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(54) **Fastener system for trunking.**

(57) Cable trunking has a cover (40) releasably secured to a channel member (30) by plastics moulded fasteners (1) having a head (2), a stem (5) and lugs (7,9) extending laterally from the stem. The cover has an aperture (10) for receiving the stem and legs therethrough so that the fastener is retained by one of the lugs. Further rotation of the fastener (1) effects the connection by means of the other lug. Use of the fastener (1) is not limited to cable trunking.

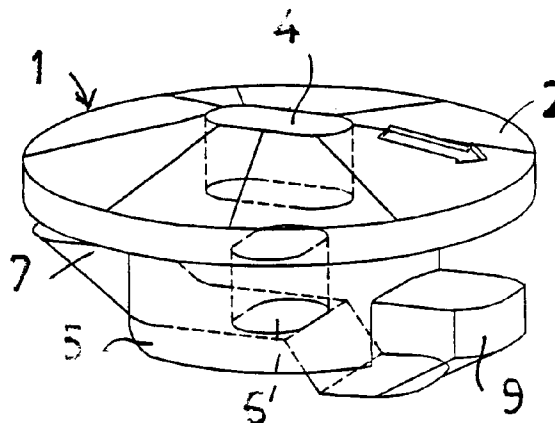


FIG.1

The invention relates to a fastener system suitable for use with trunking for electric cables or the like. Such trunking conventionally comprises an elongate metal channel member which is secured to a wall or to flooring and in which the cables or wiring received. The cabling within the channel is additionally protected by a cover member secured to the channel by screw fasteners received through aligned holes in the cover and channel portions members.

Such trunking is difficult and time consuming to install, and access to its interior after insulation can be difficult because of rusting or corrosion of the parts of which the trunking is constructed.

It is thus an object of the invention to provide a fastener system which can be advantageously employed in assembly of a trunking system. It is also an object of the invention to provide a trunking system which is economical to produce and which can be easily and quickly installed, and which is moreover cleaner, safer and more durable than conventional systems.

The invention thus provides a latching fastener for connecting together first and second overlying plates or plate-like members, typically, but not necessarily, members of a trunking system, the fastener comprising a head portion and a stem portion protruding therefrom, the stem portion having first and second lugs or latch elements projecting laterally therefrom for engaging behind the first and the second members respectively. The fastener can conveniently be moulded in a suitable plastics material.

At least the outer of the two members, that adjacent the head portion of the fastener, will have a closed or nearly closed aperture for receiving the stem portion, the aperture being shaped to permit insertion of the stem portion and rotation of the fastener to a position in which the innermost of the lugs will latch behind the member. The outer member and the fastener thus together form a sub-assembly for final assembly with the other member.

A further rotation of the fastener can bring the second lug to latch behind a second or inner member overlying the first. The second or outer lug can rotate over an edge of the second member where this is suitably restrained with respect to the first, but the second member can instead be provided with a suitable closed or nearly closed aperture for receiving the stem portion and the lugs, the aperture being shaped to accommodate movement of the first lug over the first member as the second lug moves into latching engagement with the second member.

The invention thus also provides a fastener system comprising the fastener described above and members having apertures shaped to co-operate with the fastener in securement of the members together.

The invention thus also provides a trunking system comprising elongate members which can be assembled together to provide and elongate trunking

chamber within or between them, and fastener means for connecting the elongate members together by a latching action.

The invention will be seen to provide for the latching together of members such as members of a trunking system by means of a fastener which needs simply to be turned through a limited angle, typically 90°. A trunking system in accordance with the invention can be easily and quickly assembled, with consequential savings in time and costs.

The invention is further described below, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a latching fastener for use in a trunking system in accordance with the invention,

Figure 2A is a plan view of a fastener of Figure 1, Figures 2B and 2C are side views of the fastener, taken on viewpoints angularly spaced apart by 90°,

Figures 3A and 3B show apertures in respective members, such as members of a trunking system in accordance with the invention, the aperture being shaped to accommodate the fastener of Figures 1 and 2,

Figures 4A and 4B show respectively two trunking members of the system of the invention in perspective unassembled view, and in perspective view after assembly, whilst Figures 4C, D and E are perspective views showing the action of the fastener of Figures 1 and 2 in securing together the two trunking members,

Figure 5A and 5B are perspective views showing stages of the connection of the trunking members of Figure 4 with a third, connector, member, again by the fastener of Figures 1 and 2,

Figure 6 is a sectional view of the assembled trunking, and

Figure 7 is a partial sectioned plan on a larger scale of means for insuring electrical continuity between adjacent lengths of the trunking.

The latching fastener 1 shown in Figures 1 and 2 comprises a head portion 2 having the form of a circular disc with a domed outer surface provided with a formation for receiving a tool by which the fastener can be rotated, here shown as a diametrically extending slot 4.

