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Description

This invention relates to lighting units of the type having a double ended straight, elongate lighting element such as a tubular tungsten or tungsten halogen lamp. A double ended lighting element is one in which an electrical connection is made to each end. The invention relates in particular to a lighting unit of this type into which an element may conveniently and safely be inserted.

With some of the lighting units widely used at present there is a risk to a person inserting a new element. Should the power supply be left on and the person introduce one end of the element to the live terminal of the unit whilst holding the other end he may complete an electrical circuit and receive an electric shock. To combat this risk the use of warning labels on such lighting units is recommended. This remedy is clearly unsatisfactory in view of the hazard involved.

This invention provides a lighting unit of the above type in which the risk of a person inserting a new lighting element receiving an electric shock by touching a live terminal is substantially eliminated.

DE-C-827 529 discloses a lighting unit comprising a cartridge holder having socket openings containing electrical contacts and a cartridge for engagement with the cartridge holder, the cartridge comprising a straight, elongate, double-ended lighting element and a lighting element holder having terminals in electrical contact with the lighting element and arranged for engagement with the contacts. The cartridge and cartridge holder have cooperating means such that the cartridge can be moved with respect to the cartridge holder in a generally lengthwise direction to secure the cartridge to the cartridge holder and connect the terminals to the contacts.

According to DE-C-827529 the cooperating means extend the entire length of the cartridge and cartridge holder so that the cartridge has to be moved longitudinally to a distance equivalent to the length of the cartridge holder before it can be disengaged therefrom. This means that the lighting unit cannot be used in a restricted space, such as an alcove. Moreover, the terminals of the lighting element holder are exposed so that it is possible for them to be touched by the person inserting the cartridge in the cartridge holder at a time when the terminals are in electrical contact with the contacts in the cartridge holder.

According to the present invention there is provided a lighting unit comprising a cartridge holder having socket openings containing electrical contacts and a cartridge for engagement with the cartridge holder, the cartridge comprising a straight, elongate double-ended lighting element and a lighting element holder having terminals in electrical contact with the lighting element and arranged for engagement with the contacts, the cartridge and cartridge holder being provided with co-operating means such that the cartridge can be moved with respect to the cartridge holder in a generally lengthwise direction to secure the

cartridge to the cartridge holder and connect the terminals to the contacts, the cartridge having an installed position in which the terminals are connected with the contacts and a retracted position in which the terminals and contacts are disconnected, the cartridge being movable from its installed position only towards its retracted position, characterised in that the cooperating means prevent lengthwise movement of the cartridge from the installed position beyond the retracted position, in that the cartridge, when in the retracted position, can be disengaged from the holder by movement of the cartridge transverse to its length and in that the terminals are shielded when the cartridge is in its retracted position.

Preferably the co-operating means constrains the cartridge to move lengthwise between a retracted position in which the cartridge can be disengaged from the holder by movement transverse to its length and an installed position in which the terminals are connected with the contacts and from which the cartridge can only be moved towards its retracted position.

The co-operating means may comprise a projection carried by the cartridge holder or the lighting element holder, slidable within a slot formed on the other part, the slot having an introduction opening at one end, to receive the projection. The opening may have a lead-in surface to guide the projection into the slot. The slot may be on either the cartridge or the cartridge holder, and the projection on the other part; in a preferred embodiment a plurality of slots on the cartridge holder are engageable with a corresponding number of projections on the lighting element holder of the cartridge. Thus, the cartridge holder may have a first pair of slots transversely spaced from one another, adjacent the contact end of the cartridge holder, and a second pair of slots, transversely spaced from one another, adjacent the other end of the cartridge holder, the lighting element holder having four projections for respective engagement in the slots. In one such arrangement which provides particularly positive and easy engagement and disengagement one pair of slots has a pair of upwardly directed guiding shoulders associated with the openings of the slots and the other pair of slots has no upstanding projections associated with its openings.

It is preferred that the co-operating means is adapted to support the weight of the cartridge so that the terminals of the cartridge carry substantially none of the weight thereof in the installed position.

In a preferred embodiment a pair of guiding surfaces is provided about each socket opening to guide the cartridge terminals into the socket openings when the cartridge is slid from its retracted to its installed position.

The terminals preferably project from one end of the cartridge.

