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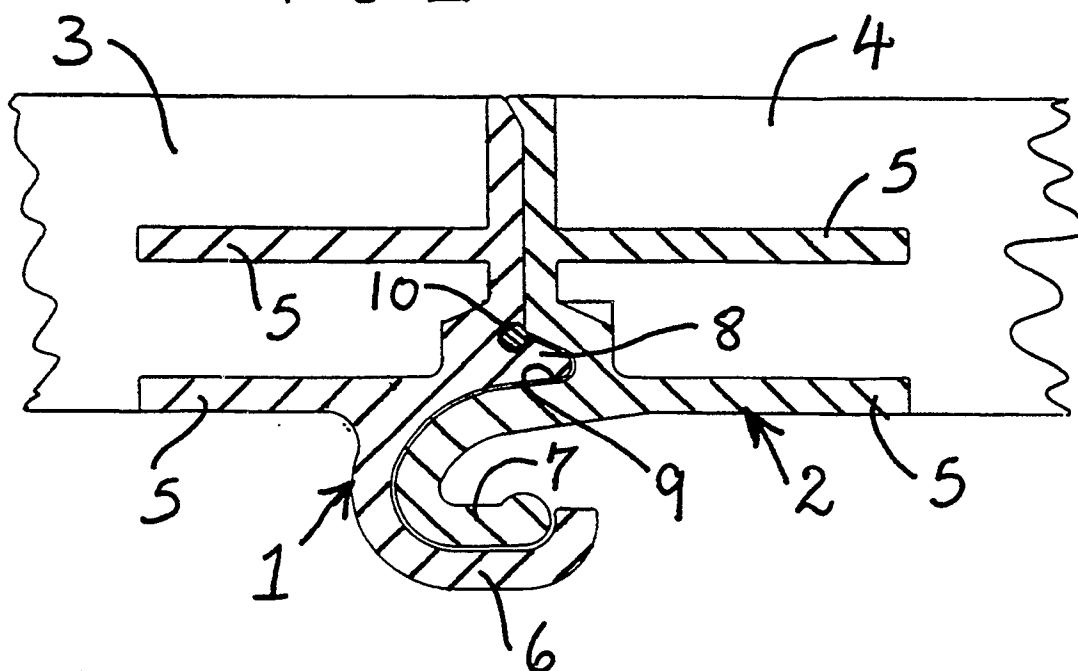
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⑤④ Improvements relating to shutter panel linkage systems.

⑤⑦ Two panels (3,4) form part of a shutter with articulated linkages formed by link members (1,2). Panel (4) is offered up in a generally vertical attitude to enable the hook portion (7) to locate over the end of the hook portion (6). The panel (4) is then swung up beyond the vertical position, so that positive interconnection between the two members (1,2) is achieved. Once the panel (4) is moved up to a sufficient extent the link members cannot be disengaged from one another.

FIG. 1



Shutters comprising a series of hingedly inter-linked panels are available for a number of purposes, for example for providing access to garages and the like and for rear or side doors of vans or other vehicles. Shutters formed from narrow width slats can be wound on a drum, but wider slatted shutters in particular are generally caused to move along a storage channel (when access is required by moving the shutter out of the way). It will be appreciated that, for shutters made to a substantial size, the weight of each panel will be such that manipulation of the panels, by operators in a workshop or on an assembly site who are constructing the shutters from a number of panels, can create difficulties. Because the interlinking between the panels has to be in the form of a relatively tight hinged arrangement there is little play between the members, and the offering-up of one part to another during construction has to be fairly precise.

It is an object of this invention to reduce the problems in assembly and installation of shutters from individual, hinged panels.

Accordingly this invention provides a shutter panel linkage system comprising a male link member and a female link member each having flanges projecting away from one end for connection to respective shutter panels, the female link having a depending hook portion projecting at the other end from one side and in the opposite direction to the flanges, whilst the male link has a complementary but smaller hook portion projecting at the other end from the one side and in the same direction as the flanges, the two hook portions being able to interlink when the two link members are in a substantially non-aligned attitude, whilst the male hook portion will be nested within the female hook portion and incapable of release therefrom, whilst the link members, and associated panels, are aligned.

