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C. M. SMITH

2,961,631

WIRING DEVICE

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Fig. 1.

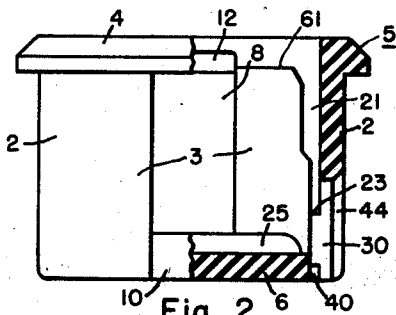
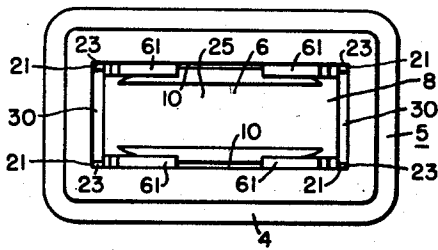


Fig. 2.

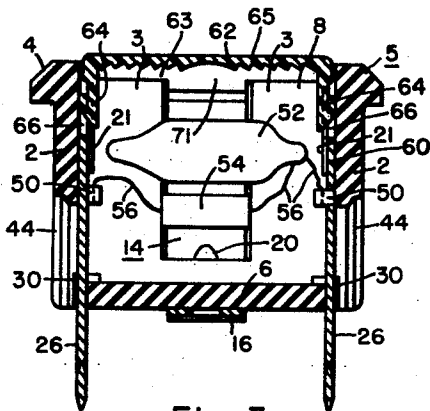


Fig. 3.

Fig. 4.

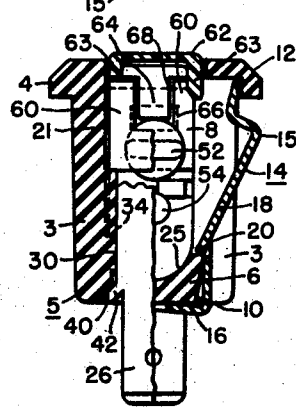
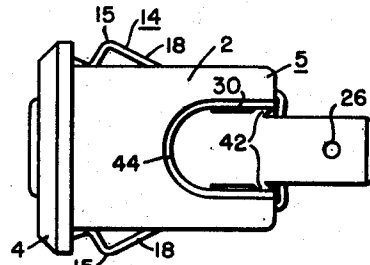


Fig. 5.

WITNESSES

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2,961,631

WIRING DEVICE

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7 Claims. (Cl. 339—128)

My invention relates generally to electric wiring devices, and more particularly to such a device for mounting a pilot light.

As can readily be appreciated in using various wiring devices as a component part of an assembly it is desirable that the device be easily mounted to the assembly in such a manner that wiring connections may easily be made thereto or that the wiring connections may be made automatically. In order to accomplish these purposes I have provided a new and improved wiring device which may easily be secured within an opening in a supporting panel or the like, by merely pushing the device into the opening and which will simultaneously establish electrical connections by means of male type contacts extending outwardly from the wiring device. I have also attained these purposes by means of a housing construction which permits quick assembly of the various components of the device in such a manner as to form a compact and symmetrical appearing structure.

Accordingly, one object of my invention is to provide a new and improved low cost pilot light which may be easily installed.

Another object of my invention is to provide a new and improved wiring device which requires only a single staking operation to secure all the electrical components to the housing of the device.

A more specific object of my invention is to provide a new and improved pilot light having a housing which both supports and electrically isolates the terminals upon the insertion of the terminals therein.

Another object of my invention is to provide a new and improved wiring device having a mounting clip with a pair of spaced movable arms which arms have integral means for automatically engaging the device housing to support the clip thereon.

Another object of my invention is to provide a new and improved wiring device which is secured to a supporting panel automatically by inserting a part of the wiring device through an opening in the panel.

Another more specific object of my invention is to provide a new and improved wiring device having spaced resilient mounting arms for securing the device within an opening in a panel and extending contacts for automatically engaging electrical conducting means upon such insertion.

Another object of my invention is to provide a new and improved pilot light in which the light transmitting member is supported in the housing by spaced electrical terminals.

