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(54) Fixing device for automatic draught excluders and draught excluder incorporating the device

(57) A fixing device for draught excluders which include a first profile shaped like an inverted U to be fixed inside a seat formed in the lower edge of a door or window unit and a second U-shaped profile which can slide in a guillotine-like fashion in the first profile so as to close a gap present between the edge and the floor; expansion means being associated with the first profile and gradually engaging the walls of the seat so as to detachably fix the first profile to the unit. The invention solves the problems observed in fixing known draught excluders, since it makes them practical, fast and extremely easy to install in units made of any material.

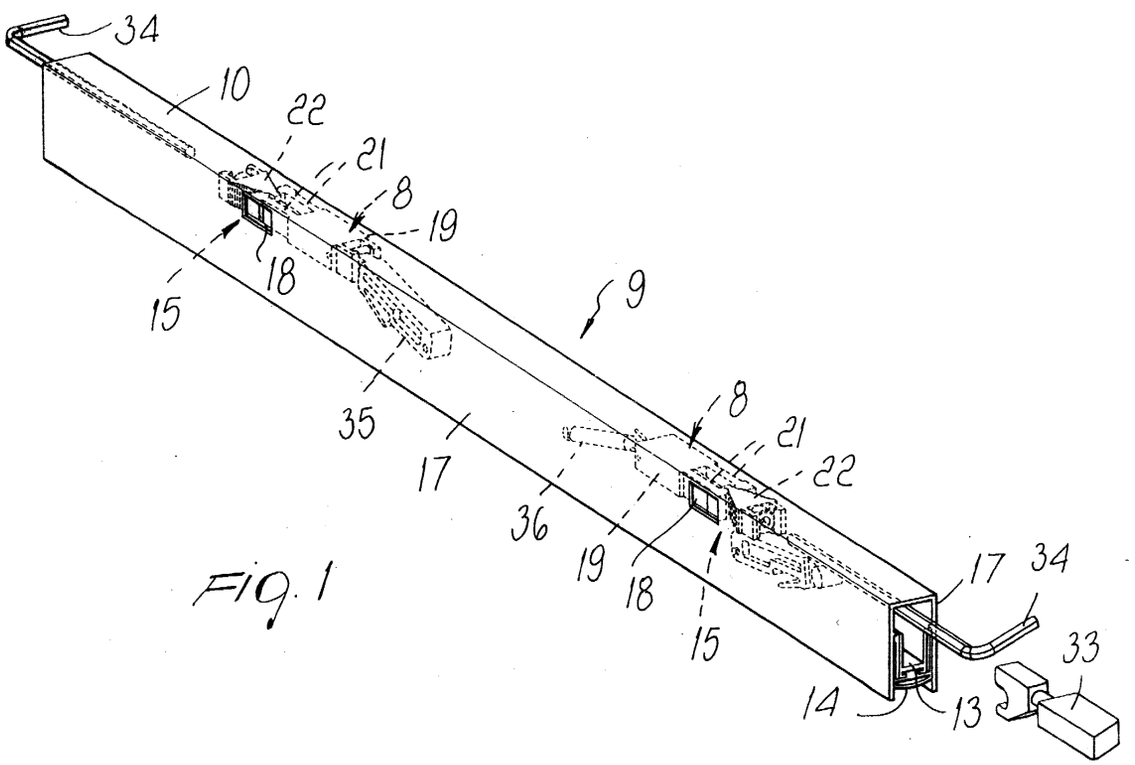

Fig. 1

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Description

[0001] The present invention relates to a fixing device for automatic draught excluders and to a draught excluder which incorporates the device.

[0002] It is known that automatic draught excluders are installed on the bottom edge of door and window units in order to close gaps between the edge of the units and the floor. Generally, these draught excluders are of the automatic type, since they move down and up by themselves when the unit is closed and opened, respectively, by virtue of a lateral button which cooperates with the jamb and acts on a set of levers and springs. These devices are usually fitted manually or with the aid of portable tools by specialized workers at the production sites of the units or by the fitters of the units directly at the buyer's premises. In particular, fitting entails preparing a longitudinal seat along the lower edge, inserting the preassembled draught excluder and then fixing it by means of a pair of screws inserted transversely in the body of the draught excluder and screwed manually into the top of the seat. Fitting of this kind is shown for example in Italian patent application no. VI97A000185 filed on 5 November 1997 in the name of the same proprietor as the present application. Another type of installation of an automatic draught excluder consists in obtaining, by molding or application, on the wings of the inverted U-shaped profile pairs of small mutually opposite tabs which protrude outward and are oriented in the opposite direction with respect to the direction in which the draught excluder is inserted in its seat. In this manner, fitting occurs by forcing, causing the interlocking of the tabs in the walls of the seat.

[0003] The described draught excluders are therefore often complicated to install and fit, especially if the door or window unit is made of metallic materials, and require periodic maintenance interventions by specialized engineers in order to restore their correct fixing and accordingly their correct operation. In particular, fitting known draught excluders to steel-clad units is extremely challenging, since these units are difficult to handle owing to their considerable weight. Moreover, this installation is rendered even more difficult when these units are already installed and especially when burglar-proof hinges have been used for connection to the jamb, as it is known that these hinges do not allow to remove the units in any way other than by forcing the hinges.

