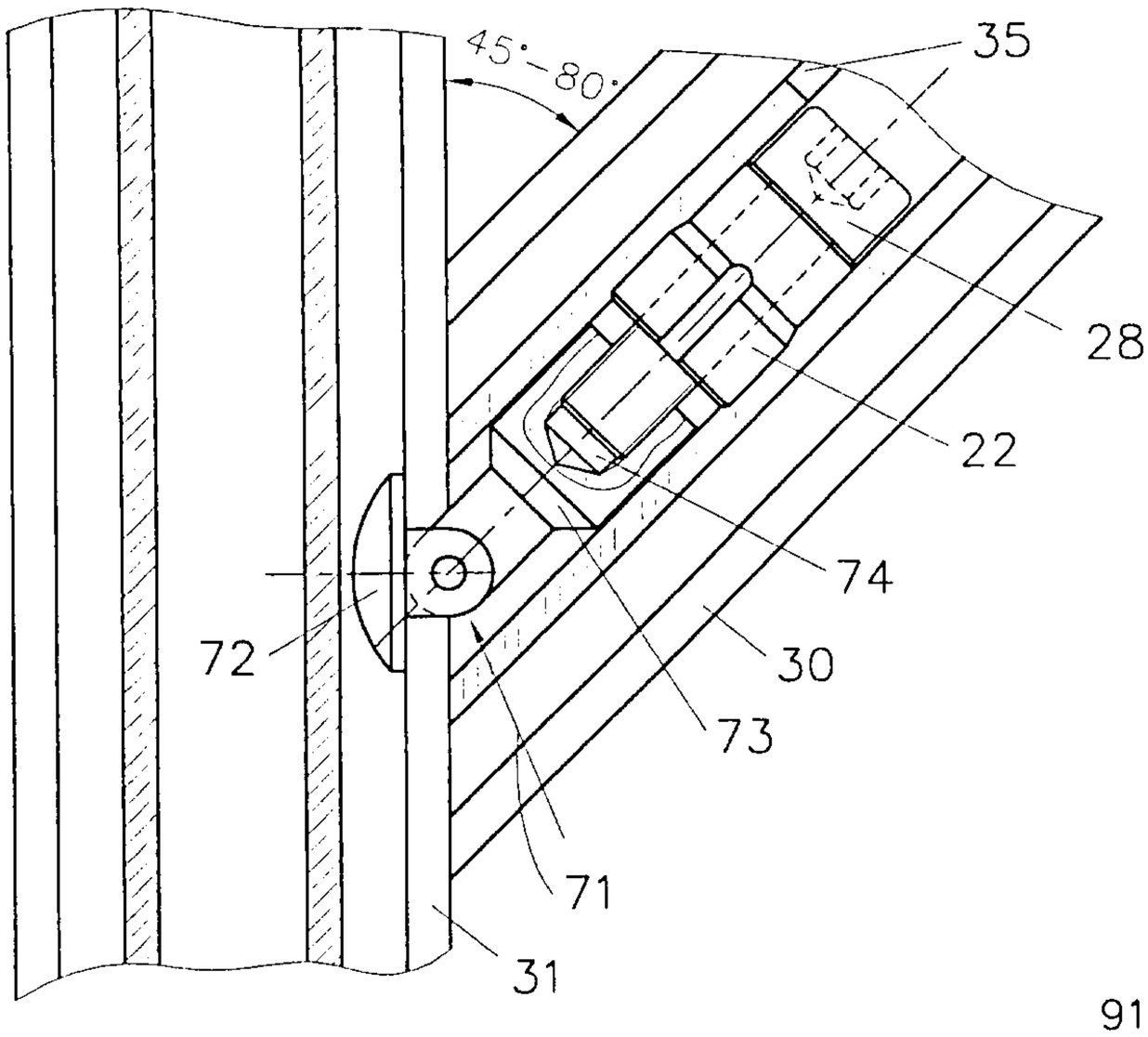

4
35
28
22
62
31
60
65
64
61
35'
4'
67
63
64'
65'
30
22'
28'