From the other surface of the head portion 2, there extends a short concentric cylindrical stem portion 5, the free end surface of which is also formed with a tool-receiving formation for effecting rotation, here a slot 6 at right-angles to the slot 4. Axially inner and outer latching lugs 7 and 9 extend at diametrically opposed positions from the stem portion 5, and extend radially to the periphery of the head portion 2. The outer lug 9 provides an upper engagement surface parallel to the undersurface of the head portion 2 and spaced from it by about twice the distance from

which a corresponding engagement surface of the inner lug 7 is spaced from this undersurface.

The fastener 1 is preferably moulded in Acrylonitrile Butadiene Styrene material (ABS) or other material providing a low coefficient of friction together with good resistance to wear and scratching and to common chemicals, including hydrocarbons. The material of the fastener 1 should withstand temperatures up to 100°C and have good electrical insulation properties. It should be capable of being self-coloured or transparent and it should offer a high gloss finish whilst being capable of it being metal plated. All these requirements are met by the use of ABS 403 to mould the fastener 1.

The fastener of Figures 1 and 2 is capable of releasably connecting together an outer and an inner plate or plate-like member, the members being provided respectively with apertures 10, 20 as shown in Figures 3A and 3B. The aperture 10 in the outer member comprises overlapping circles 11 and 12 of larger and smaller diameters respectively. The larger diameter circle can receive the cylindrical stem portion 5 of the fastener 1 which can be inserted through it, with both lugs 7, 9 on the far side, by use of the smaller diameter circle to accommodate the lugs. A small rotation then contacts the inner lug 7 against the far surface of the outer member to latch the fastener and member together by holding the member between the lug and the under surface of the head portion.

The aperture 20 in the inner plate member is similar to that of the aperture in the outer plate member, but with the addition of a lobe 14 extending outwardly of the larger circular portion opposite the small circular portion.

In assembly of the two plate members together, the lobe 14 accommodates the inner lug and the small circular portion receives the outer lug. Rotation of the fastener 1 within the angular range of 90° permitted by the lobe 14 allows the outer lug to slide over the outer surface of the inner plate member, so that the two members are secured by being latched or clamped together.

The fastener of Figures 1 and 2 can also be employed to clamp together two members where an edge of the inner member is adjacent to the aperture in the outer member, as shown in Figure 4A.

Figure 4A thus discloses two cable trunking members 30 and 40 in accordance with the invention, of which the member 30 comprises a channel having a base web 31 and two parallel side webs 32 extending from it, the side webs terminating in lips 34 turned inwardly from their free edges so as to be parallel to the base web. The member 40 comprises a cover again in the form of a channel with a base web 41 and relatively short side webs 42. The cover member 40 can be assembled with the channel member 30, as shown in Figure 4B to provide generally square cross section trunking for protecting cabling extending with-

in it.

As shown in Figure 4A, fasteners 1 are inserted through apertures 10 provided in the cover member 30 with the lugs extending longitudinally of the cover so as to retain the fasteners thereon. After assembly to the condition shown in Figures 4B and 4C, the fasteners 1 are rotated by a tool inserted in the slots 4 from outside the trunking in the direction of the arrow 45 shown in Figure 4D, so as to bring the outer lugs 9 over the far surface of the lips 42 of the channel member. The final position is then as shown in Figure 4E, with the inner lugs 7 engaging against the inner surface of the cover member 40 and the outer lugs 9 engaging the inner surfaces of the lips 42.

The fasteners 1 can be secured in place in the cover member 40, thanks to the inner lugs 7, before the cover member is assembled with the channel member 30. In difficult working conditions therefore, the operator has merely to place the cover member on the channel member with one hand, and to rotate the fasteners 1 by means of a screw-driver in his other hand. Any danger that the cover member might fall off the channel member during assembly, causing possible damage and injuries, is thereby avoided.

As shown in Figure 4A, the lips 34 can be provided with recesses, to receive the cylindrical portion of the fasteners. Such recesses can be rectangular in shape as shown but could be part circular or otherwise shaped.

Turning now to Figure 5, lengths of trunking formed of the channel and cover members 30 and 40, can be assembled together into end-to-end relationship with the assistance of connector elements 50. The connector elements 50 are generally L-shaped in cross section and have a main wall 51 and a shorter wall 52. The wall 51 abuts in use against the inner surface of the side web 32 of the channel member 30. For securement of the channel members 30 to the connector member 50, the former is provided with an aperture 20 shaped as shown in Figure 3B near each end of each side web 32, and the latter is provided with an aperture 10 shaped as shown in Figure 3A. With the fastener 1 in place in the channel member aperture 10, the connector member 50 is placed with one end projecting within the channel member, and the apertures 10 and 20 in registration, after which the fastener member is turned to secure the channel and connector elements together, in the way described with reference to Figures 3A and 3B.

It will be noted that the apertures 10 in the side webs 32 are aligned across the channel member 30. The channel member may be installed a short distance away from a wall, making it difficult or impossible to effect rotation of the fasteners 1 adjacent the wall from outside the trunking. Such rotation can be readily effected however by insertion of a screw-driver from the free side of the trunking through the outer aperture 10, prior to insertion of the fastener 1

therein, so that the opposite fastener 1 can be rotated by engagement of the screw-driver into the slot 6.

