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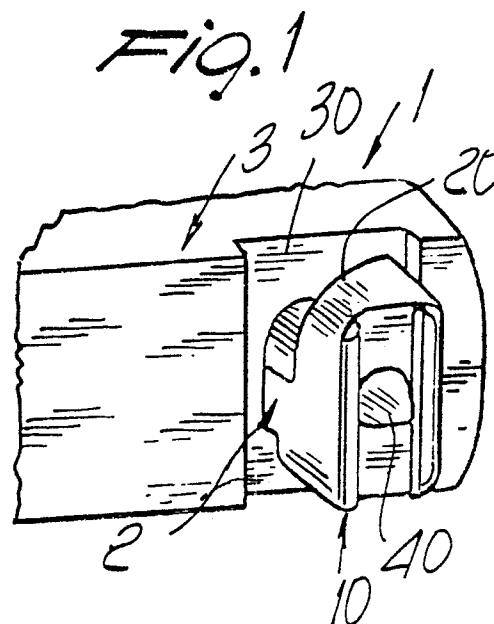
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⑤ **Self-locking coupling particularly for profiled elements of casements, door- and window-frames and the like, and accessories provided with the self-locking coupling.**

⑦ The present invention relates to a self-locking coupling particularly for profiled elements of casements, door- and window-frames and the like, which has the peculiarity of comprising a coupling tang (2) which extends from an abutment body (3) and ends with coupling protuberances (10). The coupling protuberances (10) have a smaller width and a greater length than the distance defined between the opposite wings (11) which delimit the coupling seat (12) defined on a profiled element (13). The coupling protuberances (10), on the face directed towards said abutment body (3), define opposite inclined planes (20) engageable with the wings (11) to generate a movement of said coupling (1) in the direction defined by the tang (2) upon the rotation of the coupling (1) about said direction. The wings (11), with the coupling (1) applied to the profiled element (13), are clamped between the coupling protuberances (10) and the abutment body (3).



SELF-LOCKING COUPLING PARTICULARLY FOR PROFILED ELEMENTS OF CASEMENTS, DOOR-AND WINDOW-FRAMES AND THE LIKE, AND ACCESSORIES PROVIDED WITH THE SELF-LOCKING COUPLING

The present invention relates to a self-locking coupling particularly for profiled elements of casements, door-and window-frames and the like, and to accessories provided with said self-locking coupling.

As is known, in the production of frameworks for casements, door-and window-frames and the like, effected by means of profiled elements in aluminum and the like, it is currently necessary, to apply the so-called accessories of the framework, to execute a whole series of successive operations which require long times and specific equipment.

In particular, according to a currently very widespread method, it is necessary to form perforations in the profiled elements to connect, by means of screws, possible counterplates, or to attach, by means of fixing dowels, the various particular accessories to be added.

This fact, besides making the operations of production of the various frameworks particularly long and laborious, in many cases compels said operations to be effected with poor versatility and flexibility in use and assembly, and the execution of said operations directly in the factory, their execution not being generally possible at the installation site.

The aim proposed by the invention is indeed to eliminate the above described disadvantages by providing a self-locking coupling designed specifically for profiled elements of casings, door-and window-frames and the like, which can be applied to a profiled element without having to resort to screws or to perforations in the profiled element itself, by simply using recesses which are already usually provided on said profiled elements.

Within this aim, a particular object of the invention is to provide a coupling which is rapidly and simply applicable to the profiled element, not requiring for its installation laborious operations, but simply a rotation of a quarter turn executable with an ordinary tool such as a spanner.

Still another object of the present invention is to provide a self-locking coupling which is usable for the provision of an entire range of accessories produced specifically according to the type of connected or to the element which must be connected.

Not least object of the present invention is to provide a self-locking coupling which is easily manufacturable from commercially readily available materials and which is competitive from a merely economical standpoint of view.

The above described aim, as well as the objects mentioned and others which will be come apparent hereinafter, are achieved by a self-locking

coupling particularly for profiled elements of casements, door-and window-frames and the like, according to the invention, characterized in that it comprises a coupling tang extending from an abutment body and ending in coupling protuberances, said coupling protuberances having a smaller width and a greater length than the distance between the opposite wings delimiting the coupling seat defined on a profiled element, said protuberances, on the face directed towards said abutment body, defining at least one inclined-plane portion engageable with said wings to generate a movement of said couplings in the direction defined by said tang upon rotation of the coupling about said direction, said wings, with said coupling applied to said profiled element, being clamped between said coupling protuberances and said abutment body.

Further characteristics and advantages will become apparent from the description of a preferred but not exclusive embodiment of a self-locking coupling particularly for profiled elements of casements, door-and window-frames and the like, illustrated only by way of non-limitative example in the accompanying drawings, wherein the various accessories employing the coupling are also illustrated; in the drawings:

figure 1 is a schematic perspective view of the self-locking coupling, according to the invention, and a seat of a profiled element for the insertion of said coupling;

figure 2 is a front view of the coupling;

figure 3 is a cross section view of the coupling taken at the level of the coupling tang, to highlight the configuration of the coupling protuberances;

figure 4 is a sectional view taken along the line IV-IV of figure 1 at the moment of the introduction of the coupling tang of the body into the seat;

figure 5 is a sectional view taken along the line IV-IV of figure 1 with the self-locking coupling in a locking position;

figure 6 is a sectional view taken along the line VI-VI of figure 4;

figure 7 is a sectional view taken along the line VII-VII of figure 5;

figure 8 is a sectional view taken along the line VIII-VIII of figure 5;

figure 9 is a schematic exploded perspective view of an abutment block and of a profiled element on which the abutment block is applicable;

figure 10 is a front view of the abutment block seen from the part bearing the tang;

figure 11 is a front elevation view of the abutment block;

figure 12 is a lateral elevation view of the abutment block;

figure 13 is a sectional view of the abutment block during the initial step of insertion into the profiled element;

figure 14 is a view of the abutment block connected to the profiled element;

figure 15 is a schematic exploded perspective view of a fixing pin with the coupling according to the invention seen in relation to a profiled element;

figure 16 is a perspective view of the fixing pin;

figure 17 is a schematic view of an element to be coupled, seen from its face directed towards the profiled element;

figures 18 and 19 are lateral elevation views, illustrating both sides of the fixing pin;

figure 20 is a schematic view of the fixing dowel in the initial step of insertion;

figure 21 is a partially sectional view of the fixing pin with the element fixed to the profiled element;

figure 22 is an exploded perspective view of a different embodiment of the fixing pin and related coupling seat;

figure 23 is a sectional view of the fixing pin of figure 22 applied to a profiled element;

figure 24 is a bottom plan view of the fixing pin;

figures 25, 26 and 27 are views, respectively in lateral elevation from one side, in lateral elevation from the other side and in top plan, of the fixing pin;

figure 28 is a plan view of the coupling seat;

figure 29 is a sectional view taken along the line XXIX-XXIX of figure 28;

figure 30 is a sectional view taken along the line XXX-XXX of figure 28;

figure 31 is a schematic perspective view of a joint for connecting profiled elements, with the self-locking coupling illustrated exploded with respect to an upright profiled element;

figure 32 is an view of the joint connected to the upright profiled element and of exploded transverse profiled element;

figure 33 is a sectional view of the joint with the tang inserted into the hole before locking is performed;

figure 34 is a transverse sectional view at the level of the coupling tang;

figure 35 is a schematic sectional view of the joint, once the coupling between the upright profiled element and the transverse profiled element is performed;

figure 36 is a schematic exploded perspective exploded view of a block for connecting to the self-locking coupling, according to the invention, used in a device for the connection of reclining members;

figure 37 is a perspective view of the slider;

figure 38 is a front view of the slider;

figure 39 is a sectional view along the line XXXIX-XXXIX of figure 38;

figure 40 is a view of the slider from one end thereof;

figure 41 is a view of the slider from the other end thereof;

figure 42 is a perspective view of the connecting block;

figure 43 is a front view of the connecting block;

figure 44 is a sectional view along the line XLIV-XLIV of figure 43,;

figure 45 is a lateral view of the connecting block;

figure 46 is a view of the connecting block from the end provided with the self-locking coupling element.