A more specific object of my invention is to provide a new and improved pilot light having a light transmitting member which has a pair of opposed elongated hooks extending inwardly of the light housing which engage apertures in spaced electrical terminals located in the housing.

Another more specific object of my invention is to provide a new and improved pilot light having a U-

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shaped mounting member having inwardly extending projections in each arm adjacent the bight portion for engaging a portion of the housing so that the mounting member is automatically secured to the housing by merely being inserted over such portion of the housing.

These and other objects will become more apparent upon consideration of the following detailed description of a lighting device constructed in accordance with the principles of my invention and taken in conjunction with the attached drawings, in which:

Figure 1 is a top plan view of the housing only for a wiring device constructed in accordance with the principles of my invention;

Fig. 2 is a partial side elevational view and a partial side sectional view of the housing shown in Fig. 1;

Fig. 3 is a longitudinal cross sectional view of a wiring device constructed in accordance with the principles of my invention;

Fig. 4 is an elevational view of an end of the wiring device as shown in Fig. 3; and

Fig. 5 is a lateral cross sectional view of the wiring device shown in Fig. 3, one half of which is taken centrally thereof and one half of which is offset from the central portion thereof.

Referring to the drawings, it will be noted that the wiring device, constituted in accordance with the principles of my invention comprises an elongated rectangular one-piece housing 5, shown in Figs. 1 and 2, which is formed from any suitable insulating material, and preferably a molded insulating material, which may readily be provided with the structure as hereinafter described. As shown, housing 5 comprises a pair of longitudinally spaced elongated ends 2. Each side of each end 2 is provided with an elongated integral arm 3 extending towards the other end 2 which arms 3 terminate short of each other so as to form, in effect, a U-shaped end portion at each end of housing 5. A continuous integral top flange 4 is provided on housing 5 which extends substantially perpendicularly outwardly from the upper outer portion of arms 3 and ends 2 and between the upper outer portions of each of the longitudinally opposed arms 3 so that each pair of longitudinally opposed arms 3 are joined together by this flange. The lower portions of ends 2 are joined together by means of an integral base 6 extending laterally between opposed inner surfaces of laterally opposed arms 3 and longitudinally between the opposed inner surfaces of ends 2 so as to form an upwardly open cavity 8 within housing 5 in which the various components of the device as hereinafter described are located. As shown, the portions of base 6 which are located between the longitudinally opposed arms 3 are offset laterally inwardly of the outer surfaces of the opposed arms 3 so as to form a slot 10 at each side of the housing 5.

In order that housing 5 may easily be installed in an opening in a panel (not shown), a one piece symmetrical U-shaped spring clip 14 has been provided which may easily be attached to the base. Spring clip 14 may be made from any suitable resilient material, such as spring steel, and comprises a bight portion which forms a base 16 and a pair of spaced arms 18 which extend outwardly in one direction from opposite ends of the base 16. As shown in Fig. 5, arms 18 initially extend substantially perpendicularly to base 16 for a distance substantially equal to the thickness of base 6 of housing 5. Thereafter each arm 18 extends outwardly from base 16 to a point whereat each arm 18 is reversely bent inwardly toward base 16. By such construction a knee portion 15 is formed on each arm 18 which knee portions 15 are laterally opposed from each other. The free ends of arms 18 then extend upwardly and generally outwardly

with respect to the initial portions of arms 18 and are normally spaced a lateral distance apart greater than the distance the initial portions of arms 18 are spaced. It will also be noted that the upper central portion of the initial portion of each arm 18 is provided with an inwardly extending lance 20 having an elongated lower edge.