As shown in Figures 5A and 7, the connector member 50 is advantageously provided with a recess or domed portion 55 at its mid position, between the two apertures 20. Good electrical continuity for earthing purposes can then be ensured between the adjacent channel members 30 of the trunking by a connector plate 60 overlying the adjoining ends of the side webs 32 of the channel members and secured in place by self-tapping screws 61, protruding through aligned 62 apertures in the connector member and 64 in the side webs 32. The interior of the domed portion 55 accommodates the inner ends of the screws 61.

Although only one connector member is shown in Figure 5, two such members will normally be employed, as appears from the final assembled condition of the trunking is illustrated in Figure 6 which shows a cross section of the trunking adjacent a connection between adjacent lengths of the members 30 and 40 by means of two connector members 50.

Although the trunking illustrated has been shown as of uniform cross section throughout, the members illustrated can be associated with members for connecting between lengths of trunking of different width and/or height, as well as with members providing T junctions, cross-junctions, and elbows at selected angles. All such additional members can be arranged for securement to the trunking members illustrated by way of the fasteners 1.

The invention can be embodied in a variety of ways other than as specifically described and illustrated.

Claims

1. A latching fastener for connecting together first and second overlying members, the fastener comprising a head portion (2) a stem portion (5) protruding from the head portion, and first and second latch elements (7,9) projecting laterally from the stem portion at different spacings from the head portion, for engagement behind the first and second members respectively.
2. A fastener as claimed in claim 1 wherein the first latch element (7) is spaced from the adjacent surface of the head portion by half the spacing therefrom of the second latch element (9).
3. A fastener as claimed in claim 1 or 2 wherein the first and second latch elements (7,9) extend in opposite directions from the stem portion.
4. A fastener as claimed in claim 1, 2 or 3 wherein at least one of the head and stem portions (2,5) has a formation for receiving a tool whereby the

fastener can be rotated.

5. A fastener as claimed in claim 1, 2, 3 or 4 moulded in acrylonitrile butadiene styrene.
6. A fastener system comprising a fastener (1) as claimed in any preceding claim and first and second generally plate-like members (30,40;30,50) to be fastened together in overlying relationship, the first member having an opening (10) therein for receiving the stem portion (5) of the fastener therethrough with the first member between the head portion and the first latch element (7), and the second member having an edge over which the second latch element can project to secure the members together.
7. A fastener system as claimed in claim 6 wherein the opening (10) has the shape of overlapped circles of a diameter to receive the fastener stem portion (5) and of a smaller diameter to receive the latch elements, respectively.
8. A fastener system as claimed in claim 6 or 7 wherein the second member edge is recessed to accommodate the stem portion (5) of the fastener.
9. A fastener system as claimed in claim 6, 7 or 8 wherein the edge of the second member is provided by an aperture (20) therein.
10. A fastener system as claimed in claim 9 wherein the aperture (20) has the shape of overlapped circles of a diameter to receive the fastener stem portion (5) and of a smaller diameter respectively, together with a lobe portion (14) to accommodate the first latch element (7) as the fastener is rotated to engage the second latch element (9) over the second member edge.
11. A fastener system as claimed in any one of claims 6-10 wherein the first and second members comprise cable trunking members.
12. Cable trunking comprising a channel member (30) and a cover (40) for the channel member, the members being arranged to be releasably latched together by a fastener (1) rotatable to engage and disengage latch means (7,9) with the members.
13. Cable trunking as claimed in claim 12 wherein the fastener is as claimed in any one of claims 1-5.
14. Cable trunking as claimed in claim 13 wherein the channel member has intumed edges (34) over which the second latch elements (9) of the fas-

tener engage.

15. Cable trunking as claimed in claim 12, 13 or 14 having a connector member (50) for connecting an end of the channel member with the adjacent end of a like channel member by a fastener as claimed in any one of claims 1-5, the connector member having apertures (30) providing the edges over which the second latch elements engage.

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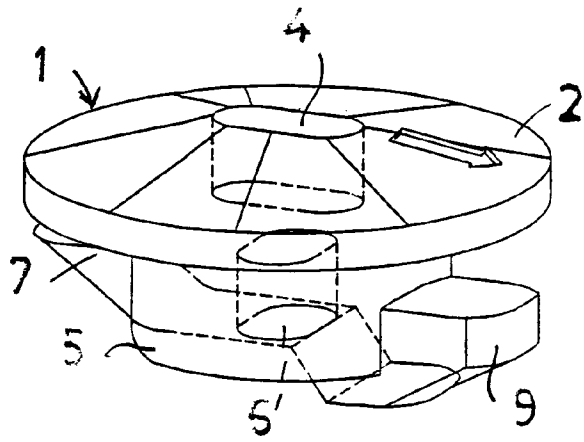