With reference to the above described figures, and in particular to figures 1 to 8, the self-locking coupling particularly for profiled elements of casings, door-and window-frames and the like, which is generally indicated by the reference numeral 1, comprises a coupling tang 2 extending from an abutment body, which may have various configurations, as will become apparent hereinafter, according to the type of specific use.

The coupling tang 2, as illustrated in figure 3, preferably has, in cross section, a configuration which is determined by rectilinear portions indicated at 2a, which extend parallel to each other which, at two opposite corners, preferably have rounded portions 2b; the tang 2 may possibly have, in transverse cross section, a substantially circular configuration.

The tang 2 ends, at its free end, with coupling protuberances, generally indicated by the reference numeral 10, which, when seen in plan view have an approximately rectangular configuration with a width which is smaller than the distance present between the opposite wings 11 which delimit a coupling seat 12 provided on a profiled element 13.

The protuberances 10 have a length which is greater than the distance between the wings 11 and substantially equal to the inner width of the seat 12 which is defined between the arms 14 which extend from the profiled element 13 and terminate at the opposite wings 11.

As pointed out in the figures, the opposite sides 10a, placed at the longitudinal ends of the protuberances 10, at two opposite corners, are radiused to the transverse counterposed sides 10b

by means of arc-like portions 10c, also configured according to a portion of circumference having its center in the axis of rotation of the tang 2.

The protuberances 10, on the side directed towards the abutment body, which is generally indicated at 3, define two opposite inclined planes, indicated at 20, which have their lower level defining a distance from the free end of the protuberances, in the axial direction with respect to the tang, which is smaller than the distance between the inner edge of the wings 11 and the bottom of the seat 12.

The abutment body 3, in the region where the tang 2 extends, may be provided with a recess 30 the function whereof will become apparent hereinafter.

To complete the coupling, at the front face of the lateral protuberances 10, there may be provided a centering and penetration cone, indicated at 40, which abuts against the bottom of the seat 12.

In practical use, the self-locking coupling, according to the invention, is simply inserted by introducing the lateral flaps 10 arranged so that their longitudinal extension coincides with the longitudinal extension of the tabs 11; in these conditions, as already previously mentioned, the lateral flaps may be inserted within the seat 12.

Once the protuberances are inserted, it is sufficient to execute a rotation through 90° in the direction defined by the inclined planes 20, so as to insert the inclined planes 20 below the wings 11.

During this rotation step, due to the presence of the inclined planes, a translatory component is generated in the direction defined by the axis of the tang 2, with insertion and locking of the lateral protuberances 10 within the seat 12.

The longitudinal ends 10a of the protuberances may act as stop elements for the rotation, since they abut against the inner surface of the arms 14, effecting locking or the continuation of rotation.

The wings 11, once the rotation is performed, are locked, as pointed out in figure 8, between the abutment body 3 and the lateral protuberances 10; a recess on the abutment body, generally indicated at 3, is furthermore provided in the coupling region of the tang 2, a deformation of the wings being obtained so as to create in practice a curve, indicated at 50 in the drawing, which prevents the possibility of sliding the coupling with respect to the seat.

Furthermore, the possible presence of the centering cone 40, which in practice produces a notch in the bottom of the seat 12, besides acting as centering element, further increases the locking action in the direction of longitudinal sliding with respect to the seat 12.

With reference to figures 9 to 14, the above

described insertion element is used for the provision of an abutment block for accessories of profiled elements for casements in which the abutment body, indicated at 51, has a substantially elongated configuration and has, in transverse cross section, a trapezoidal shape.

From the abutment body 51 there extends the insertion tang 2 which ends with the protuberances 10, similarly to what has been described above. Said abutment block has radiused thereto at an inclined angle a locking tooth 52, located at a point spaced from the region where the tang 2 is provided.

With reference to figures 15 to 21, a fixing pin particularly suitable for the coupling of accessories to profiled elements in general is illustrated. Said fixing pin, which is generally indicated by the reference numeral 60, has an abutment body which is constituted by a head 61 of a substantially cylindrical configuration which, on its outer face, has a polygonal depression 62 for engagement with a tool. From the other base with respect to the face having the polygonal depression 62 there extends the coupling tang which is similar to the one previously described to obtain the coupling element.

The coupling seat, indicated at 63, defines means which prevent rotation of the fixing pin with respect to the seat. Said means, in a preferred embodiment, are constituted by radial protrusions 64 provided on the face of the head 61 which engages with the bottom of the coupling seat 63 and which are accommodatable in complementarily shaped recesses 65 defined on said bottom, so as to obtain a coupling which opposes the rotation in the uncoupling direction.

With reference to figures 22 to 30, a different embodiment of the fixing dowel, generally indicated at 70, is illustrated, having an abutment body constituted by a frusto-conical head 71, capable of facilitating centering in the conical coupling seat indicated at 72.

More in detail, a tooth 74 with different inclinations, ending with a portion 75 which is arranged substantially on a plane perpendicular to the axis, is provided on the lower surface of the head 71.

The seat 72 in turn has a complementarily shaped recess 76 which extends substantially for 90° and ends with a terminal depression 77.

The walls which delimit the end of the depression act as stroke limiters for the tooth 74 which, upon the insertion of the locking body, only allow a rotation through 90°.

At the end of the locking rotation, the portion 75, being stressed in compression, enters in the terminal recess 77, executing a precise locking with no possibility of return.

With reference to figures 31 to 35, a connection joint is illustrated, provided with the above

described coupling, which has an abutment body constituted by a small block, generally indicated by the reference numeral 81, which advantageously has a substantially parallelepipedal configuration which is complementary to the configuration of the central body 82 of a transverse profiled element 83. Said small block 81 is insertable in said profiled element and has a through hole 86 for fixing to said profiled element.

At an end of said small block 81 there extends a coupling tang with protuberances of the above described type.

In practical use, to perform the coupling of the upright profiled element, indicated at 85, to the transverse profiled element, it is sufficient to insert the small block in the transverse profiled element and perform the locking by means of a rotation in a manner similar to what has been described previously.

With reference to figures 36 to 46, a connecting block advantageously usable for reclining shutters is illustrated.

In a form of application of said connecting block, a slider 91 is provided which is slidably engageable with the lateral edge of the profiled element 92 of a reclining shutter. The slider 91 has expansion 93 which slideably engage with guiding edges 94, defined by the usual seats provided on the profiled element 92.

The slider 91 defines in its middle portion a pivot 95 for the articulated coupling of a rod 96.

The slider, at the end of connection to the rod, furthermore has inclined abutment edges 97 which, in practice, act as an excursion-limiting element for the inclination of the rod 96, engaging by contact with said rod.

At its other end, the rod 96 engages with a connecting block generally indicated by the reference numeral 98, which has an abutment body constituted by a cylindrical body 99 which, at an axial end thereof, has a polygonal head 100, while at the other end it has the above described quick coupling means, indicated in the drawings with the same reference numerals.

Also in this form of application, to effect assembly it is sufficient to rotate the connecting block through 90°, to perform its fixing. A spacer 101 is advantageously provided.

From what has been described it can thus be seen that the invention achieves the intended aims and in particular the fact is stressed that a self-locking coupling is provided which is applicable on the seat already normally provided on a profiled element, with a simple rotation through 90°, without having to resort to the use of screws, fixing pins, screws with counterplates or to the advance perforation of said profiled element.