[0004] The aim of the present invention is to overcome the drawbacks noted above in known types of draught excluder to be applied to door or window units in order to obstruct the gaps that are present between the lower edge and the floor by providing a fixing device which makes draught excluders practical, fast and particularly easy to install in units made of any material and particularly in steel-clad units.

[0005] Within the scope of this aim, an object of the invention is to provide a fixing device for automatic draught excluders which is simple in concept and to manufacture, so as to contain as much as possible its production costs.

[0006] Another object of the invention is to provide a fixing device for automatic draught excluders which is fully contained within the dimensions defined by currently commercially available draught excluders, so that in case of replacement it is not necessary to intervene on the seat, for example by removing additional material along the walls.

[0007] Another object of the invention is to provide a fixing device which allows durable installation of these draught excluders, so as to avoid maintenance interventions and also inspection interventions, which are simpler.

[0008] This aim, these objects and others which will become apparent hereinafter are achieved by a fixing device for automatic draught excluders which include a first profile shaped like an inverted U to be fixed inside a seat formed in the lower edge of a door or window unit and a second U-shaped profile which can slide in a guillotine-like fashion in the first profile so as to close a gap present between the edge and the floor, characterized in that it includes an expansion means which is associated with the first profile and can gradually engage the walls of the seat so as to detachably fix the first profile to the unit.

[0009] Further characteristics and advantages of the invention will become apparent from the description of a preferred but not exclusive embodiment, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a perspective view of an automatic draught excluder which incorporates the fixing device according to the invention;
Figure 2 is a partially exploded perspective view of the draught excluder of Figure 1;
Figures 3, 4 and 5 are respectively a perspective view, a side view and a top plan view of the device according to the invention;
Figure 6 is a detailed and enlarged-scale top plan view of a draught excluder which incorporates the fixing device according to the invention, in the disengaged position;
Figure 7 is a view, similar to Figure 6, with the fixing device in the active position;
Figure 8 is an enlarged-scale perspective view of a component of the device;
Figure 9 is a detail perspective view of part of the component of Figure 8.

[0010] With reference to the accompanying figures, the fixing device, generally designated by the reference numeral 8, is applied in pairs to an automatic draught excluder, generally designated by the reference numeral 9, whose structure and operation are of a substantially known type. The automatic draught excluder includes a first profile 10, which is shaped like an inverted U and is

meant to be fixed inside a rectilinear seat 11 formed in the lower edge of the door or window unit 12, and a second U-shaped profile 13 with rubber trims 14, which is inserted in the first profile 10 so as to slide vertically in a guillotine-like fashion so as to close the gap (not shown) that is present between the lower edge of the unit 12 and the floor. Generally, the particularity of the fixing device 8 consists of the fact that it includes an expansion means 15 which is associated with the first profile 10 toward its ends; the means gradually engages walls 16 of the seat 11, so as to detachably fix the first profile 10 to the unit 12 and accordingly fix the entire preassembled draught excluder 9. In detail, two mutually opposite pairs of rectangular openings 18 are formed by blanking in wings 17 of the first profile 10 at the expansion means 15 and are large enough to allow the expansion means 15 to gradually engage, by protruding, the walls 16. The expansion means 15 is formed substantially by a body 19, which is hinged to the wings 17 of the first profile 10 by virtue of a transverse pivot 20 and has two rod-like projections 21 whose ends face the openings 18, and by a wedge-shaped body 22 which interacts, by virtue of adjustment members generally designated by the reference numeral 23, with the pair of projections 21 so as to cause the gradual engagement of their ends, which by protruding through the openings 18 engage the walls 16. The body 19 is constituted by an approximately prism-shaped block which has, at its center, a threaded dead hole 24 or, alternatively, a T-shaped seat 25 which is shown in Figures 3 and 5 and partially accommodates the adjustment members 23. The ends of the projections 21 are suitable to engage the walls 16 and to cooperate with the wedge-shaped body 22. In particular, double-edged protrusions 26 are formed on the ends, on the side directed toward the openings 18, and prevent, once they have engaged the walls 16, the longitudinal sliding in both directions of the draught excluder 9 in the seat 11. As shown in Figures 8 and 9, small prism-shaped bodies 37 are associable with the protrusions 26 and allow to make the fixing device 8 suitable for excessively wide seats 11. Each body 37 is fixed to each protrusion 26 by interlocking, by virtue of two rounded studs 38 formed on one face of the body 37 which enter a corresponding pair of cavities 39 formed in the front face of the protrusion 26. On the opposite side of the ends with respect to the protrusions 26 there are additional tooth-shaped protrusions 27 which cooperate with the inclined lateral surfaces of the wedge-shaped member 22. The wedge-shaped member is arranged so that its tip 28 is directed toward the block between the toothed-shaped protrusions 27 and includes, at the center, a smooth longitudinal through hole 29 which partially accommodates the adjustment members 23. Furthermore, multiple transverse, parallel and equidistant raised portions 30 are formed on the inclined lateral surfaces of the wedge-shaped body 22 and selectively cooperate with the tooth-shaped protrusions 27. In turn, the adjustment members simply consist of a screw 31 in which the head 32 is directed toward the nearest end of the first profile 10 and which, by entering the hole 29, is screwed to the required extent into the threaded hole 24. Alternatively, the screw 31 is screwed into a nut (not shown) which is locked transversely in the T-shaped seat 25 and thus enters freely the longitudinal portion of the seat 25. In this manner, by screwing the screw 31 into the hole 24 of the block or into the nut accommodated in the seat 25, the wedge-shaped body 22 is moved toward the block, consequently causing the gradual divarication of the projections 21, whose ends protrude from the openings 18, inserting and increasingly engaging the protrusions 26 in the walls 16 of the seat 11. The resulting fixing of the draught excluder 9 is maintained over time by virtue of the contrast force applied by the raised portions 30 to the tooth-shaped protrusions 27. Naturally, the adjustment of the fixing or the full disengagement of the draught excluder 9 are achieved by unscrewing the screw 31, so that the expansion means 15 retracts until it returns within the first profile 10. The fixing device 8 furthermore cooperates with the means for the movement of the second profile 13 with respect to the first profile 10. In detail, and according to the known art, this movement means includes a button-type pusher 33 which protrudes at one of the ends of the draught excluder 9 and can be conveniently removed by simply pulling, so as to allow access, by virtue of a hexagonal-head key 34, to the head 32 of the screw 31, a lever and a helical spring, designated by the reference numerals 35 and 36, which are hinged at their ends respectively to the rear of the block and to the second profile 13.