FIG. 1

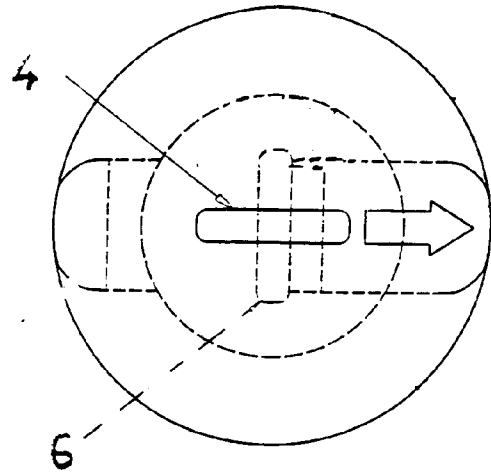


FIG. 2A

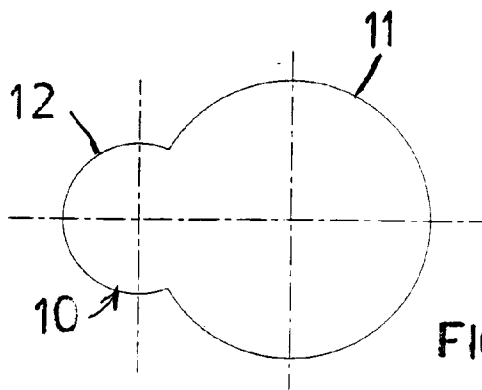


FIG. 3A

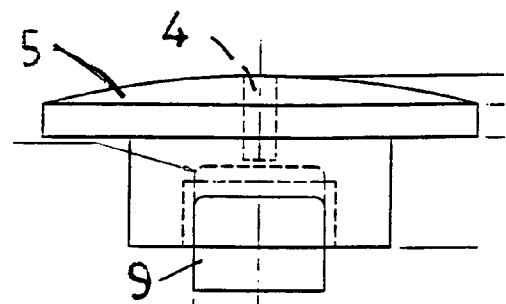