By utilising such a system, a panel to which the female link member is attached may be mounted on an assembly support. The hook portion on the male link member can then be located relatively easily over the hook portion on the female link member, the further panel then being swung more into alignment with the first panel so that the two panels are positively linked together by the link members, whilst the required pivot is achieved between the interconnected hook members.

In the preferred arrangement, the inner end of the female hook portion continues as a projecting rib to locate within a complementary groove in the male hook portion when the two link members are aligned. This provides added security and lessens the possibility of rattling when the panels are in an aligned attitude.

Advantageously, the free end of the male hook portion has a rounded end on which the male link member will pivot during the primary stages of inter-connecting the two link members. It is also preferred

that there should be a groove (ideally in the female member) for a sealing strip which will act as a water or draught barrier.

In the preferred arrangement there will be on each link member a flange to locate on the side of a panel and a further flange to locate centrally within one end of the panel. The link members and panels may advantageously be interconnected by bonding with a suitable adhesive and/or by screws or rivets.

The invention may be performed in various ways and one preferred embodiment will now be described, by way of example, with reference to the accompanying drawings, in which:-

Figure 1 is a section through a linkage between two panels using the linkage system of this invention; and

Figures 2 to 4 illustrate successive stages of inter-connecting the two link members of the linkage system of Figure 1.

The linkage system illustrated in the drawings is formed from a female link member 1 and male link member 2, each of which is secured to the end of a shutter panel 3 or 4 by means of projecting flanges 5. Both link members carry a hook portion. The hook portion 6 on the female link member 1 is larger than the hook portion 7 on the male link member 2. As can be seen from Figure 1, when the panels 3 and 4 are aligned the hook portion 7 locates snugly within the hook portion 6.

During assembly a series of panels 3 and 4 will be interconnected by means of the linkage system in the manner which is illustrated in Figure 2 to 4. The panel 3 will be attached to an assembly support structure so that the panel 4 can then be offered up in a generally vertical attitude to enable the hook portion 7 to locate over the end of the hook portion 6 (Figure 2). The panel 4 is then swung up beyond the vertical position, through the stages shown in Figure 3 and 4 to a final stage as illustrated in Figure 1, so that positive inter-connection between the two members 1 and 2 is achieved. Once the panel 4 is moved up beyond the condition shown in Figure 3, the link members cannot be disengaged from one another. In use the panels 3 and 4 will be held within side channels which will limit the extent to which the panels can move out of alignment with one another, so that they will not move much beyond the condition shown in Figure 4. In use, therefore, the panels will not tend to become disengaged.

As a further locating feature the female link member 6 has a projecting rib 8 which locates within a complementary groove 9 in the male member 1 when the panels 3 and 4 are moved into an alignment condition. A sealing strip 10 is provided to create a draught or weather-proof barrier when the two link members are flush with one another, as shown in Figure 1.

The panels 3 and 4 are formed from timber, plywood, composite plastics sheets or fibreboard