[0011] In practice it has been found that the described device achieves the intended aim and objects, since it allows to fix any kind of automatic draught excluder to any door or window unit in a practical, straightforward and facilitated way and most of all without having to provide any holes. Furthermore, the device allows to adjust the expansion means very accurately so as to adapt the pressure it applies to the walls of the seat according to the material of which the unit is made. Finally, the draught excluder that incorporates the device is particularly advantageous in that it can be applied both in the traditional way and by making it slide within the seat from one of the ends of the lower edge of already-installed units. Clearly, this aspect is particularly useful in the case of steel-clad units, since it is no longer necessary to remove them and reinstall them after application.

[0012] The device according to the invention is susceptible of numerous modifications and variations, all of which are within the scope of the same inventive concept expressed herein.

[0013] All the details may furthermore be replaced with other technically equivalent elements. In practice, the materials used, as well as the contingent shapes and dimensions, may be any according to the requirements.

Claims

1. A fixing device for automatic draught excluders comprising a first profile shaped like an inverted U to be fixed inside a seat formed in the lower edge of a door or window unit and a second U-shaped profile which can slide in a guillotine-like fashion in said first profile so as to close a gap present between said edge and the floor, **characterized in that** it comprises an expansion means which is associated with said first profile and can gradually engage the walls of said seat so as to detachably fix said first profile to said unit.

2. The device according to claim 1, **characterized in that** said first profile comprises two openings which are formed opposite each other on the wings at said expansion means and allow said expansion means to protrude in order to gradually engage said walls.

3. The device according to one or more of the preceding claims, **characterized in that** said expansion means comprises a body which is hinged to said wings of said first profile and is provided with two rod-like projections whose ends face said openings and a wedge-shaped body which interacts, by virtue of adjustment members, with said two projections, said ends protruding from said openings so as to promote said gradual engagement of said ends with said walls.

4. The device according to one or more of the preceding claims, **characterized in that** said body comprises a prism-shaped block which is provided, at its center, with a longitudinally threaded dead hole or with a T-shaped seat which are suitable to partially accommodate said adjustment members.

5. The device according to one or more of the preceding claims, **characterized in that** said ends form, on the side directed toward said openings, double-edged protrusions which are suitable to engage said walls by penetration and form, on the opposite side, tooth-shaped protrusions which cooperate with the lateral surfaces of said wedge-shaped member.

6. The device according to one or more of the preceding claims, **characterized in that** it comprises prism-shaped bodies which can be associated with said double-edged protrusions by interlocking by virtue of pairs of studs which are formed on one face of said bodies and enter corresponding cavities formed in the front face of said double-edged protrusions.

7. The device according to one or more of the preceding claims, **characterized in that** said wedge-shaped body is arranged so that its tip is directed toward said block between said tooth-shaped protrusions, said body comprising, at the center, a smooth longitudinal through hole which is meant to partially accommodate said adjustment members and a plurality of transverse raised portions which are parallel and equidistant along said lateral surfaces and cooperate selectively with said tooth-shaped protrusions.

8. The device according to one or more of the preceding claims, **characterized in that** said adjustment members comprise a screw in which the head is directed toward the nearest end of said first profile, is inserted in said hole of said wedge-shaped body and is screwed into said hole of said block or into a nut which is locked transversely in said T-shaped seat and protrudes freely in the longitudinal portion of said T-shaped seat.

9. The device according to one or more of the preceding claims, **characterized in that** it cooperates with the means for the vertical movement of said second profile with respect to said first profile, said movement means comprising a pusher which can be removed from said end of said first profile in order to access said adjustment means, and a lever and a helical spring which are hinged at their ends respectively to the rear portion of said block and to said second profile.