FIG. 2B

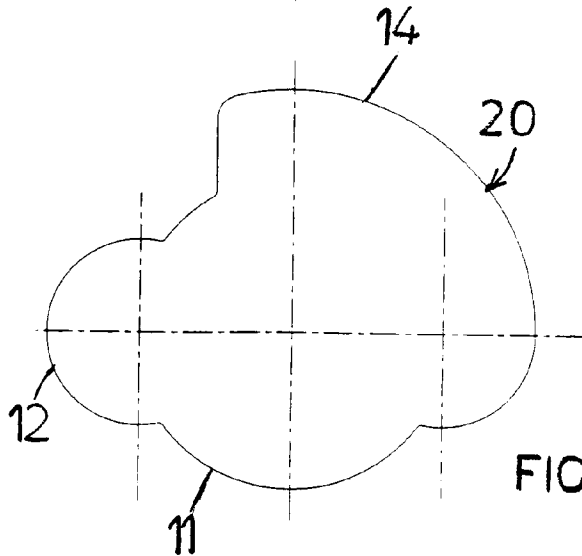


FIG. 3B

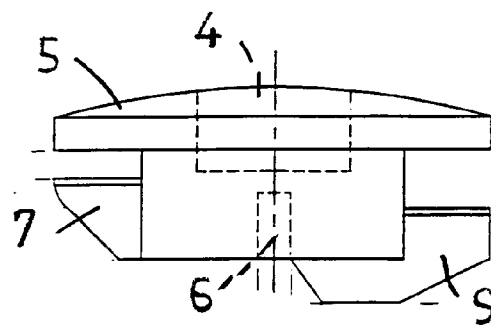


FIG. 2C

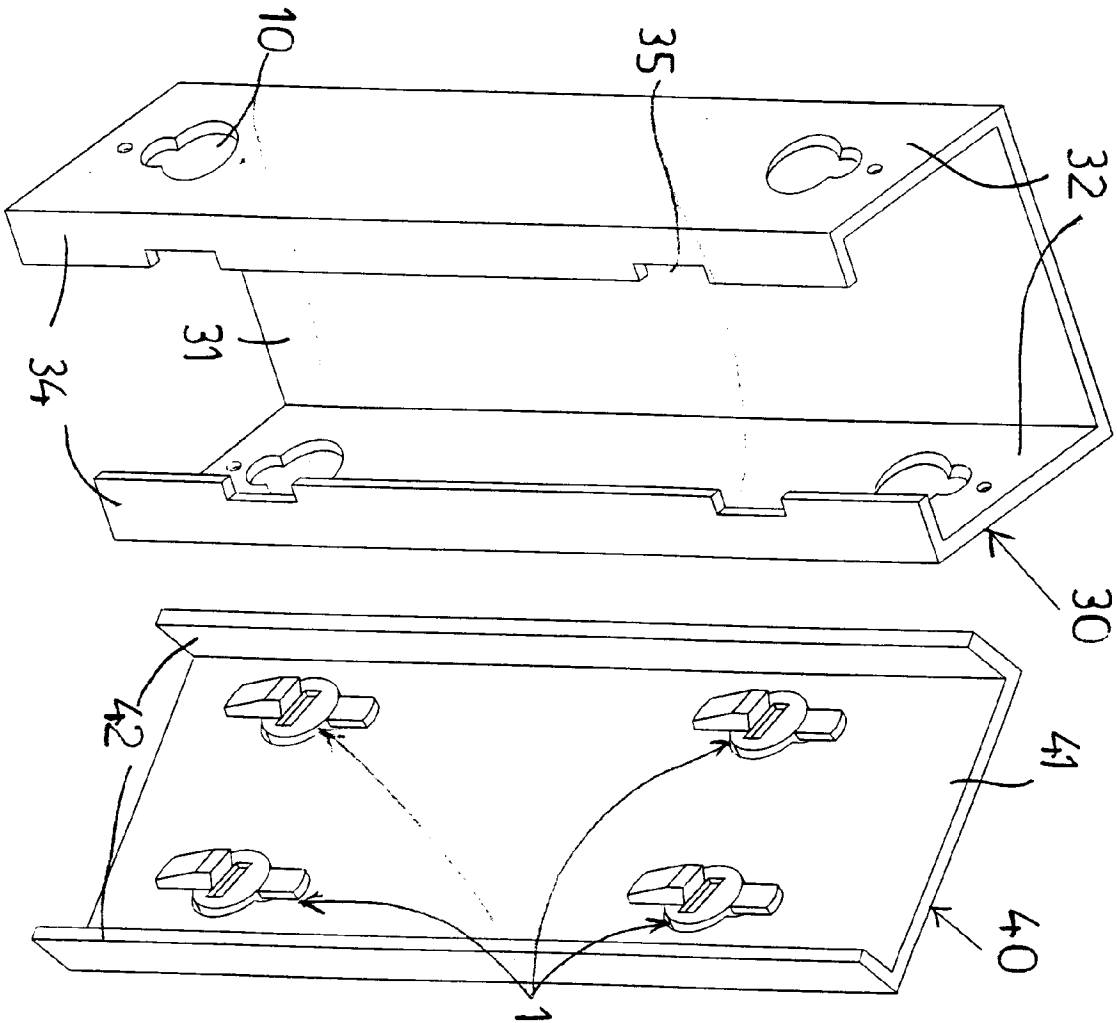