Further, another important feature of the inven-

tion resides in the fact that the presence of the inclined planes executes a abutment action of the coupling which tightly locks onto the profiled element, both in the direction of approach and in the direction of longitudinal sliding, due to the plastic deformation which is imparted to the tabs delimiting the seat.

Furthermore, by using the above described coupling it is possible to provide a wide range of accessories so as to complete the entire series of elements which are usually required for the production of casements, door-and window-frames and the like.

The invention thus conceived is susceptible to numerous modifications and variations, all of which are within the scope of the inventive concept.

Furthermore, all the details may be replaced with other technically equivalent elements.

In practice, the materials employed, though the best results have been obtained with aluminum profiled elements, as well as the contingent shapes and dimensions, may be any according to the requirements.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

Claims

1. Self-locking coupling particularly for profiled elements of casements, door-and window-frames and the like, characterized in that it comprises a coupling tang (2) extending from an abutment body (3,51,61,71,81,99) and ending with coupling protuberances (10), said coupling protuberances (10) having a smaller width and a greater length than the distance between the opposite wings (11) delimiting the coupling seat (12) defined on a profiled element (13), said protuberances (10), on the face directed towards said abutment body (3,51,61,71,81,99), defining at least one inclined-plane portion (20) engageable with said wings (11) to generate a movement of said coupling (1) in the direction defined by said tang (2) upon rotation of the coupling (1) about said direction, said wings (11), with said coupling (1) applied to said profiled element, being clamped between the coupling protuberances (10) and said abutment body (3,51,61,71,81,99).

2. Self-locking coupling, according to claim 1, characterized in that said protuberances (10) have a distance, between their longitudinal ends (10a),

substantially equal to the width of said seat (12) defined between the inner surfaces of the supporting branches (14) of said wings (11).

3. Self-locking coupling, according to the preceding claims, characterized in that said longitudinal ends (10a), at two opposite corners, are radiused to longitudinal edges (10b) of said protuberances (10) by means of rounded portions (10c) in the shape of a part of circumference having its center substantially on the axis of rotation of said tang (2).

4. Self-locking couplings, according to one or more of the preceding claims, characterized in that said longitudinal ends (10a), with said coupling (1) in locking position on the profiled element (13), abut against the inner surfaces of said branches (14).

5. Coupling, according to one or more of the preceding claims, characterized in that it comprises two portions in the shape of an inclined plane (20) positioned mutually diametrically with respect to said tang (2).

6. Self-locking coupling, according to one or more of the preceding claims, characterized in that it comprises a depression (30) on said abutment body (3), in the region of extension of said tang (2).

7. Self-locking coupling, according to one or more of the preceding claims, characterized in that in locking position said wings (11) undergo plastic deformation with a curved portion (50) accommodated between the ends of said portion in the shape of an inclined plane (20) and said depression (30).

8. Self-locking coupling, according to one or more of the preceding claims, characterized in that it comprises a cone-like protrusion (40) extending on the front face of said protuberances (10), substantially at the axis of rotation of said tang (2).

9. Accessory of the abutment block type with the self-locking coupling, according to the preceding claims, characterized in that said abutment body (51) has, on the face directed towards said profiled element (13), a locking tooth (52) arranged spaced from the axis of rotation of said coupling and being adapted to engage with the edge of one of said wings (11) to prevent the rotation of said abutment body (51) in the direction of uncoupling of said profiled element (13).

10. Accessory, according to the preceding claim, characterized in that said abutment body (51) has, in transverse cross section, a substantially trapezoidal configuration.

11. Accessory of the fixing pin type with the self-locking coupling according to the preceding claims, characterized in that said abutment body is constituted by a substantially cylindrical head (61) engaging in abutment against the bottom of a coupling seat (63), stop means being furthermore pro-

vided interacting between said head (61) and said coupling seat (63) adapted to oppose uncoupling rotation of said coupling.

12. Accessory, according to the preceding claim, characterized in that it comprises on the outer face of said head a polygonal impression (62) engageable with a tool.

13. Accessory, according to claim 11, characterized in that said stop means are constituted by at least one protrusion (64) provided on the face of said head (61) directed towards said coupling tang (2) and adapted to couple in a corresponding recess (65) defined on the bottom of said coupling seat (63).

14. Accessory, according to claim 11, characterized in that said head has a substantially frusto-conical configuration (71) and said coupling seat (72) has a substantially complementary configuration.

15. Accessory, according to claim 11, characterized in that said stop means are constituted by a tooth (74) with different inclination with respect to said frusto-conical head (71), ending with a portion (75) arranged substantially perpendicular to the axis of said abutment body, having correspondingly to said coupling seat (72), a frusto-conical depression (76) ending with a terminal depression (77) for the accommodation of said section.

16. Accessory according to the preceding claim, characterized in that said depression (76) extends substantially through 90° to act as stroke limiter element for the rotation of said head (71).

17. Accessory of the type of a joint for the connection of profiled elements with the self-locking coupling, according to the preceding claims, characterized in that said abutment block is constituted by a small block (81) insertable in the body (82) of a profiled element (83) and defining, at one end, said tang (2) ending in said coupling protuberances (10), said block (81) defining a through hole (84) for coupling to the transverse profiled element (83) in which said block (81) is insertable.

18. Accessory of the type of a small connecting block for reclining shutters, characterized in that said abutment body (99) is constituted by a cylindrical body defining, at an axial end, said self-locking coupling (10) and, at the other end, a polygonal head (10) for engagement with a tool.

19. Accessory for the connection of reclining shutters, characterized in that it comprises a slider (91) slideably connected to the edge (92) of a reclining shutter and articulating with an end of a rod (96) articulated, at the other end, to said cylindrical body (99) of the connecting block (98).

20. Accessory, according to claim 18, characterized in that said slider (91) has one of its faces expansions (93) slideably engageable with

guiding edges (94) defined by the profiled element (92) of the reclining shutter, in a middle portion said slider (91) having a pivot (95) articulating with said rod.

21. Accessory, according to claim 18, characterized in that it comprises, at the ends of said slider (91) connected to said rod (96), inclined planes (97) engageable in abutment with said rod (96) to limit rotation of said rod with respect to said slider (91).