10. A draught excluder incorporating a fixing device which comprises a first profile shaped like an inverted U to be fixed inside a seat formed in the lower edge of a door or window unit and a second U-shaped profile which can slide in a guillotine-like fashion in said first profile so as to close a gap that is present between said edge and the floor, **characterized in that** said fixing device comprises an expansion means which is associated with said first profile and can gradually engage the walls of said seat so as to detachably fix said first profile to said unit.

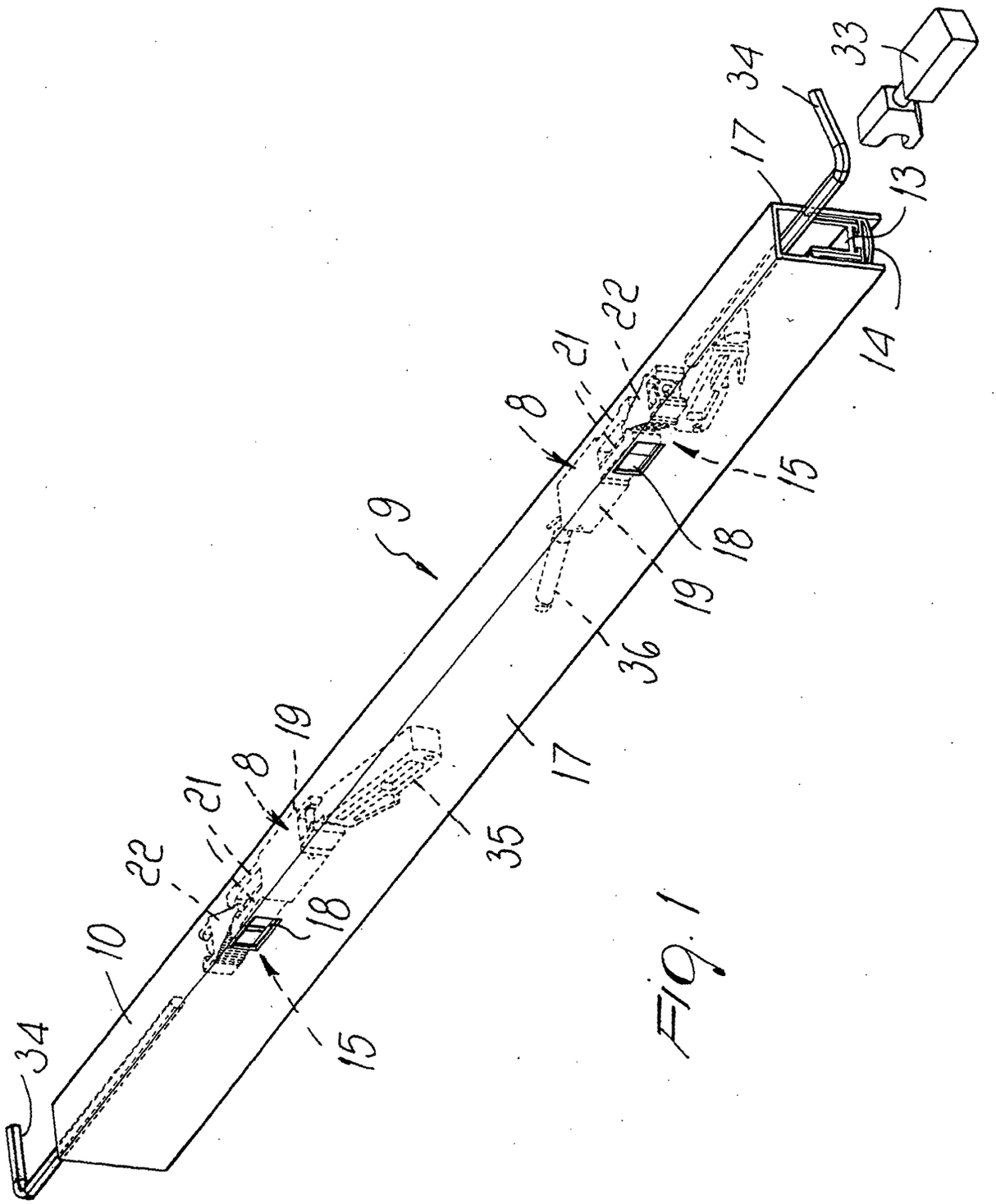

Fig. 1

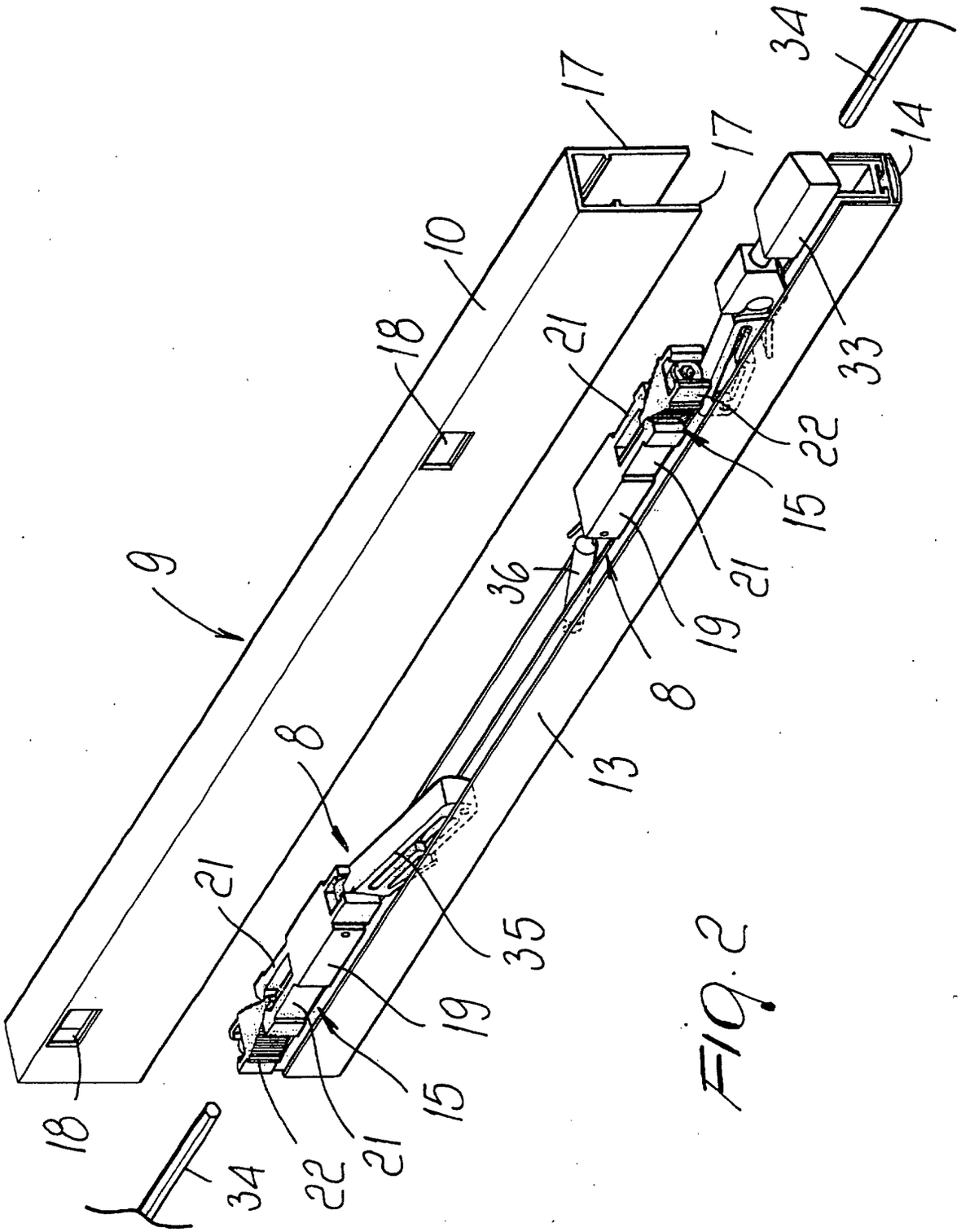
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FIG. 2