FIG. 4A

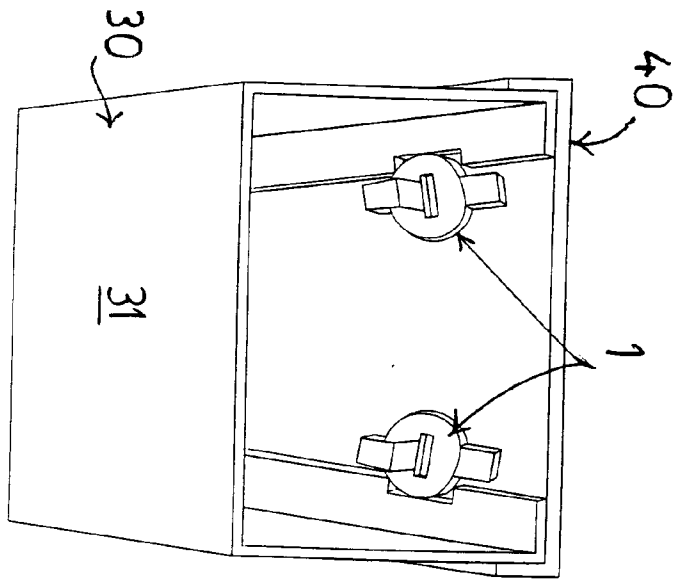


FIG. 4B

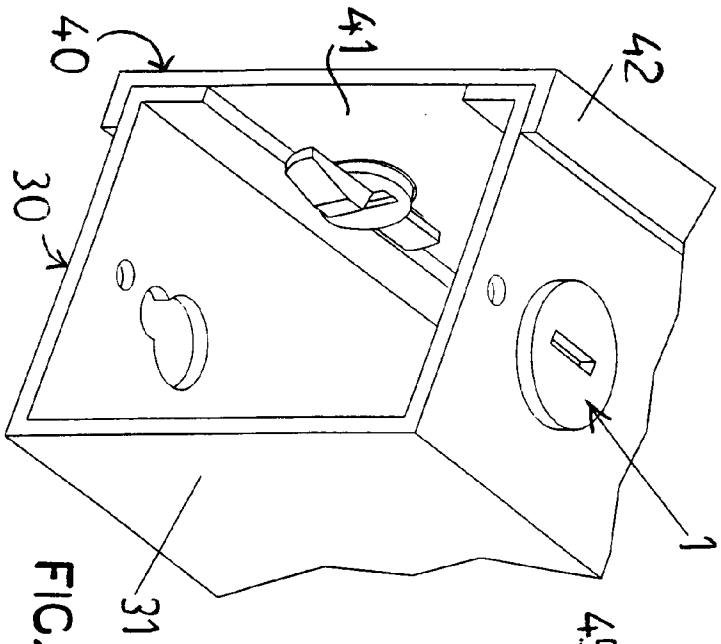


FIG. 4C

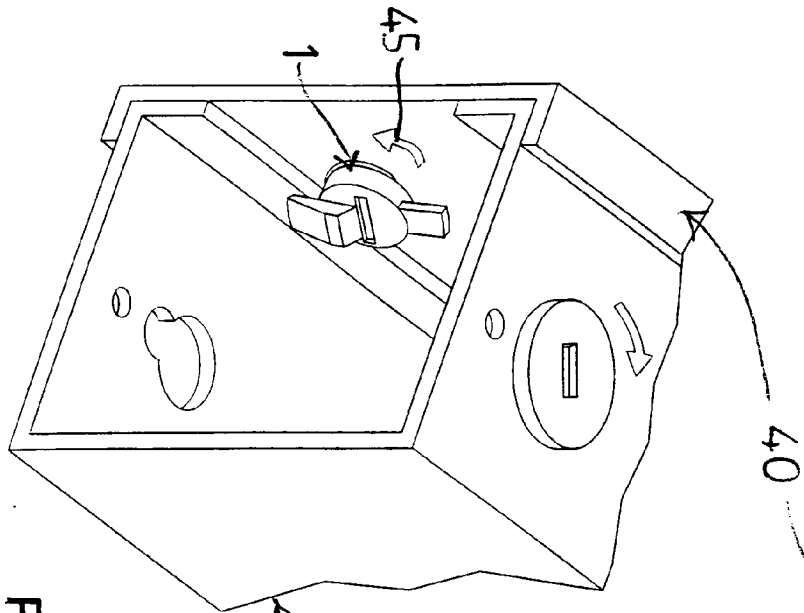