Commonly the cartridge holder has an elongate base member for securement to a wall and the lighting element holder has portions for engage-

ment along the tranverse edges of the base member.

The invention will now be further described, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 shows in perspective view a first embodiment of assembled lighting unit according to the invention;

Figs. 2 and 3 show in perspective view a cartridge and a cartridge holder which engage together to provide the lighting unit of Fig. 1;

Fig. 4 shows in perspective view the end of the cartridge shown in Fig. 2 carrying the electrical terminals for the cartridge.

Fig. 5 shows in expanded perspective view an engagement slot of the cartridge holder of Fig. 3 and an inter-engagable projection on the cartridge;

Fig. 6 shows in perspective view a second embodiment of lighting unit according to the invention.

Fig. 7 is an expanded view of a rear engagement slot of the cartridge holder of Fig. 6, and the interengagable projection of the cartridge; and

Fig. 8 is an expanded view of a front engagement slot of the cartridge holder of Fig. 6.

With reference to Figs. 1 to 5, the assembled lighting unit comprises: a cartridge 2 comprising a strip lighting element 4 and a lighting element holder 5; and a cartridge holder 6. The lighting element holder 5 and the cartridge holder 6 are moulded plastics articles.

The lighting element holder 5 may be considered as a channelled member cut away in its middle region to leave channelled end portions 8 and 10, joined by a pair of thin, parallel strips 11. Each end portion comprises opposed side walls 12 and 14 and an interconnecting web 16. The strips 11 join the parts of the side walls 12 and 14 remote from the respective webs.

Each end portion 8 and 10 has a U-shaped, insulating spring clip (not shown) secured to the inner surface of the web. The clips grip the ends of the element 4 to retain it firmly within the lighting element holder 5, with the end terminals of the element in contact with leaf spring contacts (also not shown). Both the input terminals 20 and 22 to the cartridge 2 are at one end 10 of the lighting element holder 5 (see Fig. 4). One leaf spring contact is connected directly to the adjacent terminal 20 and the other is connected to the other terminal 22 via wiring trained along the inner surface of one of the strips 11.

A cylindrical projection 24 is on the inner surface of each side wall 12 and 14 of each end 8 and 10, adjacent the free edge of the side wall (that is, remote from the web). The projections 24 form two pairs and the projections of each pair generally oppose each other across the channel of a respective end portion 8, 10. One projection is shown in Fig. 5.

The cartridge holder 6 has a base strip 26 which is slightly narrower than the width of the channel of the cartridge. The base strip 26 comprises a central portion 27 with downturned edges 28

extending along its length. The central portion 27 carries a reflective strip.

Each edge 28 is formed with two identical slots 30. The slots form two pairs transversely aligned across the base strip. Each slot is generally L-shaped, having a transverse opening 32 sufficiently wide to enable a projection 24 to pass through it, and a portion formed longitudinally along the edge 28 and leading to an abutment face or blind wall 34.

One end of the base strip 26 joins a housing 36 which contains electrical contacts with which the input terminals 20 and 22 of the plug member can connect. The electrical contacts are connected to a mains lead 38. The housing 36 has a shaver socket 40 and a cord pull switch 42.

Slit-shaped socket openings are provided in the end 44 of the housing 36 which faces the base strip 26. Three spaced apart mutually parallel guide plates 46 extend from the end 44, one between the socket openings and the others on either side of the openings. Thus, two gaps are provided in alignment with the socket openings. In other embodiments for plates could of course be used to provide the two gaps, two plates being located between the socket openings.

The outer surface of the housing 36 is identical in profile to the outer surface of the end portion 10 of the cartridge except for a shoulder portion 48 adjacent the end 44. The outer surface of this shoulder portion 48 is identical in profile to the inner surface of the end portion 10. Thus, when the cartridge and cartridge holder are engaged together the end portion 10 fits snugly over the shoulder portion 48 and the outer surface of the assembled lighting unit extends smoothly from the end portion 10 to the housing 36.

For use, the cartridge holder 6 is horizontally secured in a desired position, most commonly to a wall. For this purpose the base strip 26 has screw holes 49 and spacers (not shown) are located beneath the screw holes to prevent the central portion 27 of the base strip being deformed towards the wall.