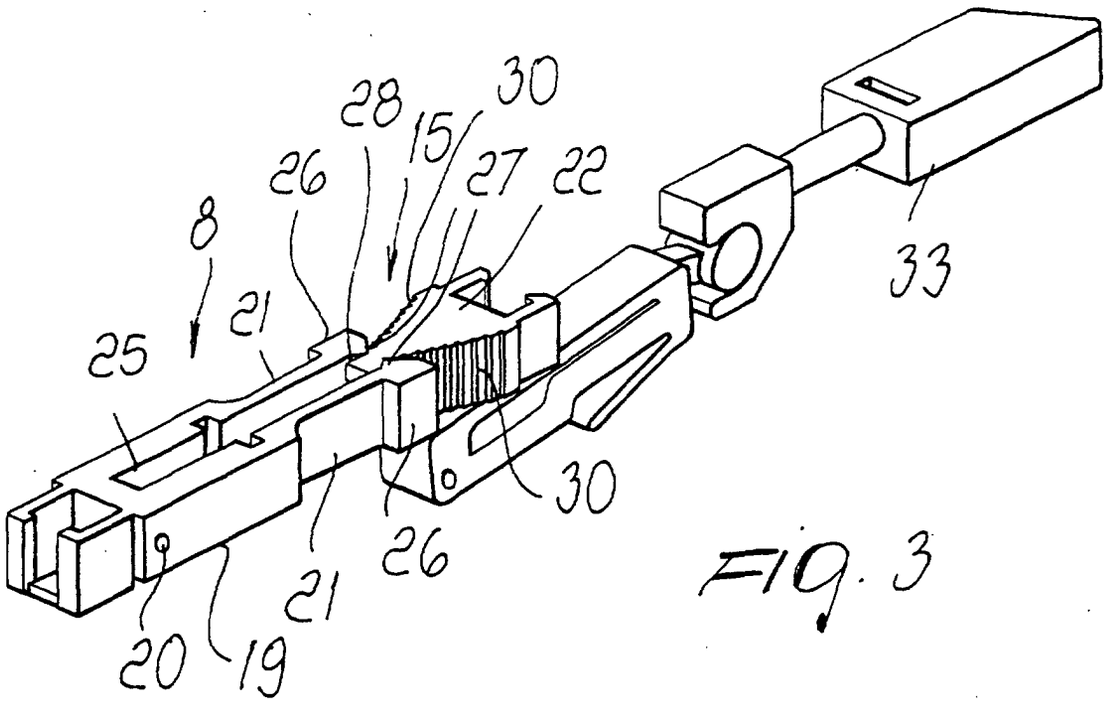

FIG. 3

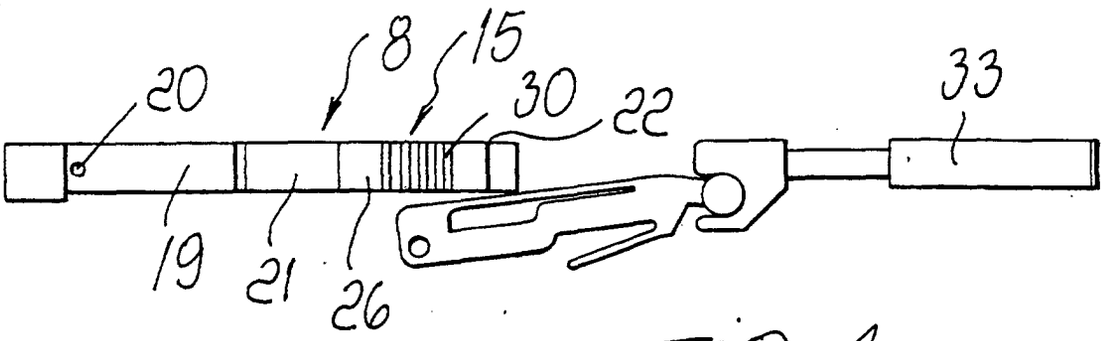

FIG. 4