Fig.6

Fig.7



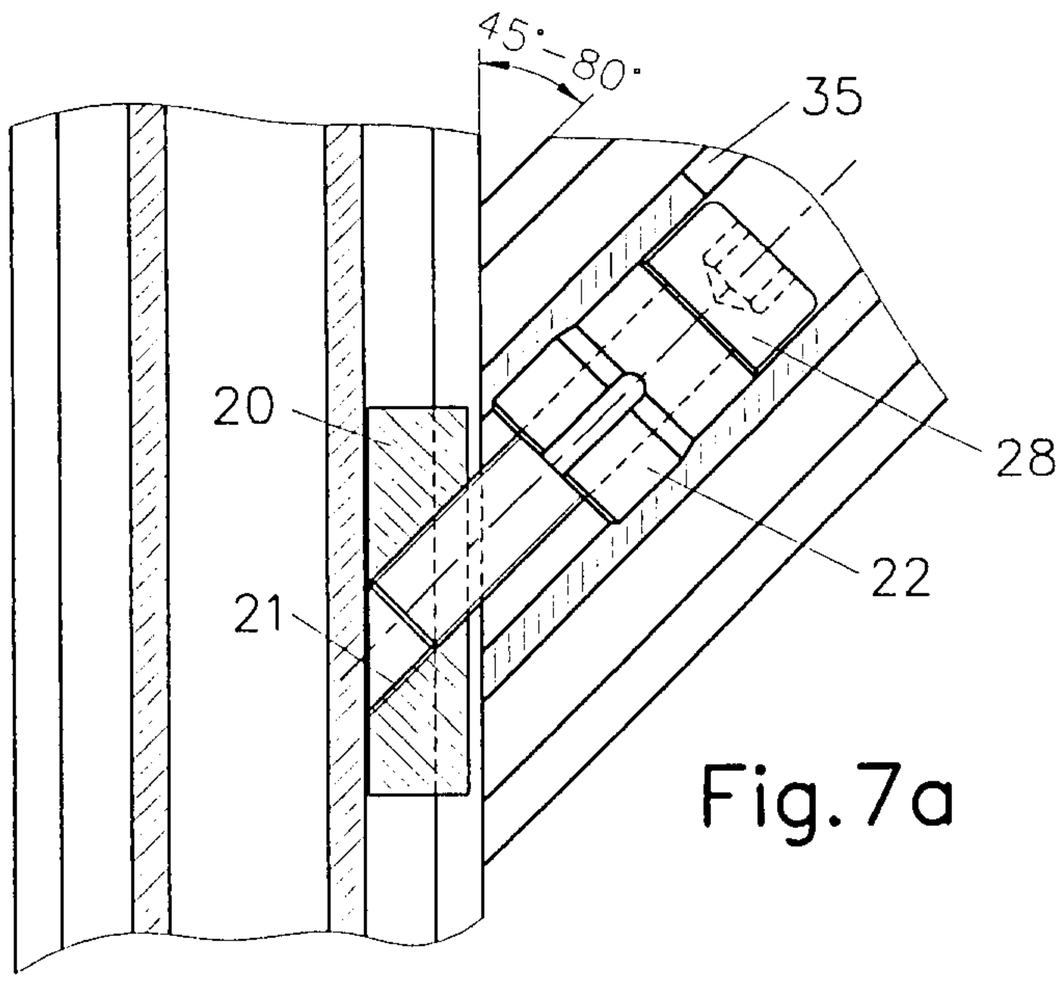


Fig.7a