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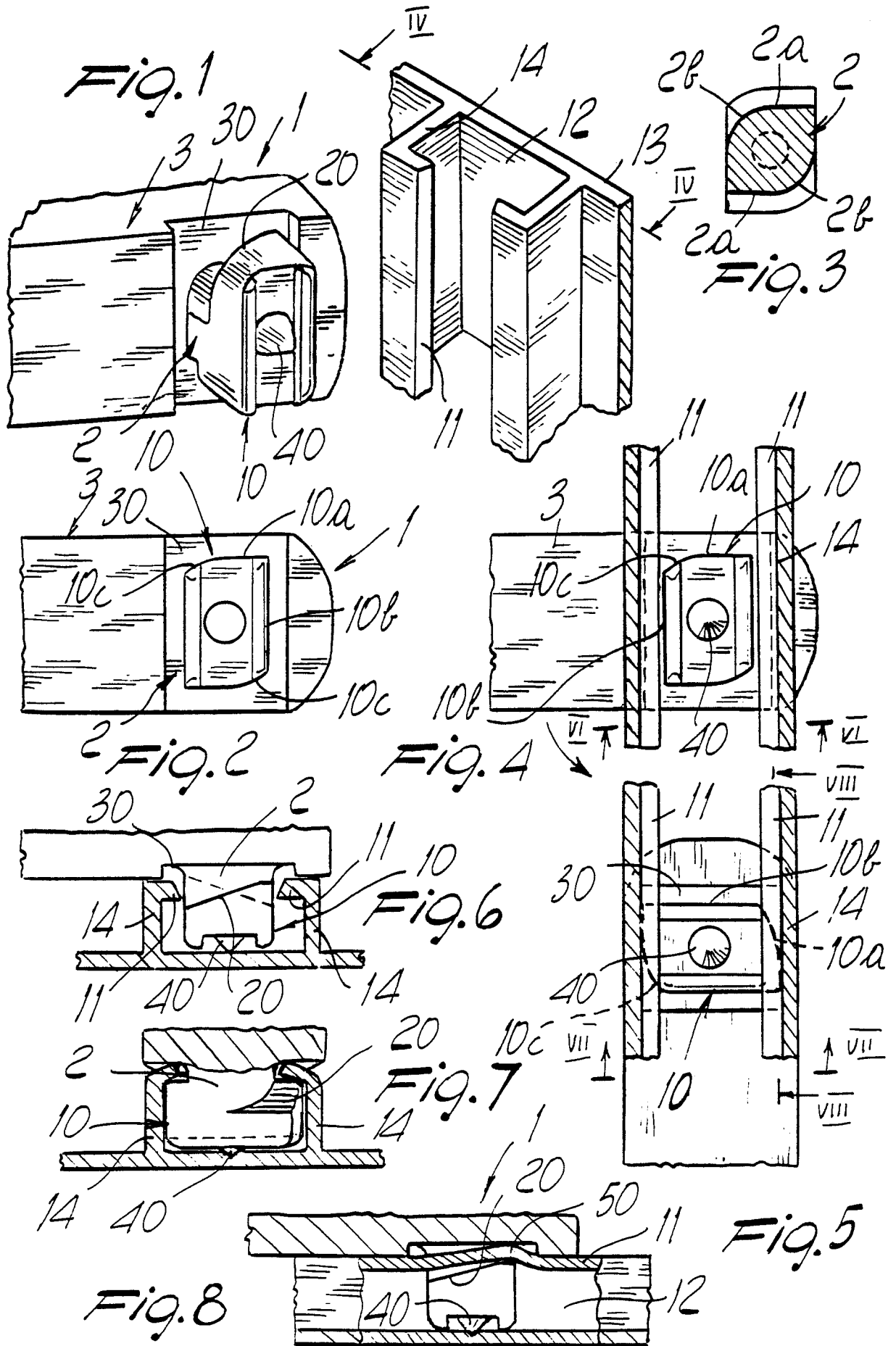
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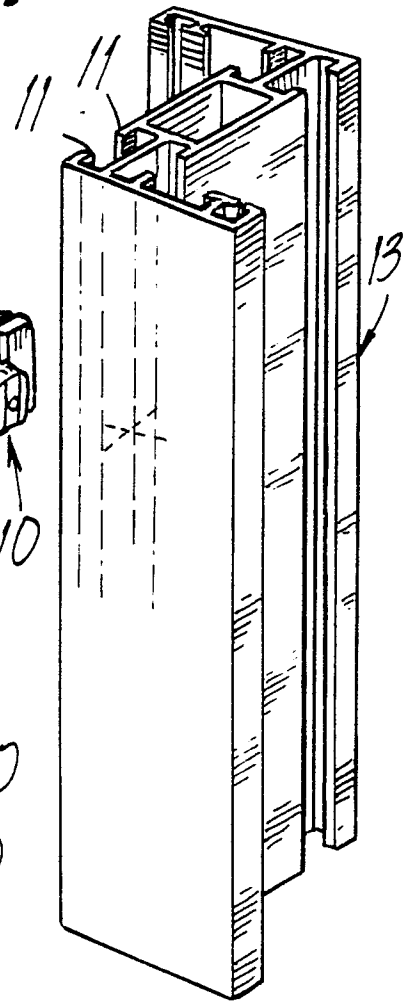
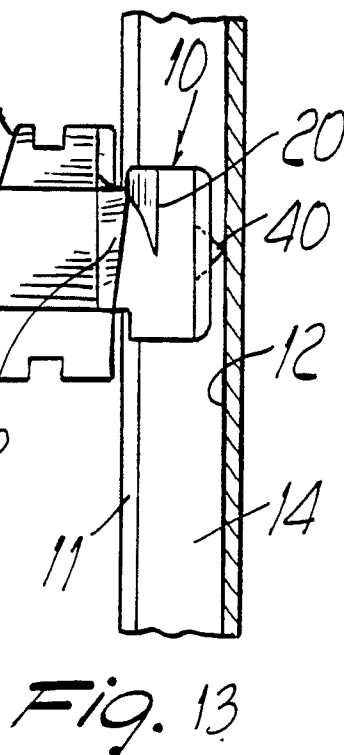
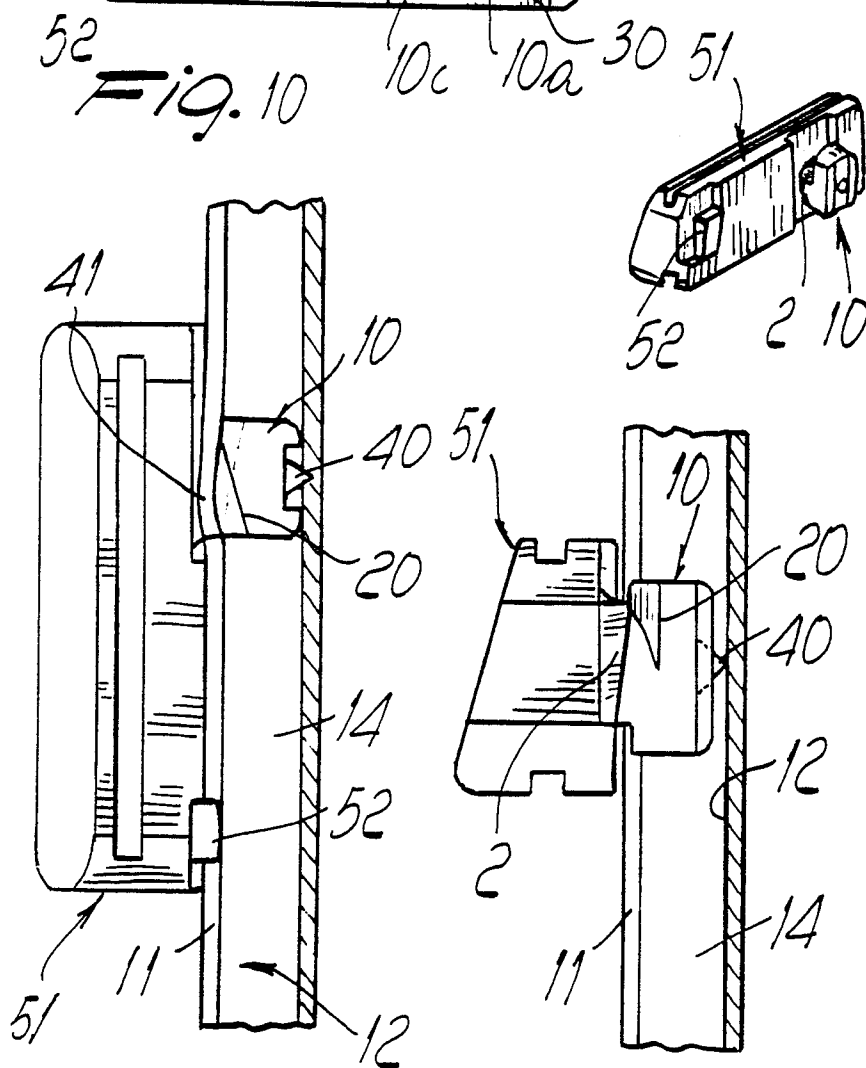