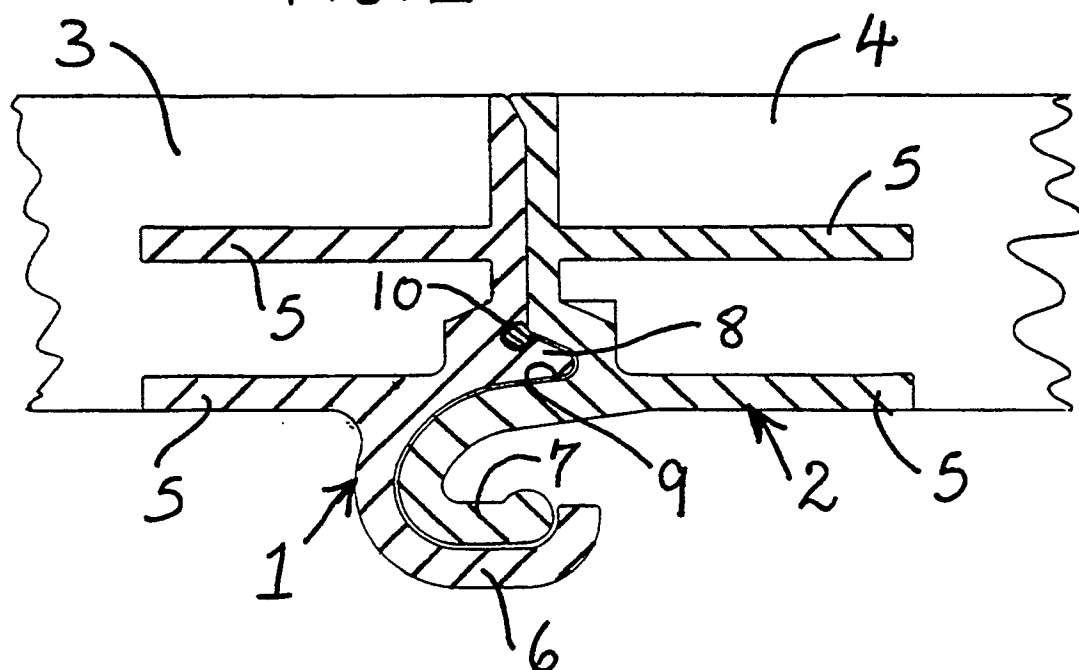
sheets. Securing of the panels to the flanges is achieved by screws or rivets, and/or by bonding with a suitable adhesive.

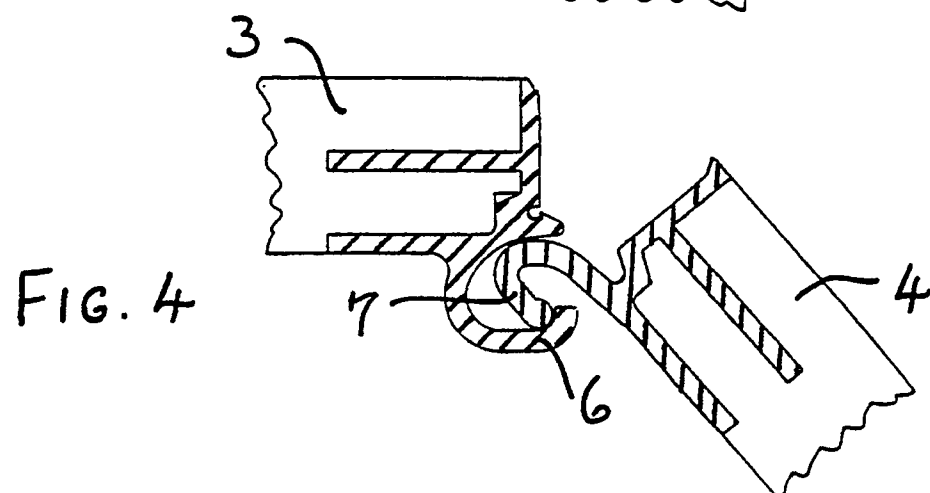
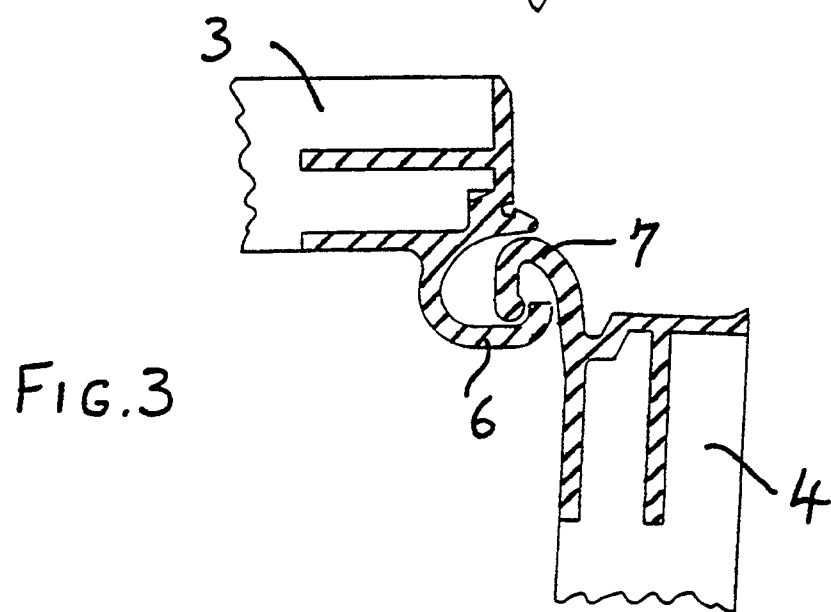
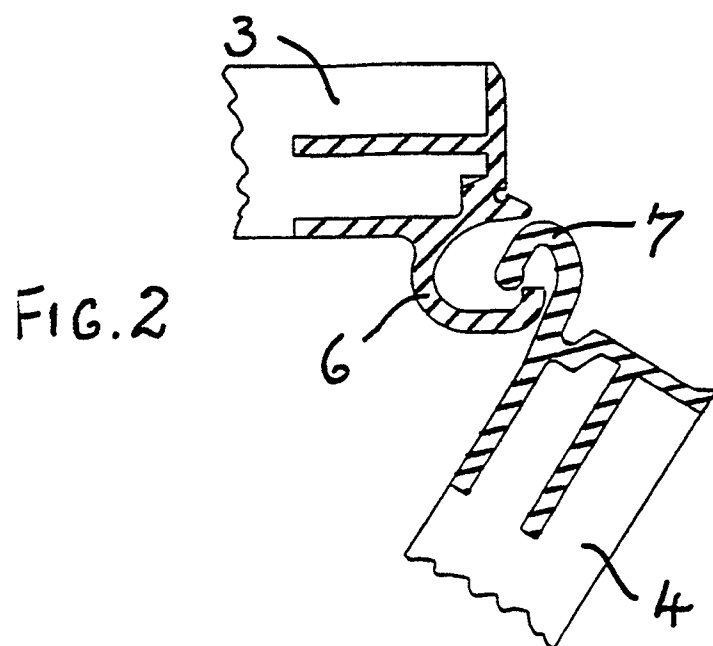
8. Any novel combination of features of a shutter panel linkage system as described or illustrated herein.