To engage the cartridge with the cartridge holder the former is introduced onto the latter by moving it in a direction generally perpendicular to its axis. The projections 24 are aligned with and pass through the openings 32 of the slots 30 and the terminals 20 and 22 each pass within the appropriate gap between the guide plates 46. The side walls 12 and 14 of the ends 8 and 10 and the strips 11 of the cartridge fit snugly over the edges 28 of the base strip 26. The cartridge is then slid towards the housing 36. The projections slide within the slots 30 and the inner surface of the end portion 10 slides over the shoulder portion 48. The terminals 20 and 22 are guided into the socket openings and into electrical contact with the contacts within the housing. The lighting unit is now ready for use. Even if the power is left on during this installing procedure there is no danger to the observer as all live terminals are completely shielded and cannot be touched.

It will be appreciated that the slots 30 are short

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in relation to the length of the unit so that the unit can be installed in places of restricted width.

When the unit is in its assembled condition the cartridge is secure on the cartridge holder and is restrained against movement transverse to its length. The weight of the cartridge is supported by the interengaging structure of the two parts and the terminals 20 and 22 bear none of the weight. The only direction in which it can be moved is away from the housing, and in so doing, the terminals of the cartridge are disconnected from the electrical supply.

To replace a spent element the cartridge is simply slid away from its installed position adjacent the housing until it reaches its fully retracted position at which it can slide no further, as a result of the abutment of the projections 24 with the ends 50 of the slots, which ends are remote from the housing. In this retracted position the cartridge 2 is electrically isolated from the cartridge holder. The cartridge is now free to move transversely to its length, by pulling it away from the cartridge holder and allowing the projections 24 to pass through the openings 32. The cartridge is now completely free of the cartridge holder and the element can be replaced.

The second embodiment of lighting unit shown in Figs. 6 to 8 has an identical cartridge 2 to that of Fig. 1 but a modified cartridge holder 6.

The second embodiment does not have a shaver socket, and a push button switch 52 is provided instead of a cord pull. The profile of the end of the housing 36 which is to adjoin the end portion 10 of the cartridge matches the profile of the cartridge but the other end of the housing is of cut-away profile.

The end 44 of the housing again has socket openings 54 into which the terminals of the cartridge must pass but the socket openings 54 are wider than those of the first embodiment and no guide plates are used. A further difference is in the region of the openings of the slots 30. The rear slots (one of which is shown in Fig. 7), are each approached by an inclined lead-in surface 56 to guide the projection 24 into opening 32 and thence into the longitudinal portion of the slot. The lead-in surfaces thus form ramps dropping towards the abutment face 34 and when the projections are moved down these ramps the cartridge is moved transversely (but not perpendicularly) to the axis of the lighting element. In contrast, the front pair of slots (one of which is shown in Fig. 8) is associated with a pair of upwardly projecting guiding shoulders 58. Each has an inclined surface 60 leading to the opening 32 and it will be apparent that the projection 24 will be easily guided into the opening even if the cartridge is initially located on the cartridge holder somewhat inaccurately. The avoidance of upwardly projecting parts adjacent the openings of at least one of the pairs of slots — here the rear pair — helps to provide easy and trouble-free engagement and disengagement.

Claims

1. A lighting unit comprising a cartridge holder (6) having socket openings containing electrical contacts and a cartridge (2) for engagement with the cartridge holder, the cartridge comprising a straight, elongate double-ended lighting element (4) and a lighting element holder (5) having terminals (20, 22) in electrical contact with the lighting element and arranged for engagement with the contacts, the cartridge and cartridge holder being provided with cooperating means (24, 30) such that the cartridge can be moved with respect to the cartridge holder in a generally lengthwise direction to secure the cartridge to the cartridge holder and connect the terminals to the contacts, the cartridge having an installed position in which the terminals are connected with the contacts and a retracted position in which the terminals and contacts are disconnected, the cartridge being movable from its installed position only towards its retracted position, characterised in that the cooperating means prevent lengthwise movement of the cartridge from the installed position beyond the retracted position, in that the cartridge, when in the retracted position, can be disengaged from the holder by movement of the cartridge transverse to its length and in that the terminals are shielded when the cartridge is in its retracted position.

2. A unit according to claim 1, characterised in that the cooperating means comprise a projection (24) carried by the cartridge holder (6) or the lighting element holder (5), slidable within a slot (30) formed on the other part (5, 6), the slot having an introduction opening (32) at one end, to receive the projection.