FIG. 4D

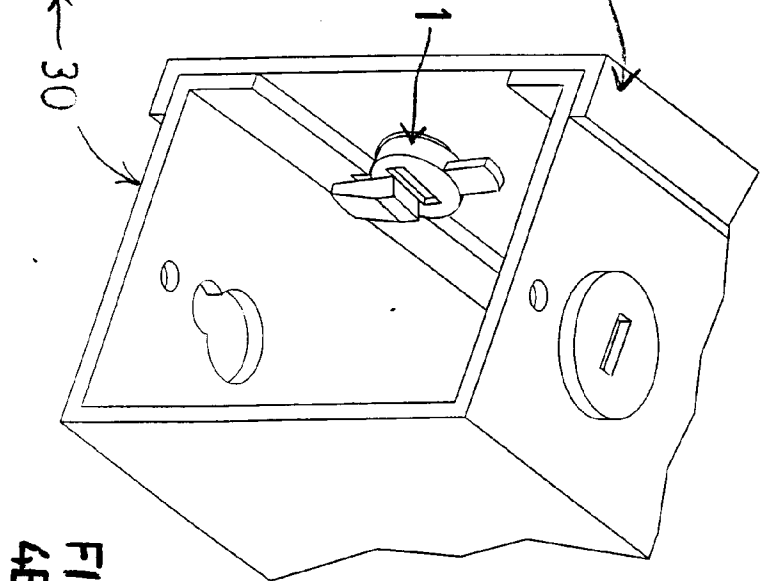
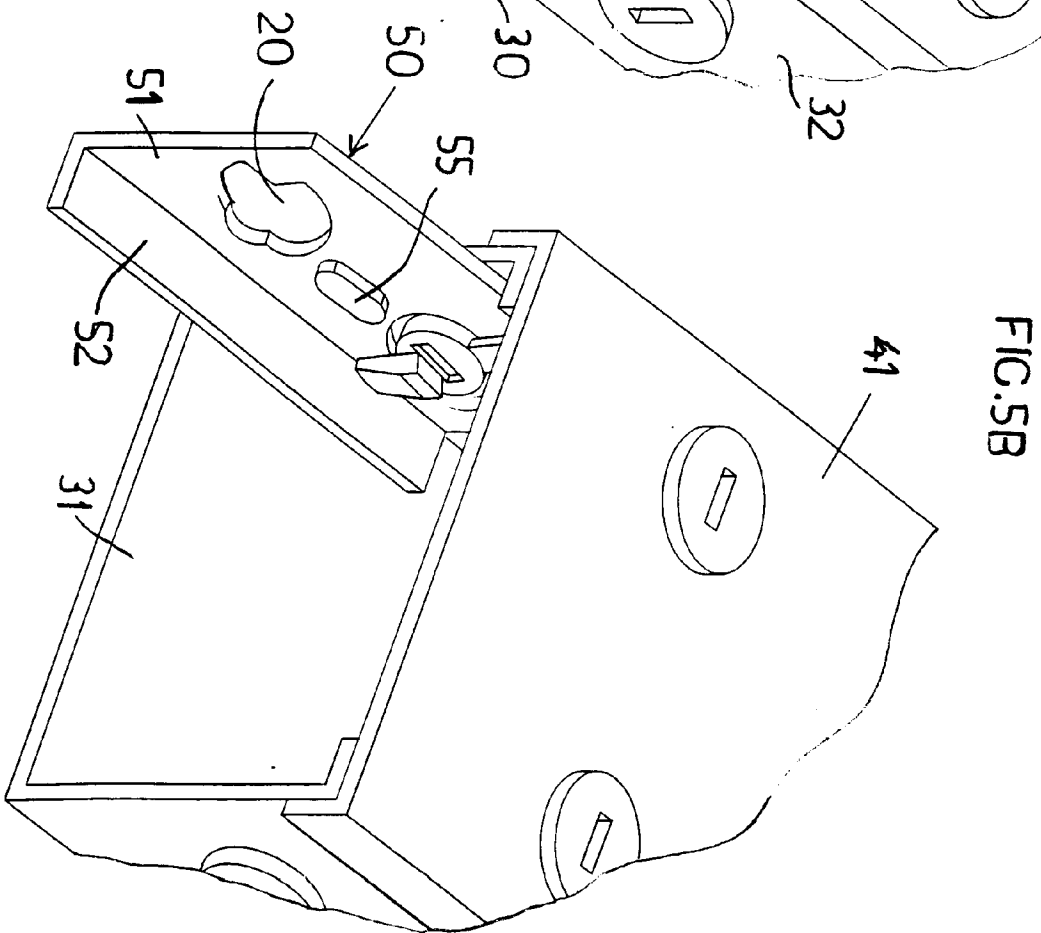
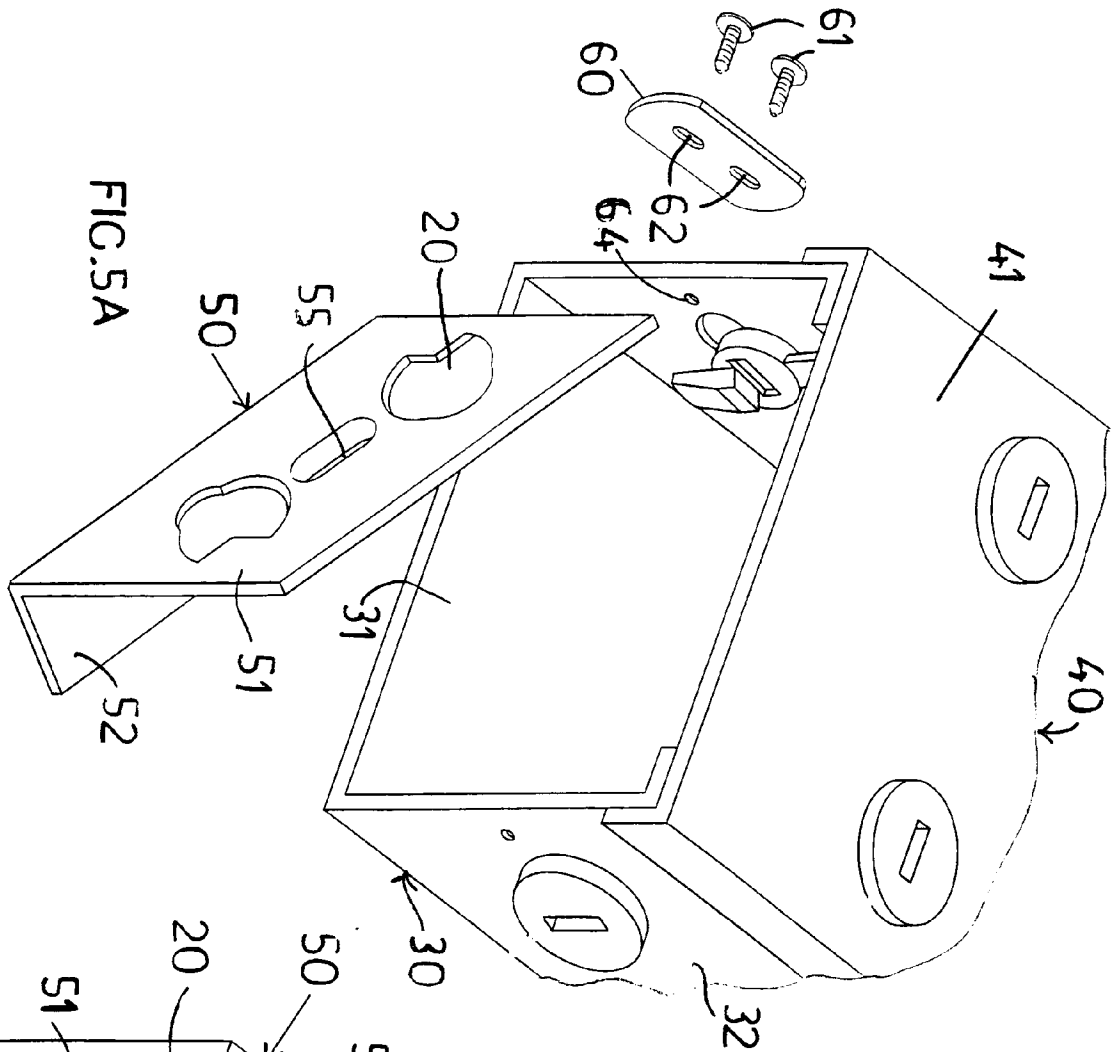