Arms 18 of spring clip 14 are formed so as to be insertable within the spaces between longitudinally opposed arms 3 at each side of housing 5. In order to so mount spring clip 14, the under surface of flange 4 between each pair of opposed arms 3 has been provided with a slot 12 at the inner side thereof and the sides of base 6 between each pair of longitudinally opposed arms 3 have been provided with an upwardly and outwardly extending taper (Fig. 5). As shown in Fig. 5, slots 12 extend laterally outwardly in flange 4, from the opening formed between each of the longitudinally opposed pair of arms 3 so as to be open toward the cavity 8 and the base 6. As the tapered sides of base 6 are opposed from each other their maximum width is at their upper edges which width is approximately equal to the spacing between the initial portions of arms 18. With such construction spring clip 14 may easily be assembled upon housing 5 by initially placing the arms 18 thereof in the side openings of housing 5 between longitudinally opposed arms 3, with the base 16 being spaced below the base 6 of housing 5. Thereafter, spring clip 14 may be forced upwardly towards base 6 on housing 5 until the opposed lances 20 engage the opposed tapered sides of base 6. Further upward movement of spring clip 14 causes the lances 20 to clear the upper edges of the tapered sides of base 6 whereat, due to the resiliency of spring clip 14, the lower edges of lances 20 will spring inwardly over the upper surfaces of base 6 adjacent thereto. Concurrently with such spring action of lances 20, it will be noted that by slightly bending the arms 18 toward each other the free ends of arms 18 enter slots 12 in flange 4 so that when arms 18 are released the free ends of arms 18 engage the inner surface of slots 12 due to the bias of arms 18 and are prevented from being moved outwardly of housing 5 beyond a certain point due to their engagement in slots 12. It will be noted, however, that the free ends of arms 18 may be moved inwardly of housing 5 through the open side of slots 12 inwardly toward cavity 8. Also, if desired, base 16 of spring clip 14 may be formed so as to have an upward bow therein, with the lances 20 located so that it is necessary to force such bowed portion upwardly against the outer portion of base 6 and stress the same by flattening it out somewhat during such assembly process before lances 20 engage the top of base 6 so that the spring clip 14 is resiliently clamped to the base 6 of housing 5. As lances 20 snap inwardly over the upper surfaces of base 6 and the free ends of arms 18 are captively located within slots 12, the spring clip 14 cannot be readily removed from the outside of housing 5 without danger of damaging housing 5.

As also shown in Figs. 3, 4 and 5, housing 5 is provided with a pair of identical elongated electrical terminal contacts 26 which may be fabricated from any suitable electrical conducting material, such as a copper or an alloy thereof. Terminal contacts 26 are adapted to be supported in engagement with the inner opposed surfaces of the ends 2 and have one end extending outwardly below the base 6 of housing 5. Accordingly, base 6 of housing 5 is provided with a laterally extending slot 30 at each of its ends in alignment with the inner surface of the ends 2. As shown, each terminal 26 has an upper portion which is of a lateral width so as to be closely received between the laterally opposed arms 3. Each terminal 26 is also provided with an intermediate portion which is of a smaller lateral width than the upper portion and extends centrally therefrom so that each terminal 26 is provided with a pair of laterally opposed projections 34 at the lower edge of its upper portion.

The inner surface of each arm 3 is provided with an elongated groove 21 which extends from the slot 30 to the flange 4. Each groove 21 has one of its longitudinal sides formed by the inner surface of the end 2 adjacent thereto so that the grooves 21 are located in the corners of housing 3. Also, as grooves 21 extend inwardly of arms 3, a ledge 23 is formed at the bottom of each groove 21 which extends to the slot 30. By such construction, terminals 26 may easily be inserted into housing 5 from the top so that an intermediate portion thereof is located in slots 30 until projections 34 engage the upper surface of ledges 23 to limit inward movement of the terminals 26 to a definite operative position within housing 5. It will be noted that although the upper portion of each groove 21 is enlarged laterally the lower portion of each groove 21 is of a lateral width to closely receive the central portion of a terminal 26 therein so that the terminals 26 are supported against movement inwardly of cavity 8.

In order to secure terminals 26 to housing 5, the outer ends of each slot 30 are tapered laterally outwardly so as to provide a pair of laterally spaced outwardly sloping surfaces 40 at the lower edge of each slot 30. It will also be noted that the width of the portion of terminal 26 which extends beyond housing 5 is less than the width of the intermediate portion of terminal 26 located in the slots 30 so that a pair of shoulders are initially formed on terminal 26 at the lower side of base 6. Each of such shoulders may thereafter be utilized to provide material for forming outwardly extending tabs 42, the upper edge of which engages the sloping surfaces 40. It is believed obvious that such tabs 42 may easily be formed by properly supporting terminals 26 within the housing 5 and thereafter staking the shoulders at the sides of terminal 26 to form the tabs 42.