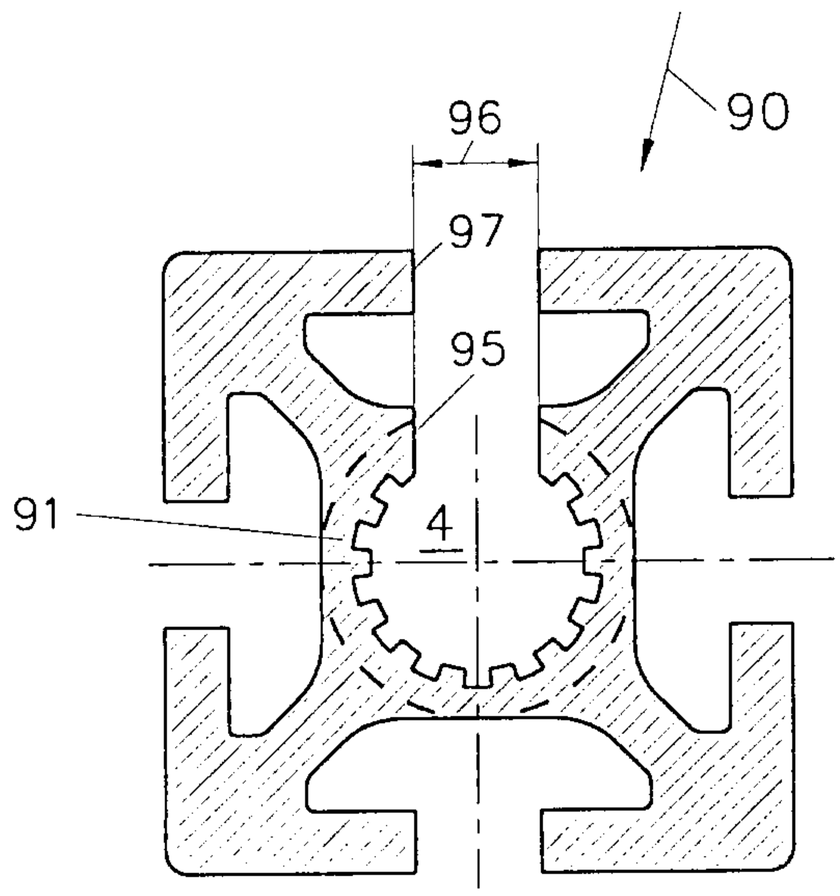


Fig.9

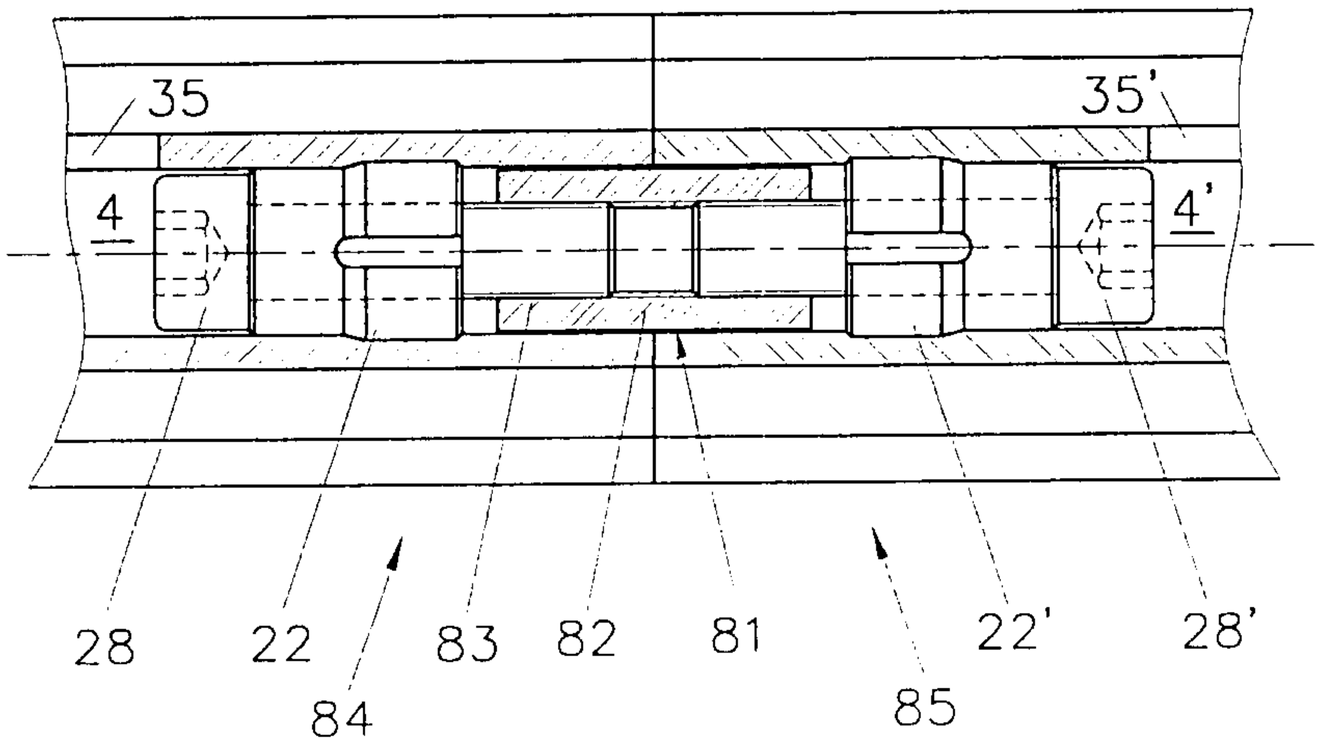