FIG. 4E



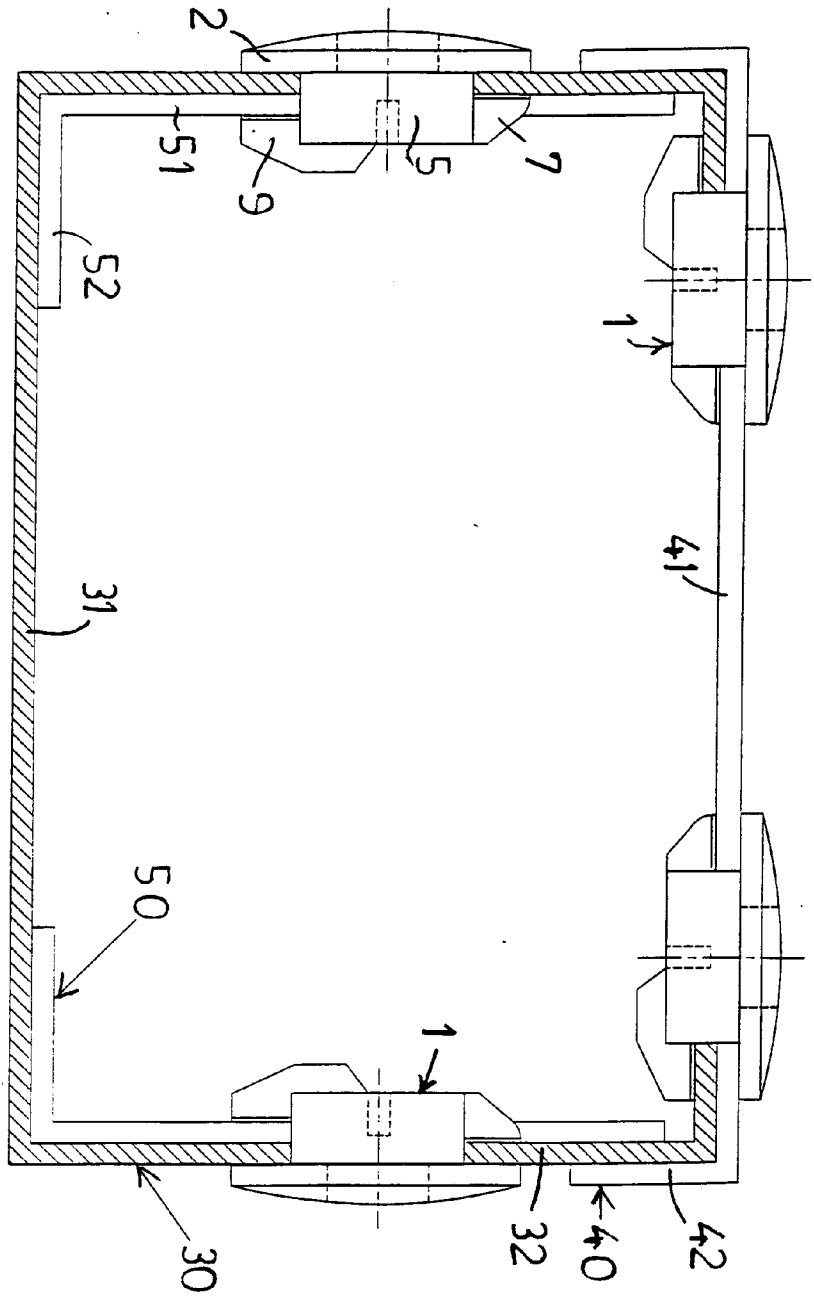


FIG. 6

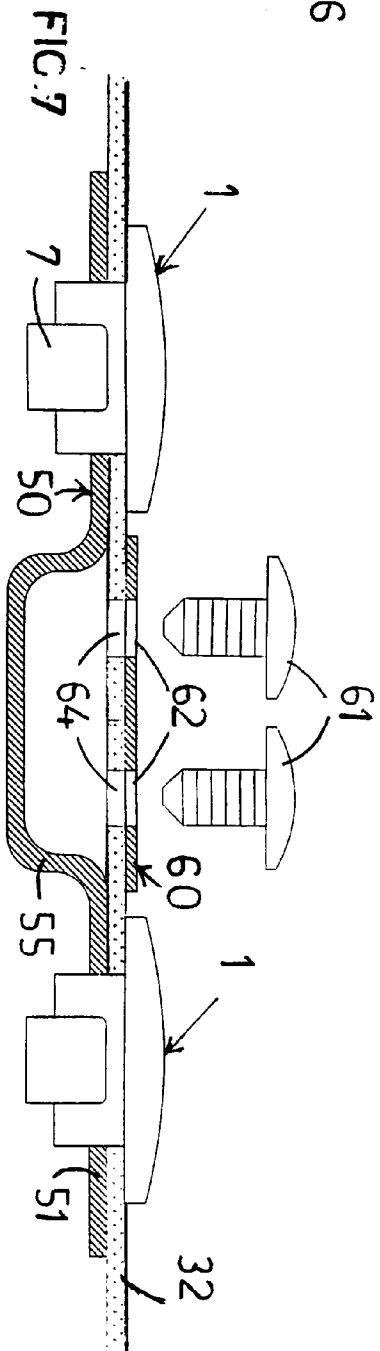


FIG. 7