Although as indicated, the lower portions of terminals 26 extend outwardly of housing 5 so that they may be plugged into a suitable female outlet, if desired the portions of terminals 26 above the base 6 may be provided with a threaded opening (not shown) whereby a terminal screw (not shown) may be secured thereto. In such event the outwardly extending portion of each terminal 26 could be eliminated and electrical connections made to the terminals 26 by securing suitable electrical conductors to the terminals 26 by means of the terminal screws. With such construction the terminals 26 would be secured to the housing 5 in the same manner as heretofore described. In addition, it is necessary to provide each end 2 of the housing with an opening 44 at its lower edge of a size so that a sufficient portion of each terminal 26 is exposed as well as the head of a terminal screw, so that a conductor may be secured to each terminal. As shown, openings 44 extend upwardly from the lower edge of base 6 in the end 2 so as to expose a portion of the sides of terminal 26 a sufficient distance above base 6 so that the shank portion of a terminal screw may extend inwardly of the housing 5 above base 6. If desired, the upper surface of base 6 may be concave as at 25 to provide clearance for the shank portion of such a binding screw.

Fig. 3 illustrates a lamp 52 and a resistance element 54 located in cavity 8, and electrically connected in series with each other and with each of the terminals 26 by suitable electrical conductors 56. As shown, the conductors 56 are electrically connected to lances 50 on each of the terminals 26 so that the lamp 52 is energized when the terminals 26 are energized. Lances 50 are formed integrally with terminals 26 and extend inwardly of cavity 8 above the upper edge of end openings 44. In actual practice a resistance 54 having a value of about 100,000 ohms and a standard small neon lamp have proven to be satisfactory. Also tinned copper wire has been found to be satisfactory for conductors 56, whereby electrical connections may easily be made to the lances 50. As the space within cavity 8 is limited, it will be

noted that the conductors 56 at the end of lamp 52 from which they emerge are located close to the adjacent terminal 26 and, as one of such conductors is at a different potential than the adjacent terminal 26, it is possible that vibration of the pilot light may cause such conductor 56 to engage the adjacent terminal 26 whereby the lamp 52 would be shunted. In order to prevent such shunting of the lamp 52 a flat rectangular insulator 60 which may be fabricated from any suitable insulating material, such as a fiber sheet, is provided. Insulator 60 is located in housing 5 by enlarging the upper portions of laterally opposed grooves 21, adjacent the terminal 26, toward the center of cavity 8. Such enlarged portions of grooves 21 are of a width and length to closely receive and support the insulator 60 therein. In order, however, to eliminate any necessity of locating the lamp 52 in any particular position within housing 5 the upper portions of both grooves 21 have been so enlarged so that either terminal 26 may be insulated from the conductors 56.

Further, in order to complete the device, an elongated translucent cover 62 is provided which is rectangular and of a size so as to closely fit in the rectangular central opening formed by the flange 4. Cover 62 may be formed from any suitable translucent material and in actual practice a cover formed from a nylon or polystyrene material has proven to be satisfactory. It also can be appreciated that cover 62 may be made to provide various types of color indications. Each end of cover 62 is provided with an integral outwardly extending hook portion 64 which is of a length so as to be cooperable with openings 66 formed adjacent the upper end of each terminal 26. Although openings 66 may have any suitable form, as shown they are rectangular so as to provide an upper edge extending laterally across the central portion of terminals 26 which is engageable by hook portions 64 upon insertion of cover 62 to secure the cover in place.

It, of course, will be realized that inasmuch as an insulator 60 is located between one or both of the terminals 26 and the hook portions 64 of cover 62, the insulators 60 must be provided with a suitable opening for the hooks 64 to extend through. As shown, an upwardly open ended slot 68 is provided in insulator 60 in alignment with the opening 66 adjacent thereto so that the hook portion 64 may engage the upper edge of the opening 66. Thus, cover 62 may easily be located with respect to housing 5 by merely being forced inwardly of the opening formed by the flange 4, so that the hook portions 64 of the cover will engage opposed surfaces of terminals 26 and be flexed slightly inwardly until the hook portions 64 pass below the upper edge of openings 66. When so located, hook portions 64 will spring outward so that the upper edges of the hook portions 64 engage the upper edges of openings 66 due to the resiliency of the material of cover 62. Thus, it will be seen that cover 62 should be fabricated from material which may be slightly bent and have some resiliency, and the above-mentioned materials have proven to be satisfactory.