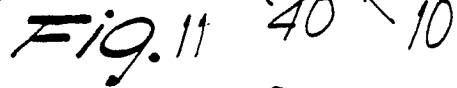
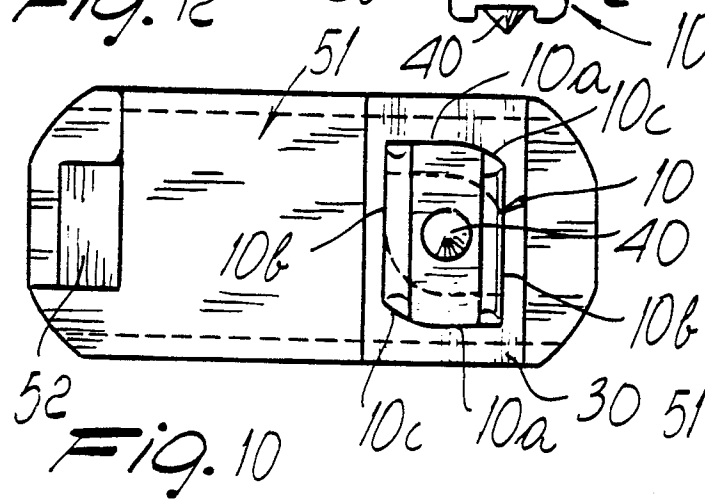
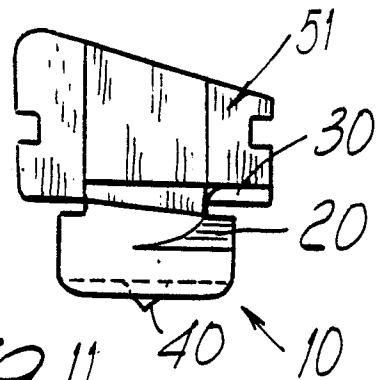
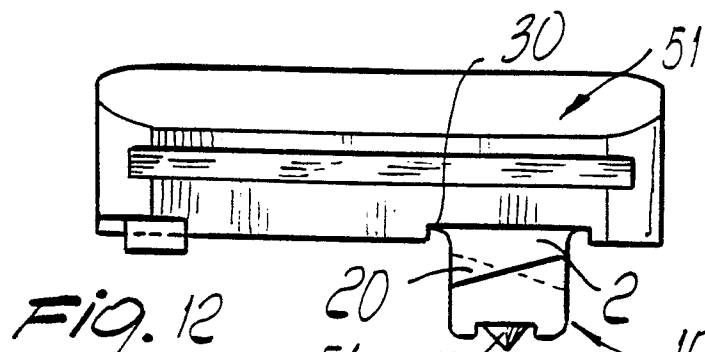
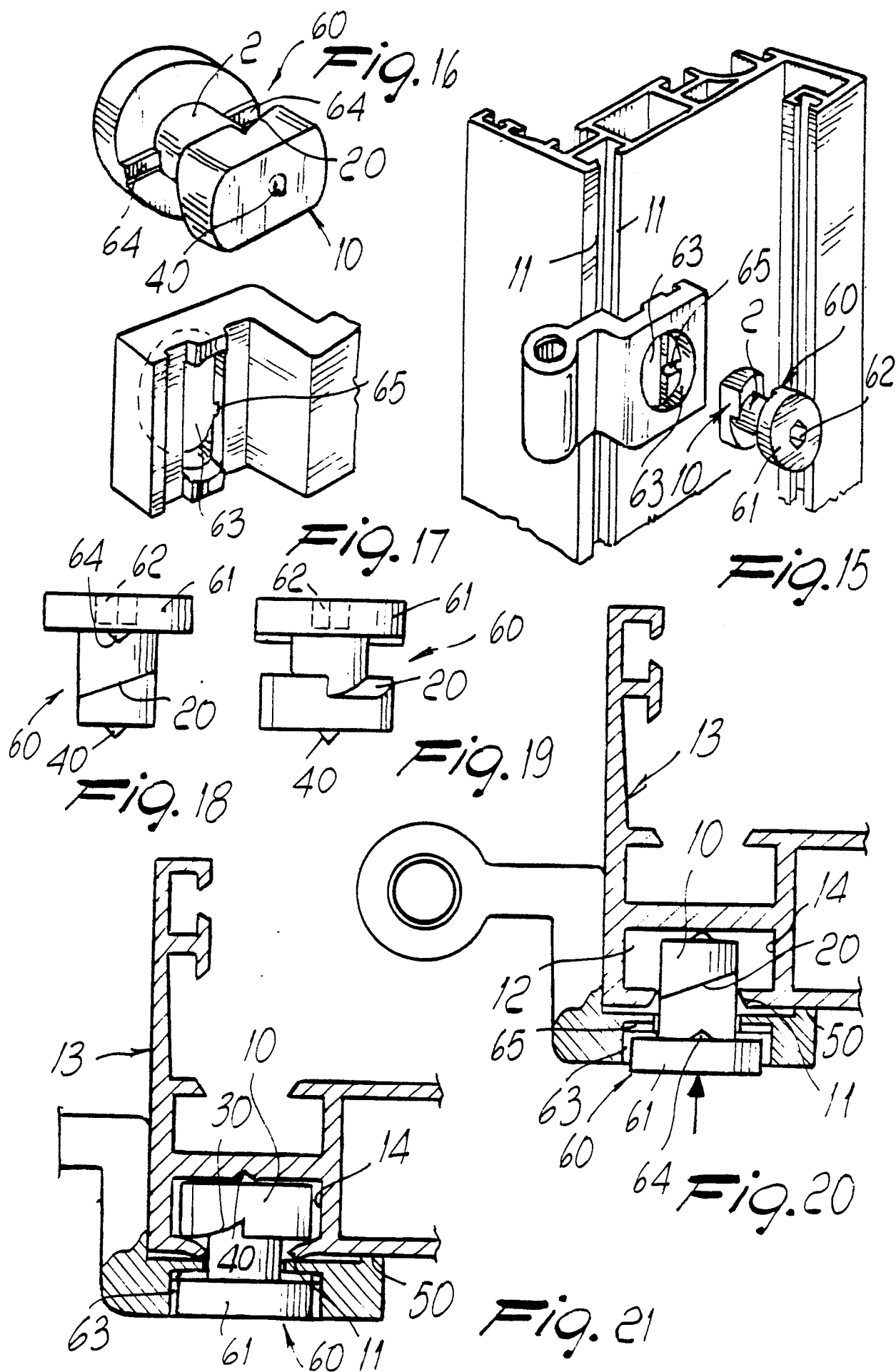
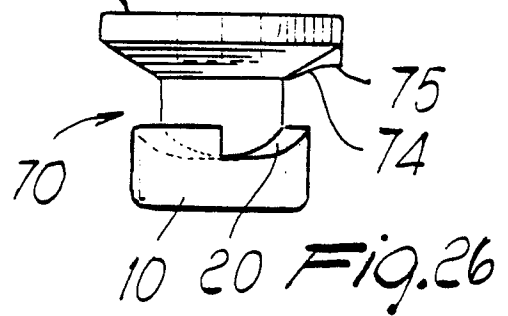
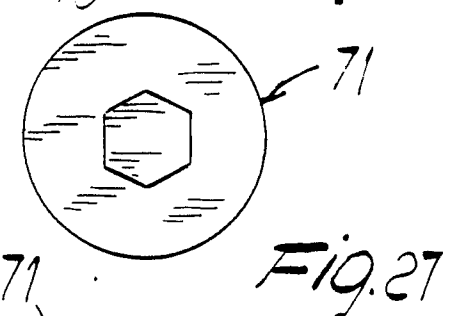