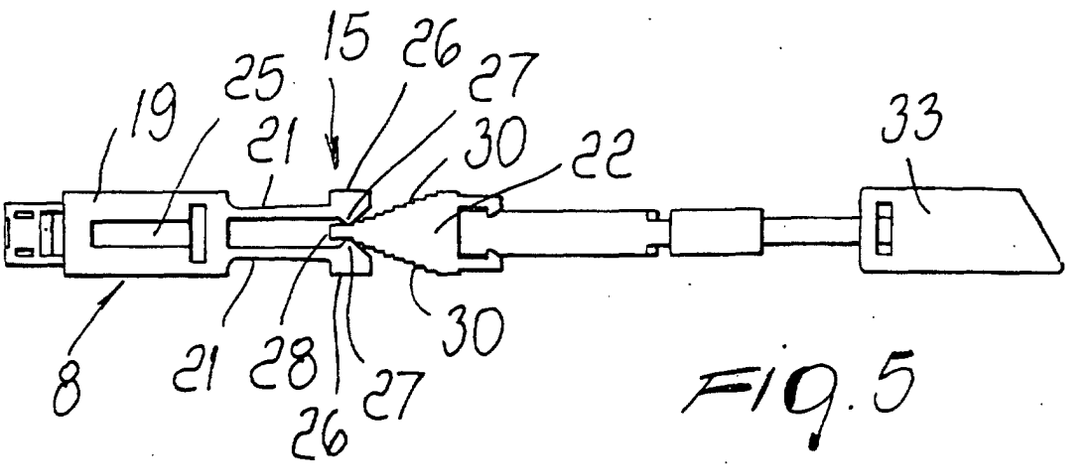

FIG. 5

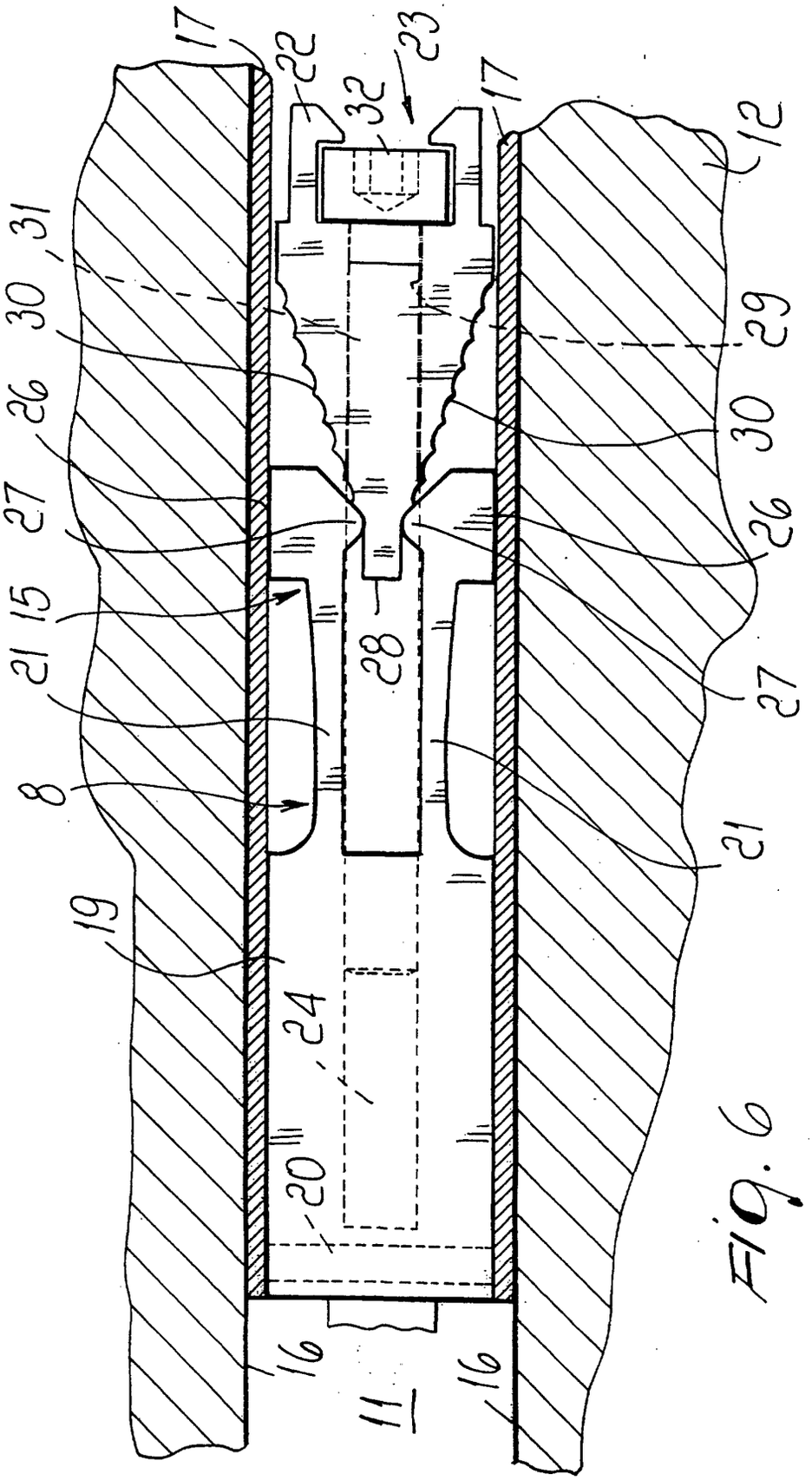

Fig. 6