In order to support cover 62 within the cavity 8 an inwardly extending flange 63 is provided at each of its sides which is engageable with the upper edges of a projection 61 extending inwardly from the inner surface of each arm 3 of body 5. If desired, the central portion of flange 63 may be provided with an inwardly extending projection 71 which is positioned between the opposed ends of laterally opposed sides 3 to locate cover 62 with respect to housing 5. Also, the upper edges of projections 61 are located inwardly of the outer edge of flange 4 a distance sufficient to support the cover 62 with its outer surface slightly above the outer surface of flange 4. However, it is to be expected that the projection 61 can be arranged to support the cover 62 with its outer surface flush with the outer surface of flange 4. Also, the inner surface of the central portion of cover 62 is pref-

erably provided with various light control prisms 65 to diffuse the light transmitted.

Although the pilot light as described above is not shown located in a panel, it is believed obvious that such can readily be accomplished by merely placing the complete pilot light assembly into a rectangular opening in a relatively thin panel. Such an opening need only be of a size to freely receive the housing 5 therein. In installing the pilot light, the lower portion of the light is initially inserted into the opening until the sides of the opening engage the outer surfaces of arms 18 of spring clip 14. Thereafter a force is applied to the light until the knee portions 15 of arms 18 are forced inwardly of housing 5 until they clear the edges of the opening, at which time flange 4 will engage the outside of the panel and arms 18 will spring outwardly so that the device is thereby secured to the panel. In order to remove the device from the panel it is only necessary to force the arms 18 inwardly of housing 5 so that the knee portions 15 clear the edges of the opening and then push the device outwardly through the opening.

Thus, it will be seen that I have provided a new and improved pilot light which may easily be assembled as it is only necessary that the terminals 26 be inserted within the housing 5 and thereafter simply staked to the housing 5. If desired, the lamp 52 and resistance 54 may initially be electrically connected to the terminals 26 prior to the insertion of the terminals 26 within the housing. Also, it will be noted that all the metal parts are simple in form so that they may easily be fabricated. Further it will be noted that only a one-piece housing molding is required whereby the cost of such a device is materially reduced. Also, my device is adapted for various types of service wherein it may be desired to use terminal screws or a plug-in type of connection. I have also provided a unique one-piece spring clip for securing the pilot light to a panel.

Having described a preferred embodiment of my invention in accordance with the patent statutes, it is desired that the invention be not limited to the specific construction illustrated, as it is apparent that many modifications in addition to those specifically indicated herein may be made without departing from the broad spirit and scope of my invention.

I claim as my invention:

1. A wiring device comprising an elongated cup-shaped housing having a flange extending outwardly therefrom at its open end, each side wall of one pair of opposed side walls having a slot extending completely there-through which slots being in alignment with each other and extending from the lower side of said flange to the lower edge of a base of said housing, a generally U-shaped resilient mounting member having the portion of each of its arms initially extending from the bight portion spaced a distance approximately equal to the width of said base between said aligned slots, said initial portions of each of said arms having inwardly extending abutments spaced from said bight portion a distance approximately equal to the thickness of said base between said aligned slots so that said mounting member can be forced onto said base in a direction toward said flange by stressing the inner end of said mounting member and be retained thereon by said bight portion engaging the outer surface of said base and said abutments engaging the inner surface of said base, with said arms of said mounting member extending from said initial portions along and diverging from said housing in alignment with said opposed slots so as to be movable therein, said flange having recesses in its underside in alignment with said slots, respectively, and said arms of said mounting member having their free ends located in said recesses, respectively, so that movement of said arms outwardly of said housing is limited by engagement with said flange.