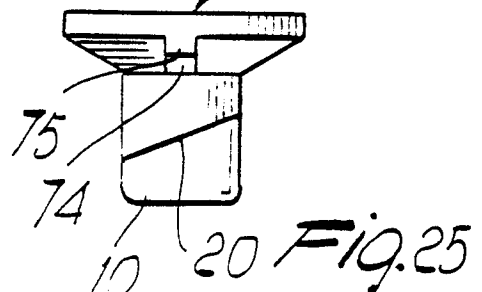
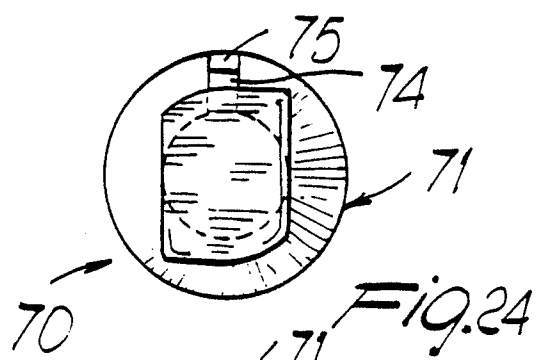
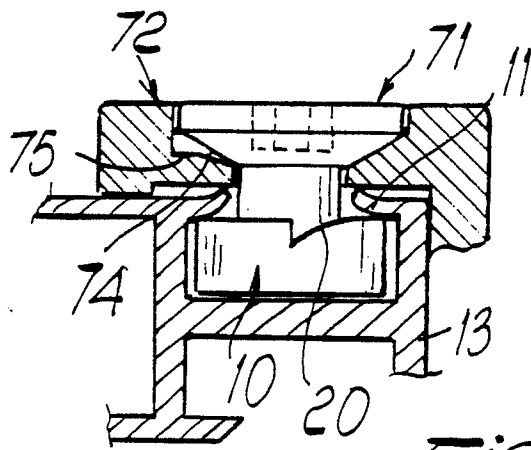
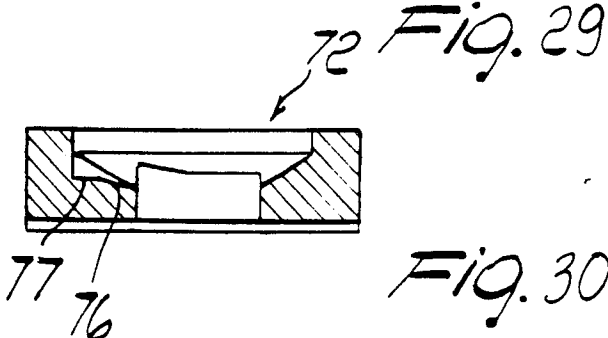
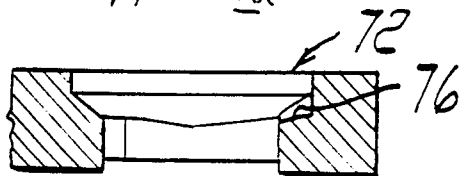
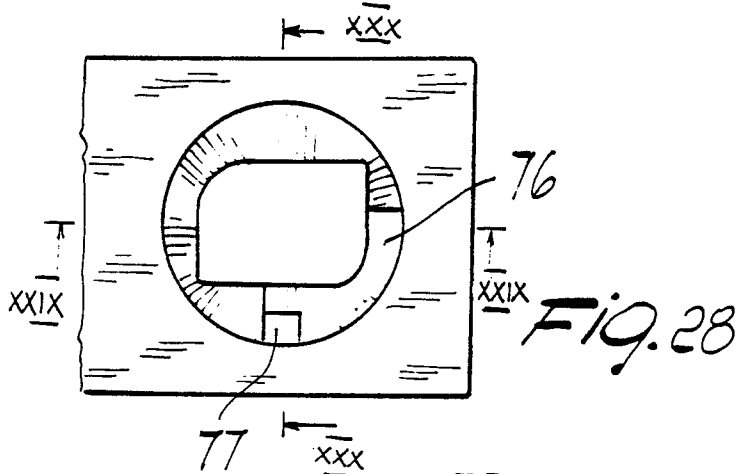
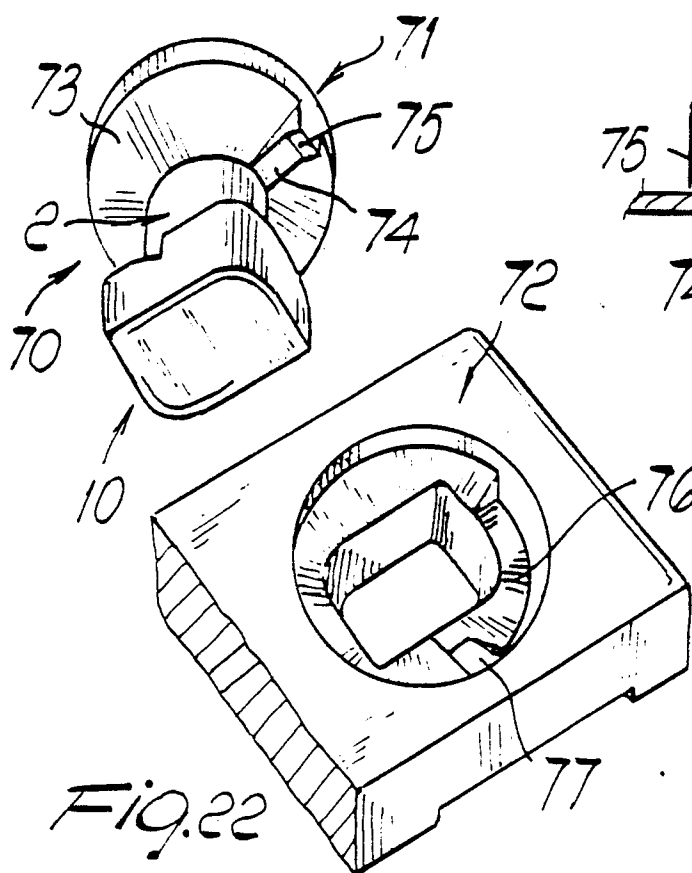