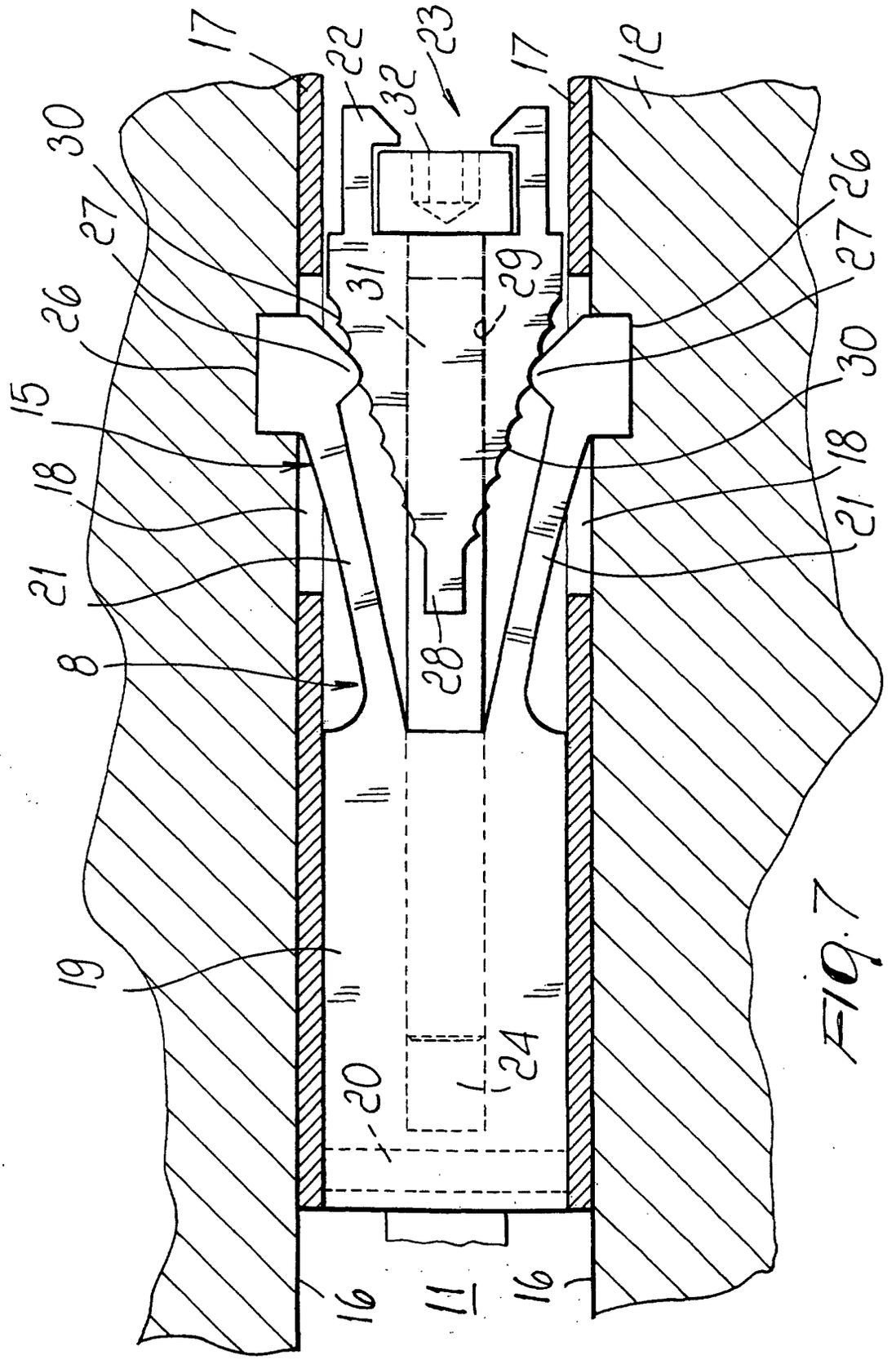
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FIG. 7