3. A unit according to claim 2, characterised in that the opening (32) has a lead-in surface (56, 60) to guide the projection (24) into the slot (30).

4. A unit according to claim 2 or 3, characterised in that the cartridge holder (6) has a first pair of slots (30) transversely spaced from one another, adjacent the contact end of the cartridge holder, and a second pair of slots, transversely spaced from one another, adjacent the other end of the cartridge holder, the lighting element holder (5) having four projections (24) for engagement in respective slots.

5. A unit according to claim 4, characterised in that one pair of slots (30) has a pair of upwardly directed guiding shoulders (58) associated with the openings (32) of the slots (30) and the other pair of slots has no upstanding projections associated with its openings.

6. A unit according to any preceding claim, characterised in that a pair of guiding surfaces (46) is provided about each socket opening to guide the cartridge terminals (20, 22) into the socket openings when the cartridge (2) is slid from its retracted to its installed position.

7. A lighting unit according to any preceding claim, characterised in that the co-operating means (24, 30) is adapted to support the weight of the cartridge (2) so that the terminals (20, 22) of

the cartridge carry substantially none of the weight thereof in the installed position.

8. A lighting unit according to any preceding claim, characterised in that the terminals (20, 22) project from the same end of the cartridge (2).

9. A unit according to any preceding claim, characterised in that the cartridge holder (6) has an elongate base member (26) for securement to a wall and the lighting element holder (5) has portions for engagement along the transverse edges of the base member.

Patentansprüche

1. Leuchtarmatur mit einem Hülsenhalter (6) mit Hülsenöffnungen, die elektrische Kontakte enthalten, und einer Hülse (2) zum Eingriff mit dem Hülsenhalter, wobei die Hülse ein geradliniges, langgestrecktes, doppelendiges Leuchtelement (4) und einen Leuchtelementhalter (5) mit Anschlüssen (20, 22) enthält, die in elektrischem Kontakt mit dem Leuchtelement stehen und zum Eingriff in die Kontakte angeordnet sind, wobei die Hülse und der Hülsenhalter mit zusammenwirkenden Einrichtungen (24, 30) versehen sind, die eine Bewegung der Hülse gegenüber dem Hülsenhalter in einer allgemeinen Längsrichtung ermöglichen, um die Hülse an dem Hülsenhalter zu befestigen und die Anschlüsse mit den Kontakten zu verbinden, wobei die Hülse eine Einbauposition hat, in der die Anschlüsse mit den Kontakten verbunden sind, und eine zurückgezogene Position, in der die Anschlüsse und Kontakte getrennt sind, wobei die Hülse von der Einbauposition nur in Richtung ihrer zurückgezogenen Position bewegbar ist,

dadurch gekennzeichnet, daß die zusammenwirkenden Einrichtungen eine längsgerichtete Bewegung der Hülse aus der Einbauposition über die zurückgezogene Position hinaus verhindern, daß die in der zurückgezogenen Position befindliche Hülse von dem Halter gelöst werden kann, indem die Hülse quer zu ihrer Längsrichtung bewegt wird, und daß die Anschlüsse abgeschirmt sind, wenn die Hülse sich in ihrer zurückgezogenen Position befindet.

2. Leuchtarmatur nach Anspruch 1, dadurch gekennzeichnet, daß die zusammenwirkenden Einrichtungen einen Vorsprung (24) aufweisen, der von dem Hülsenhalter (6) oder dem Leuchtelementhalter (5) gehalten und in einem Schlitz (30) verschiebbar ist, der in dem anderen Teil (5, 6) ausgebildet ist, wobei der Schlitz eine Einführöffnung (32) an einem Ende aufweist, um den Vorsprung aufzunehmen.

3. Leuchtarmatur nach Anspruch 2, dadurch gekennzeichnet, daß die Öffnung (32) eine Einführfläche (56, 60) zur Führung des Vorsprungs (24) in den Schlitz (30) aufweist.

4. Leuchtarmatur nach Anspruch 2 oder 3, dadurch gekennzeichnet, daß der Hülsenhalter (6) ein erstes Paar von quer voneinander beabstandeten Schlitzen (30) nahe dem Kontaktende des Hülsenhalters und ein zweites Paar quer voneinander beabstandeter Schlitze nahe dem anderen

Ende des Hülsenhalters aufweist und daß der Leuchtelementhalter (5) vier Vorsprünge (24) zum Eingriff in die jeweiligen Schlitze hat.