Fig. 9





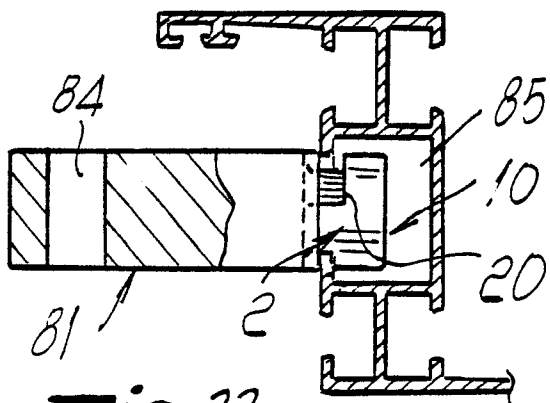


Fig. 33

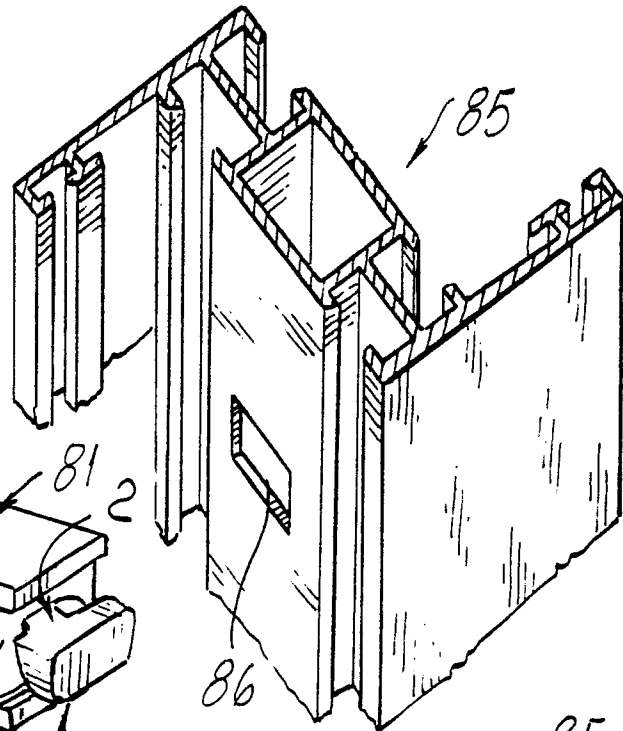


Fig. 31

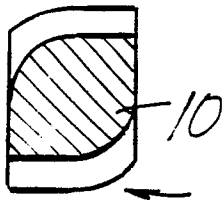


Fig. 34

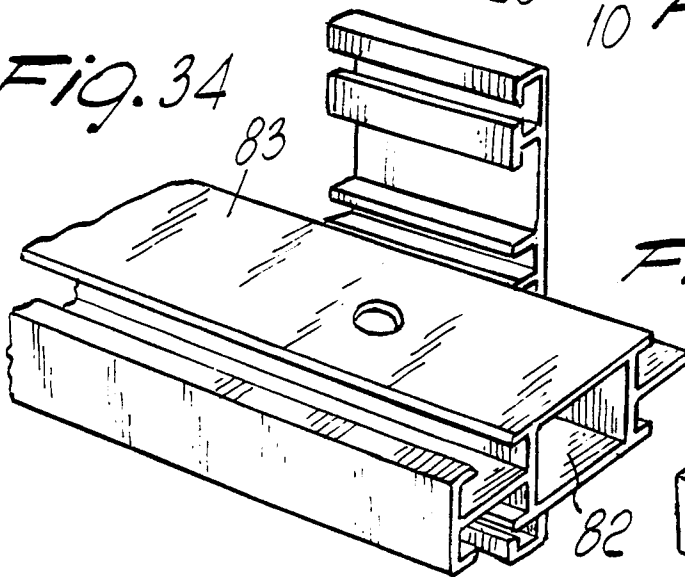
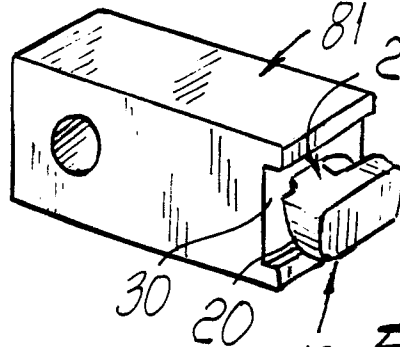


Fig. 32

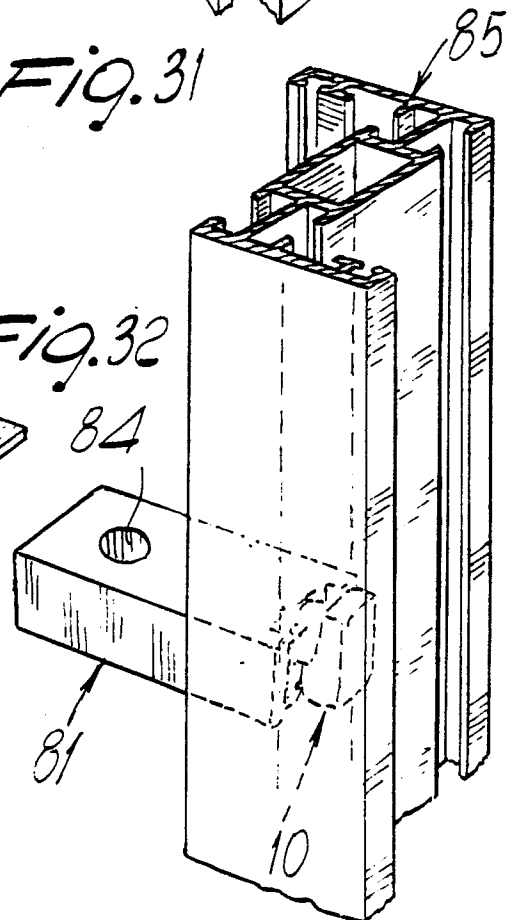
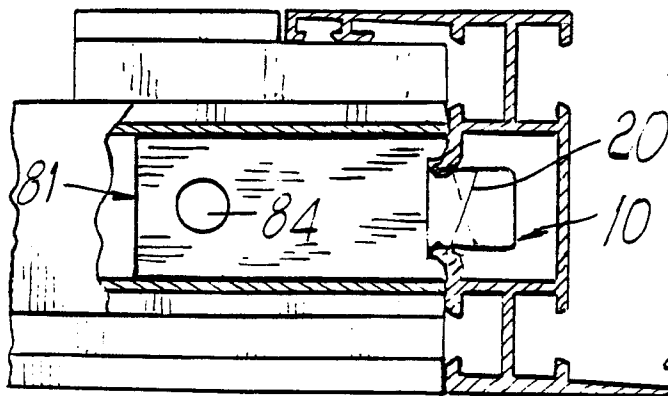
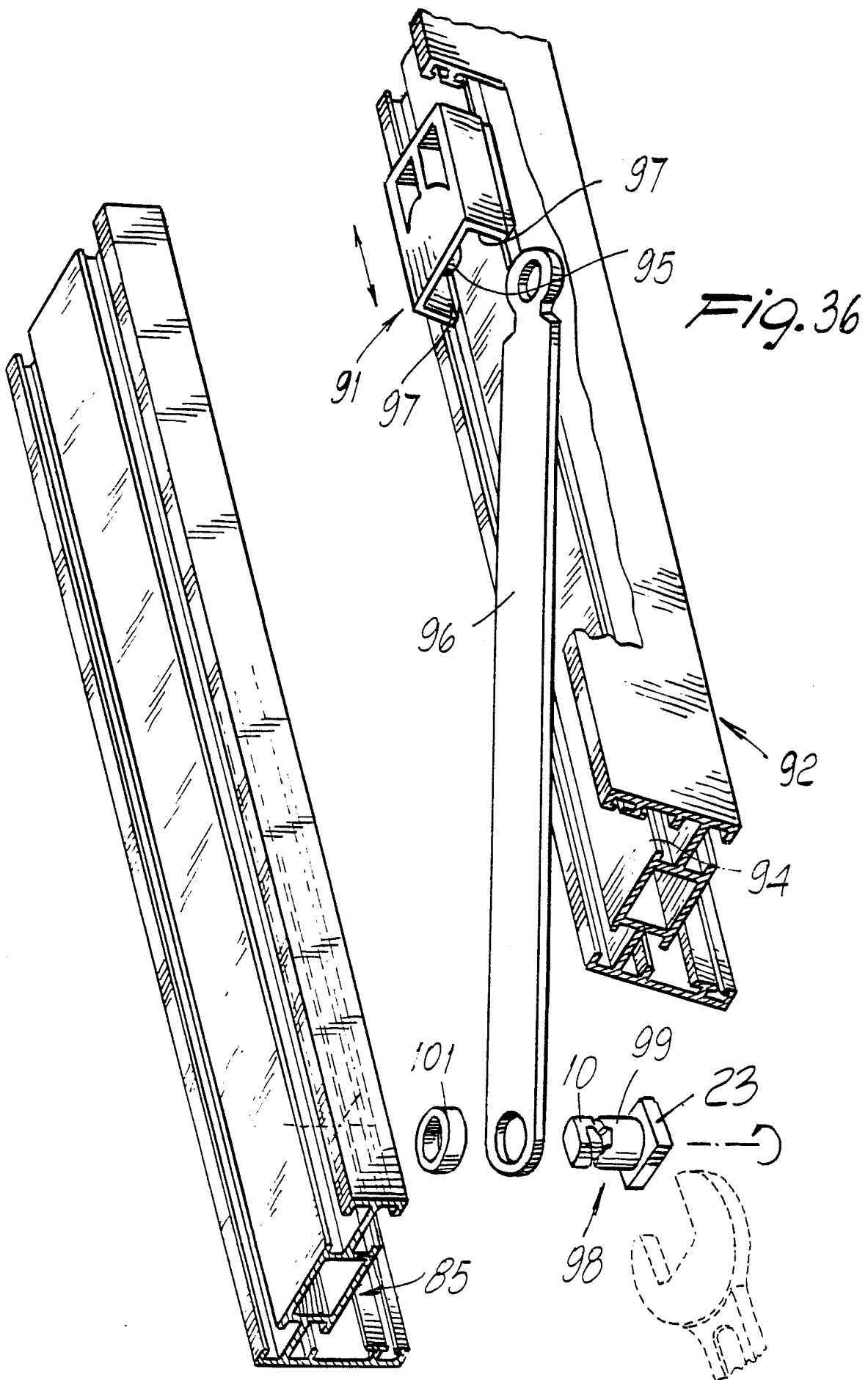