2. A wiring device comprising a cup-shaped housing having a flange extending outwardly therefrom at its open

end, each side wall of one pair of opposed side walls having a slot extending completely therethrough, which slots being in alignment with each other and extending from the lower side of said flange to the lower edge of a base of said housing, a generally U-shaped resilient mounting member having the portion of each of its arms initially extending from the bight portion spaced a distance approximately equal to the width of said base between said aligned slots, said initial portions of each of said arms having inwardly extending abutments spaced directly from said bight portion a distance approximately equal to the thickness of said base between said aligned slots so that said mounting member can be forced onto said base in a direction toward said flange by stressing the inner end of said mounting member and be retained thereon by said bight portion engaging the outer surface of said base and said abutments engaging the inner surface of said base, with said arms of said mounting member extending from said initial portions along and diverging from said housing in alignment with said opposed slots so as to be movable thereinto, said flange having recesses in its underside in alignment with said slots, respectively, said arms of said mounting member having their free ends located in said recesses, respectively, so that movement of said arms outwardly of said housing is limited by engagement with said flange, and the sides of said base in alignment with said slots being sloped outwardly to force said arms of said mounting member outwardly during such mounting thereon.

3. A wiring device comprising a cup-shaped housing of insulating material, a pair of contacts being rigidly engaged with opposed inner surfaces of said housing, respectively, each of said contacts having openings therein spaced inwardly of the open end of said housing, a cover member having a pair of spaced, resiliently yieldable latching members extending from the inner side thereof, and said yieldable latching members having means at their free ends engageable with said contacts through said contact openings, respectively, so that said cover can be assembled with said housing substantially without deflecting said contacts.

4. A wiring device comprising a cup-shaped housing of insulating material, a pair of contacts being rigidly engaged with opposed inner surfaces of said housing, respectively, a cover member, and cooperable latching means on said cover and each of said contacts, the portion of said latching means on said cover being resiliently yieldable so that said cover can be automatically secured to said housing substantially without deflecting said contacts.

5. A wiring device comprising a cup-shaped housing of insulating material, a pair of contacts being rigidly engaged with opposed inner surfaces of said housing, respectively, each of said contacts having an opening located therein with a laterally extending edge spaced inwardly from the open end of said housing, a cover member of a size to be inserted through said open end of said housing to close said open end, said cover having a pair of spaced members each having an outwardly extending hook portion at its free end, said cover spaced members being spaced from each other approximately the same distance as the distance between said contacts, and said cover spaced members being resiliently yieldable so that said cover can be assembled with said housing substantially without deflecting said contacts and so that said hook portions engage the upper portions of said contacts, respectively, to be deflected toward each other until said hook portions are in alignment with said openings in said contacts, respectively, whereat said hook portions

spring outwardly to engage said laterally extending contact edges.

6. A wiring device comprising a housing of insulating material having at least one pair of opposed side walls, said housing having a pair of spaced slots being positioned, respectively, to be extended through the region of said housing between first opposed edges of said side walls to the exterior of said housing, each of a pair of electrical contacts being insertable into said slots from the interior region of said housing, respectively, cooperating engageable means on said housing side walls and said contacts, respectively, for limiting movement of said contacts through said slots to a predetermined amount, each of said contacts having at least one portion which is spaced from said engageable means and which is deformed into engagement with the exterior side of said housing region between said first side wall opposed edges so that said contacts are secured to said housing with another portion of each of said contacts being rigidly engaged at least with said side walls, respectively, a cover for closing said interior region of said housing between second side wall opposed edges which are spaced from said first side wall opposed edges, said contacts and opposite ends of said cover having interengaging latch means for securing said cover in place, the portion of said latch means forming a part of said opposite cover ends being yieldable to enable a securing of said cover in place substantially without deflecting said rigidly engaged contacts.

7. A wiring device comprising a housing having at least a pair of opposed side walls, each of said side walls having a slot extended from one edge thereof along its outer face, said side wall slots being aligned with each other, a generally U-shaped resilient mounting member having its arm portions which initially extend from the bight portion thereof spaced from each other a distance approximately equal to the width of a first region of said housing adjacent said one side wall edges and between said aligned side wall slots, the outer ends of said initial portions of each of said arms having inwardly extending abutments thereon spaced from said bight portion a distance approximately equal to the distance between the inner and outer sides of said first housing region so that said mounting member can be forced onto said base in the extended direction of said side wall slots to be retained thereon by said bight portion engaging said outer side of said first housing region and by said abutments extending through said side wall slots to engage said inner side of said first housing region, and said arms of said mounting member extending from said initial portions along said side walls but diverging outwardly of said housing in alignment with said opposed slots so as to be movable thereinto substantially without movement of said arm initial portions.

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