5. Leuchtarmatur nach Anspruch 4, dadurch gekennzeichnet, daß ein paar Schlitze (30) ein paar nach oben gerichteter Führungsschultern (58) aufweist, die mit den Öffnungen (32) der Schlitze (30) verbunden sind, und daß das andere paar Schlitze keine nach oben stehenden, mit ihren Öffnungen verbundenen Schlitze hat.

6. Leuchtarmatur nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß ein paar Führungsflächen (46) um jede Hülsenöffnung angeordnet ist, um die Hülsenanschlüsse (20, 22) in die Hülsenöffnungen einzuführen, wenn die Hülse (2) aus ihrer zurückgezogenen position in die Einbauposition vorgeschoben wird.

7. Leuchtarmatur nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die zusammenwirkenden Einrichtungen (24, 30) das Gewicht der Hülse (2) tragen können, so daß die Anschlüsse (20, 22) der Hülse in der Einbauposition der Hülse kein Gewicht tragen.

8. Leuchtarmatur nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die Anschlüsse (20, 22) von demselben Ende der Hülse (2) vorstehen.

9. Leuchtarmatur nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß der Hülsenhalter (6) ein langgestrecktes Basisbauteil (26) zur Befestigung an einer Wand aufweist und daß der Leuchtelementhalter (5) Abschnitte aufweist, die in die Querränder des Basisbauteils eingreifen.

Revendications

1. Un appareil d'éclairage comprenant un support de cartouche (6) comportant des ouvertures de douille contenant des contacts électriques et une cartouche (2) destinée à être engagée dans le support de cartouche, la cartouche comprenant un élément d'éclairage (4) droit, allongé, à deux extrémités actives et un support (5) d'élément d'éclairage comportant des bornes (20, 22) en contact électrique avec l'élément d'éclairage et agencées pour entrer en liaison électrique avec les contacts, la cartouche et son support étant pourvus de moyens coopérant (24, 30) de telle sorte que la cartouche puisse être déplacée par rapport à son support dans une direction longitudinale dans l'ensemble de façon à fixer la cartouche sur son support et à relier les bornes aux contacts, la cartouche comportant une position d'installation dans laquelle les bornes sont connectées avec les contacts et une position rétractée dans laquelle les bornes et les contacts sont déconnectés, la cartouche étant mobile à partir de sa position d'installation seulement en direction de sa position rétractée, caractérisé en ce que les moyens coopérant empêchent un mouvement longitudinal de la cartouche de la position d'installation au delà de la position rétractée, en ce que la cartouche, lorsqu'elle se trouve dans la position

rétractée, peut être sortie du support par mouvement de la cartouche transversalement à sa longueur et en ce que les bornes sont protégées quand la cartouche se trouve dans la position rétractée.

2. Un appareil selon la revendication 1, caractérisé en ce que les moyens coopérants comprennent une saillie (24) portée par le support (6) de cartouche ou par le support (5) d'élément d'éclairage, pouvant coulisser dans une fente (30) ménagée dans l'autre partie (5, 6), la fente étant pourvue à une extrémité d'une ouverture d'introduction (32) pour recevoir la saillie.

3. Un appareil selon la revendication 2, caractérisé en ce que l'ouverture (32) comporte une surface d'engagement (56, 60) pour guider la saillie (24) jusque dans la fente (30).

4. Un appareil selon la revendication 2 ou 3, caractérisé en ce que le support (6) de cartouche comporte une première paire de fentes (30) espacées transversalement l'une de l'autre, adjacentes à l'extrémité de contact du support de cartouche, et une seconde paire de fentes, espacées transversalement l'une de l'autre, adjacentes à l'autre extrémité du support de cartouche, le support (5) d'élément d'éclairage comportant quatre saillies (24) pour un engagement dans des fentes respectives.

5. Un appareil selon la revendication 4, caractérisé en ce qu'une paire de fentes (30) comporte une paire d'épaulements de guidage (58) dirigés

vers le haut et associés aux ouvertures (32) des fentes (30), et l'autre paire de fentes ne comporte aucune saillie dirigée vers le haut qui soit associée à ses ouvertures.