Fig. 35





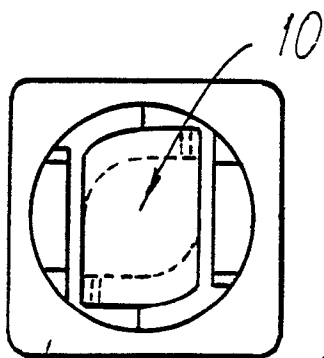


Fig. 46

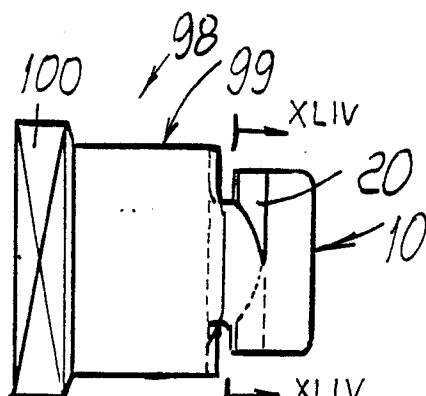


Fig. 43

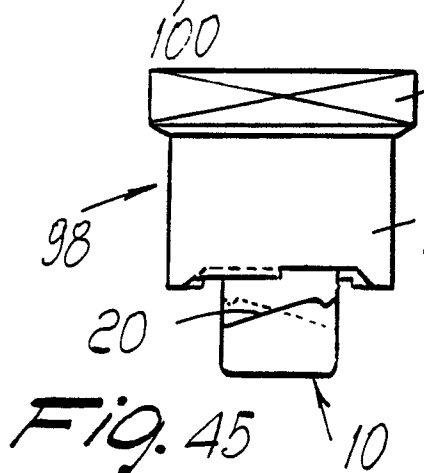


Fig. 45

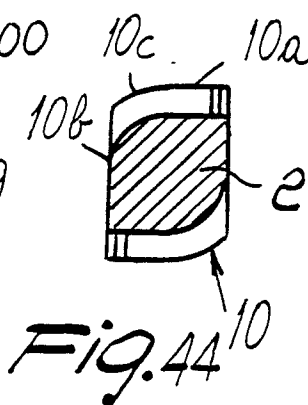


Fig. 44

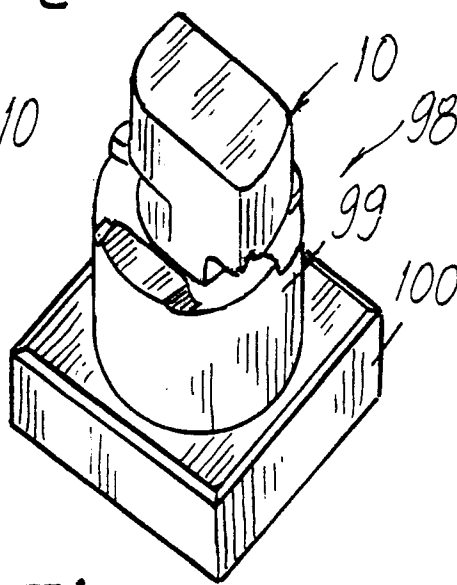


Fig. 42

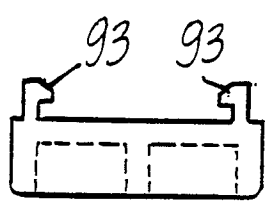


Fig. 40

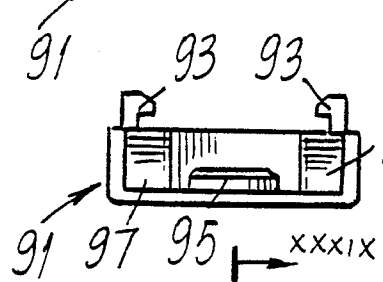


Fig. 41

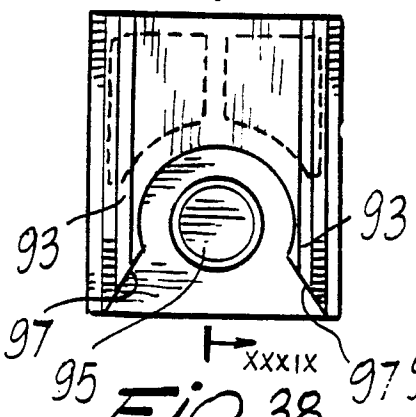


Fig. 38

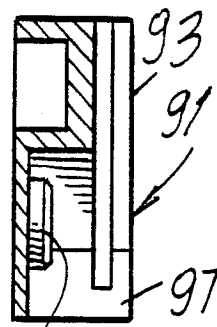


Fig. 39

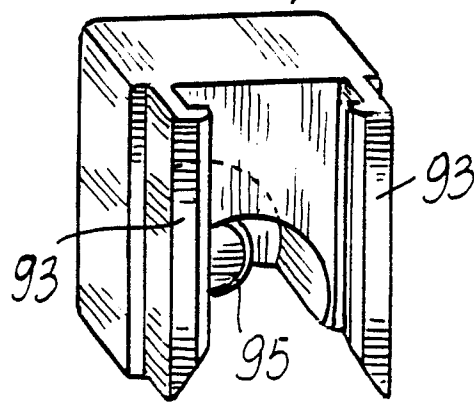


Fig. 37



European Patent
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EUROPEAN SEARCH REPORT

Application Number

EP 88 10 4444

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 4)
X	FR-A-2 333 993 (A. GENTRIC ET J. LE ROUZIC) * Figures 1-9; page 3, line 24 - page 4, line 23 *	1,2,4,5,8	E 05 D 5/02
A	AT-B- 310 398 (SIEGENIA-FRANK K.G.) * Figure 1-3; page 2, line 56 - page 3, line 2 *	3	
A	DE-A-2 716 295 (WERAG A.G.) * Figures 12-14; page 19, lines 20-24 *	7	
A	DE-B-1 250 687 (ELTREVA A.G.) * Figures 1-3; column 2, line 36 - column 3, line 12 *	9	
A	DE-A-1 683 317 (E. NOTTER) * Figures 1-6; page 6, lines 3-20 *	11,12	
A	FR-A-2 233 477 (W. FRACH & B. JANKE) * Figures 8-13; page 5, lines 29-34; page 7, lines 7-25 *	14	TECHNICAL FIELDS SEARCHED (Int. Cl. 4)
A	FR-A-1 498 257 (J. & A. ERBSLÖH K.G.) * Figures 5a,5b; page 2, column 2, paragraph 2 *	17	E 05 D E 04 B E 06 B F 16 F
A	DE-A-2 261 946 (SIEGENIA-FRANK K.G.) * Figures 1,2; page 9, paragraph 2 *	18	
A	DE-A-2 913 281 (W. HARTMANN & CO.)		
A	FR-A-1 603 501 (CENTRE DE RECHERCHE D'ARCHITECTURE, D'URBANISME ET DE CONSTRUCTION)		
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 24-06-1988	Examiner SCHEIBLING C.D.A.
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X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	