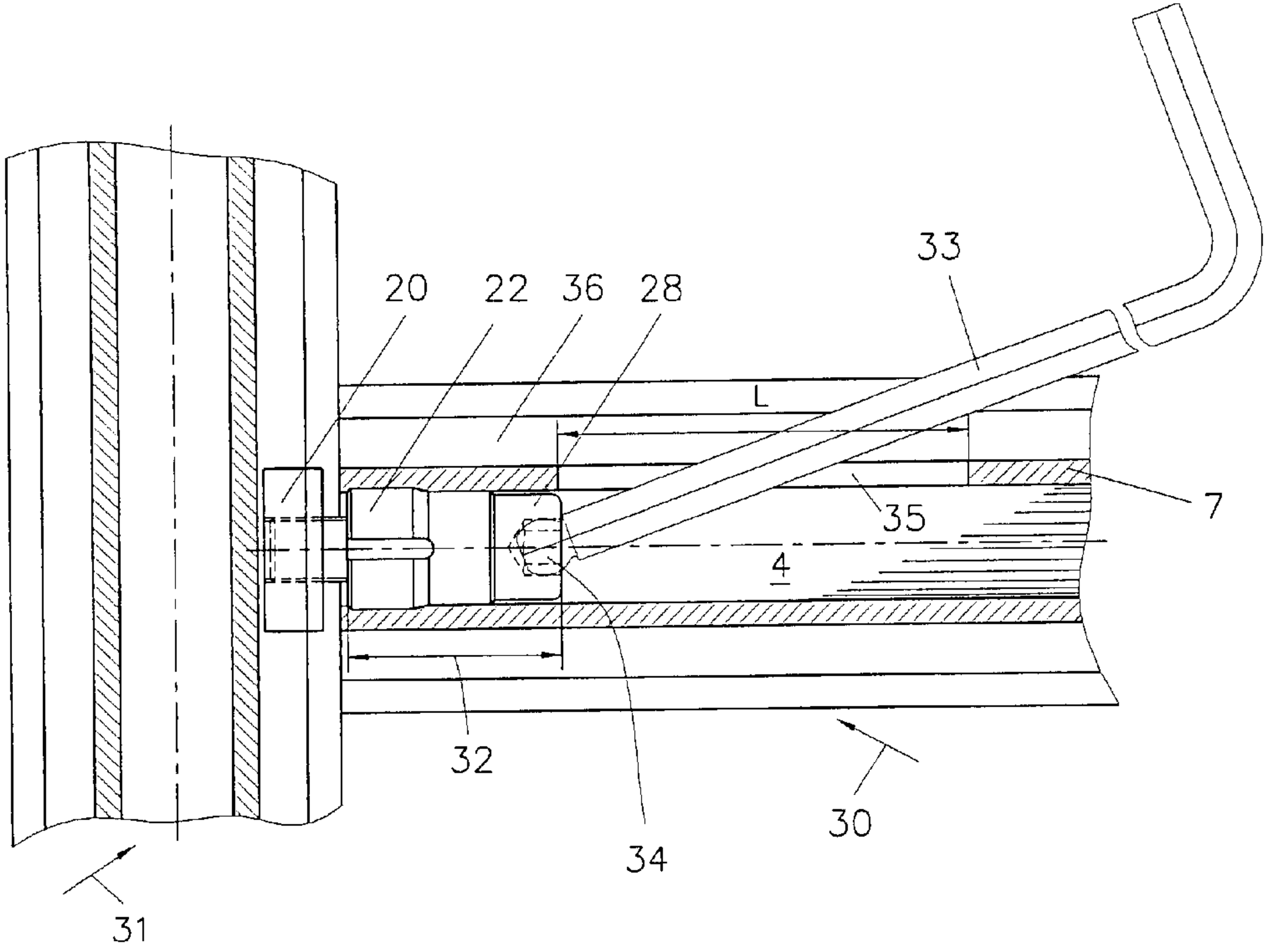


Fig.8


20
22
36
28
33
L
35
7
4
32
34
30
31