6. Un appareil selon une quelconque des revendications précédentes, caractérisé en ce que deux surfaces de guidage (46) sont disposées autour de chaque ouverture de douille pour guider les bornes (20, 22) de la cartouche jusque dans les ouvertures de douille quand la cartouche (2) est déplacée par glissement de sa position rétractée jusque dans sa position d'installation.

7. Un appareil d'éclairage selon une quelconque des revendications précédentes, caractérisé en ce que les moyens coopérants (24, 30) sont adaptés pour supporter le poids de la cartouche (2) de telle sorte que les bornes (20, 22) de la cartouche ne supportent pratiquement pas son poids dans la position d'installation.

8. Un appareil d'éclairage selon une quelconque des revendications précédentes, caractérisé en ce que les bornes (20, 22) font saillie de la même extrémité de la cartouche (2).

9. Un appareil selon une quelconque des revendications précédentes, caractérisé en ce que le support (6) de cartouche comporte un organe de base allongé (26) pour être fixé sur une paroi et le support (5) de l'élément d'éclairage comporte des parties pour s'appliquer le long des bords transversaux de l'organe de base.

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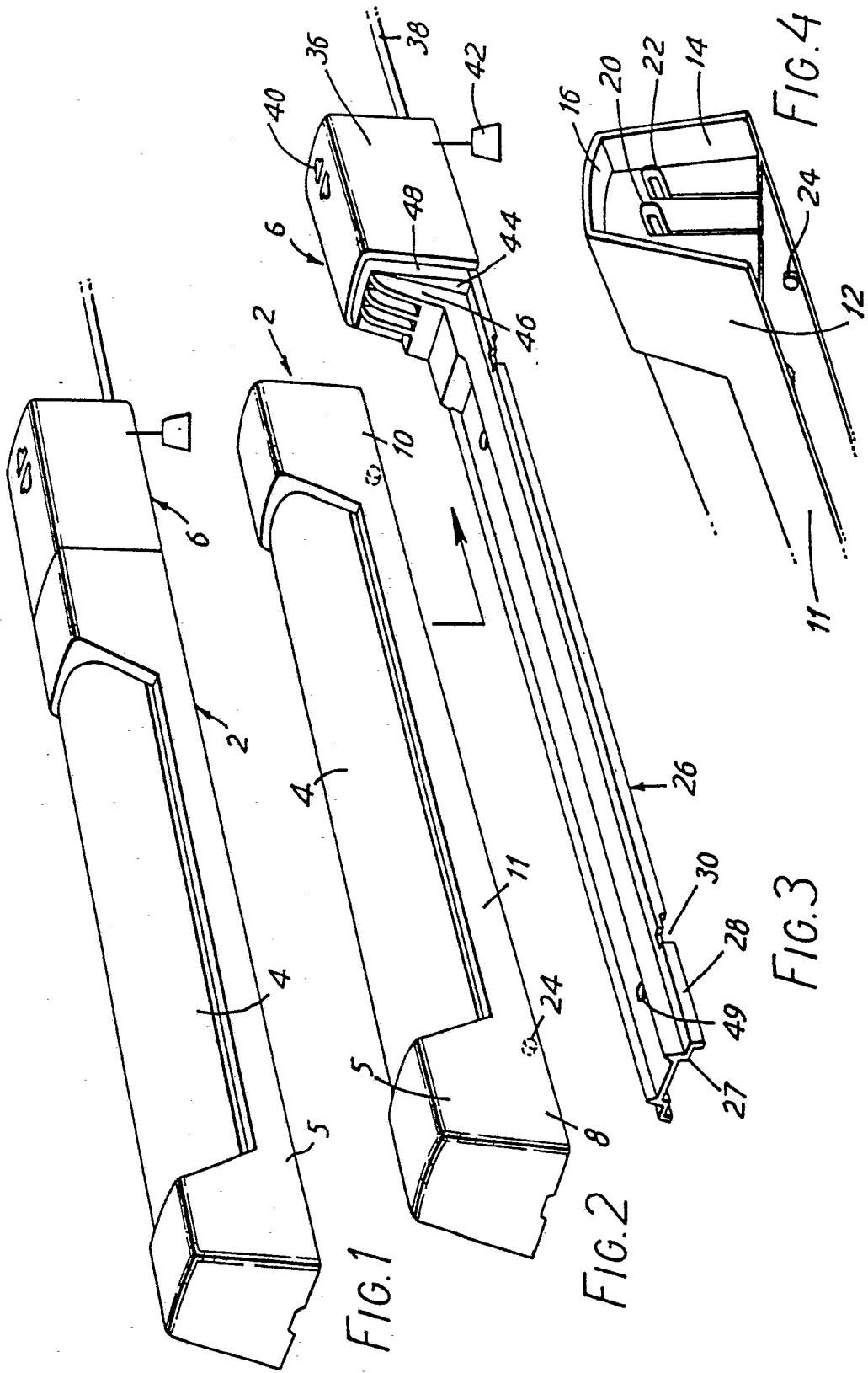