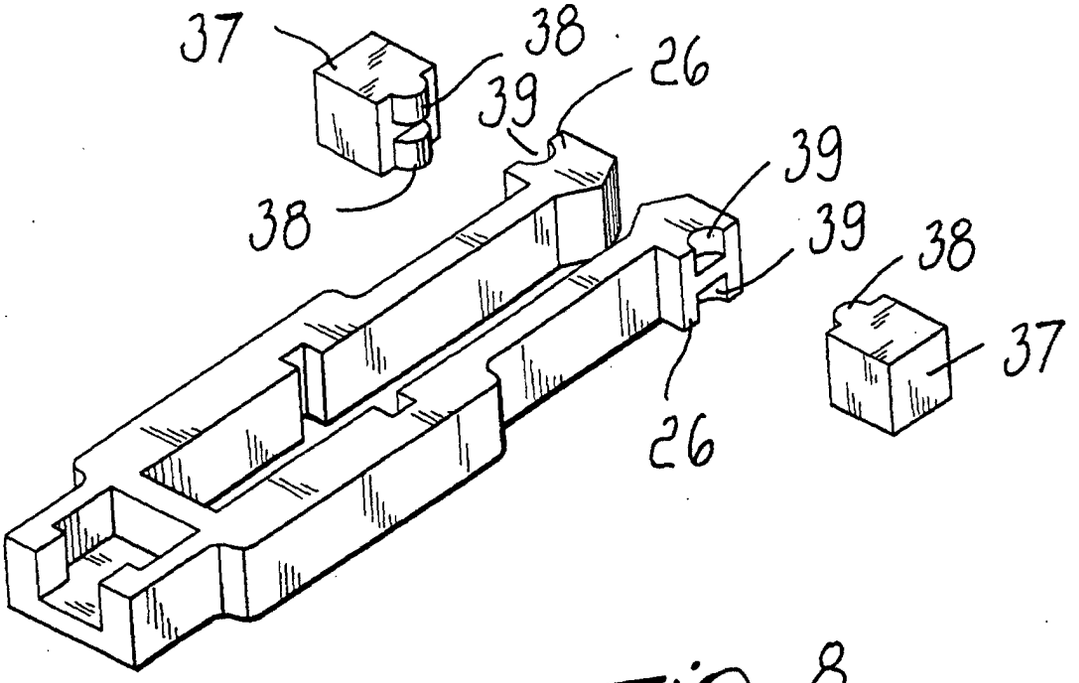

Fig. 8

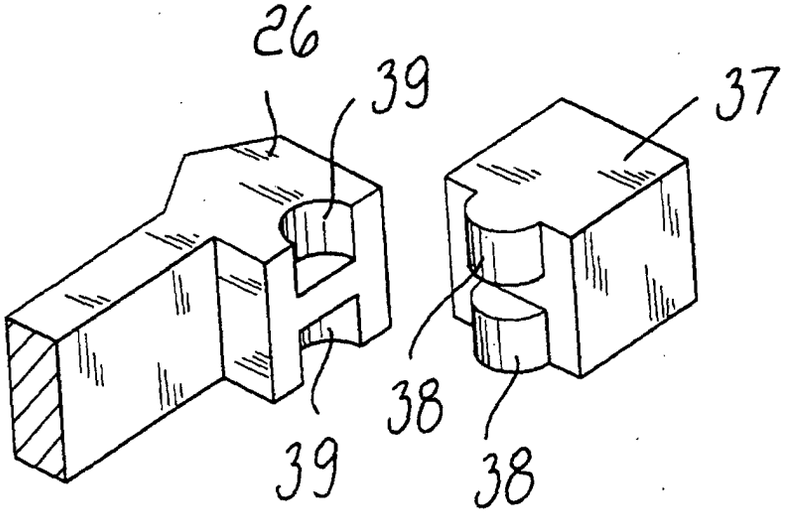

Fig. 9