FIG. 1

FIG. 2

FIG. 3

FIG. 4

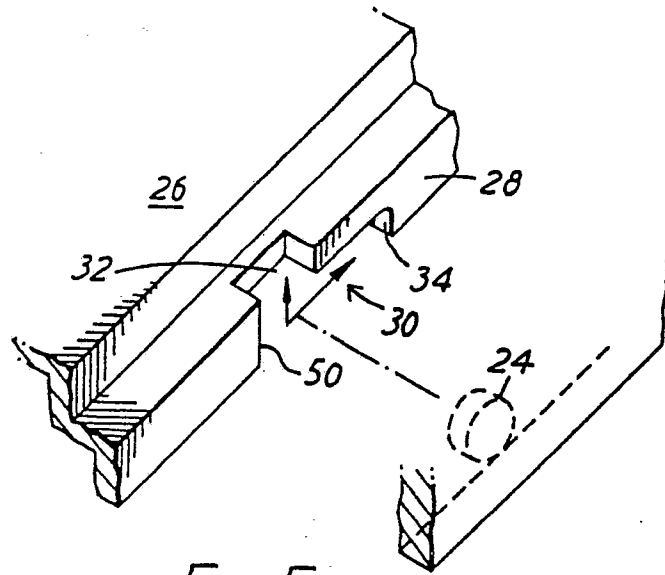


FIG. 5

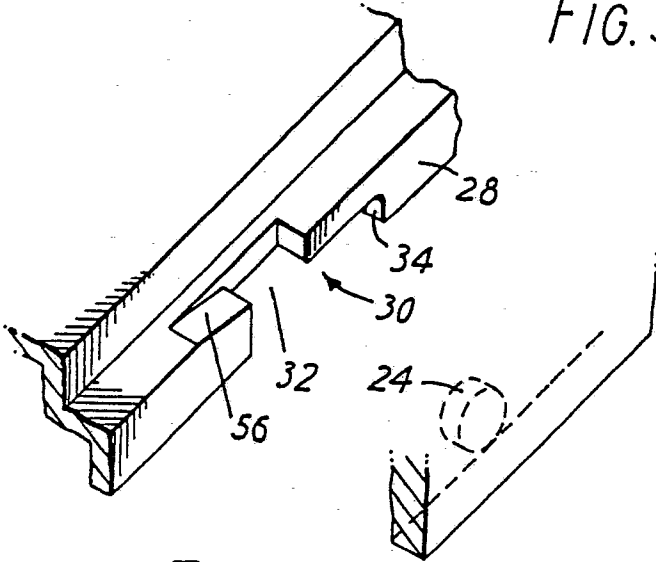


FIG. 7

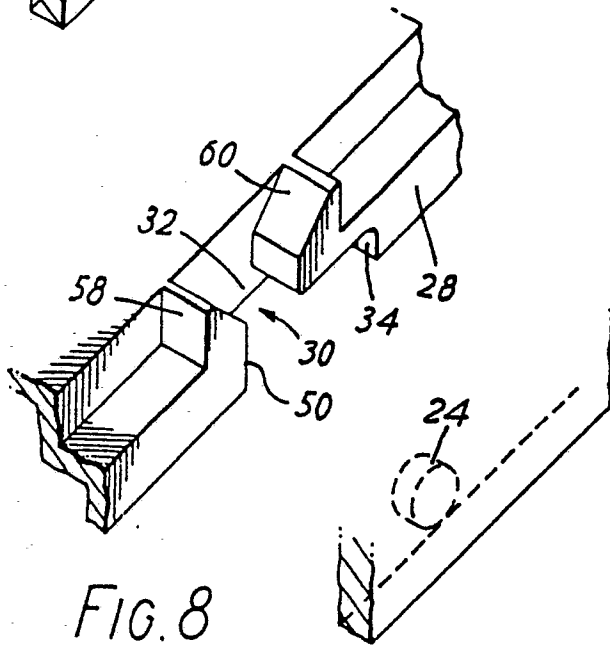


FIG. 8

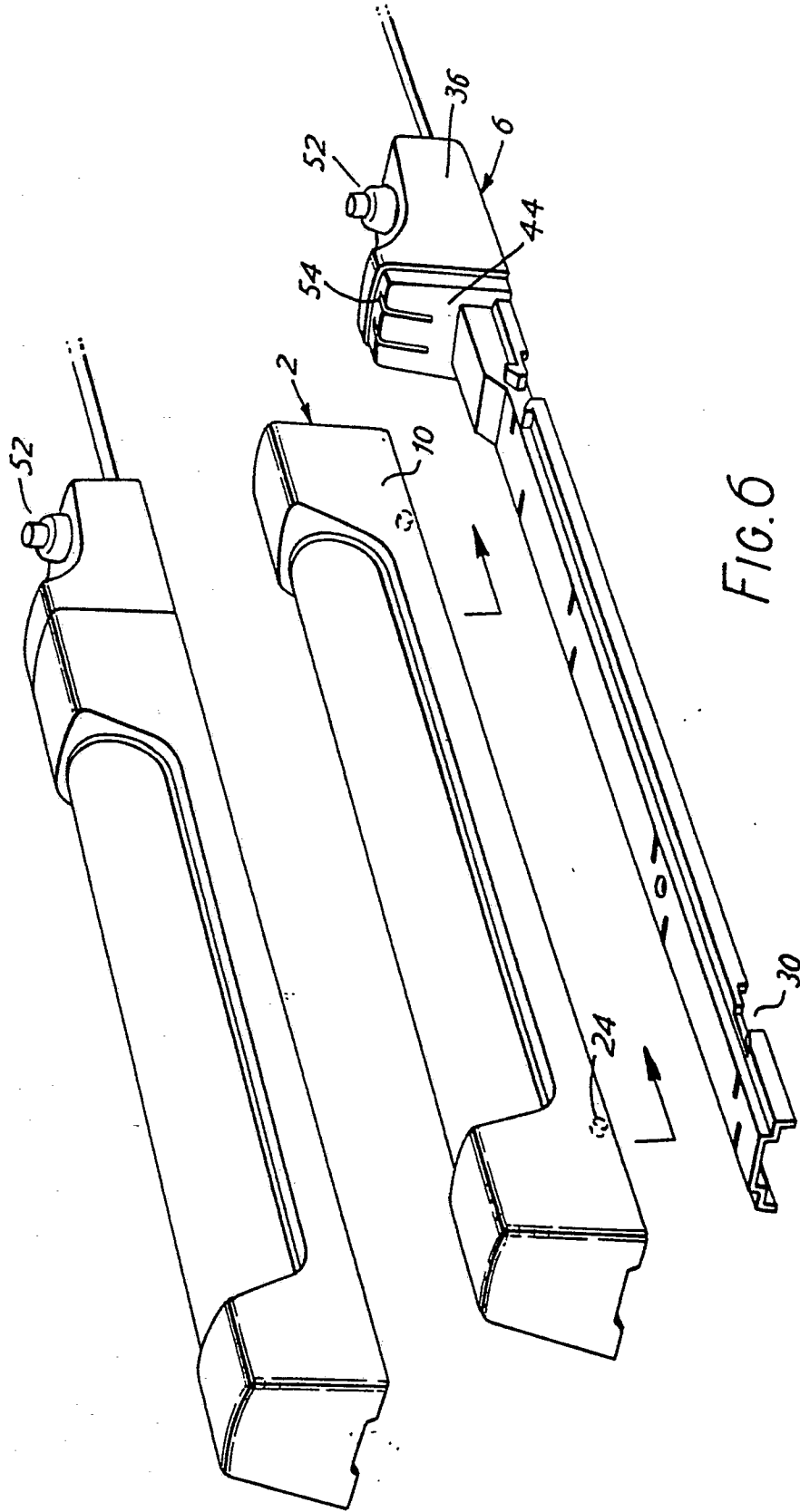


FIG. 6