Claims

1. A shutter panel linkage system comprising a male link member and a female link member each having flanges projecting away from one end for connection to respective shutter panels, the female link having a depending hook portion projecting at the other end from one side and in the opposite direction to the flanges, whilst the male link has a complementary but smaller hook portion projecting at the other end from the one side and in the same direction as the flanges, the two hook portions being able to interlink when the two link members are in a substantially non-aligned attitude, whilst the male hook portion will be nested within the female hook portion and incapable of release therefrom, whilst the link members, and associated panels, are aligned. 10 15 20
2. A linkage system according to Claim 1, wherein the inner end of the female hook portion continues as a projecting rib to locate within a complementary groove in the male hook portion when the two link members are aligned. 25 30
3. A linkage system according to Claim 1 or Claim 2, wherein the free end of the male hook portion has a rounded end on which the male link member will pivot during the primary stages of interconnecting the two link members. 35
4. A linkage system according to any one of Claims 1 to 3, wherein a groove is defined at the junction of the two link members, a sealing strip being positioned in said groove to act as a water or draught barrier, when the link members are in the aligned condition. 40
5. A linkage system according to any one of Claims 1 to 4, wherein a flange is provided on each link member to locate on the side of a panel and a further flange is provided to locate centrally within one end of the panel. 45
6. A linkage system according to any one of Claims 1 to 5, wherein the link members and panels are interconnected by bonding with a suitable adhesive and/or by screws or rivets. 50
7. A shutter panel linkage system substantially as hereinbefore described with reference to the accompanying drawings. 55

FIG. 1







European Patent
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EUROPEAN SEARCH REPORT

Application Number

EP 91 30 5252

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
Y	US-A-4 930 561 (CLAY) * column 3, line 42 - column 7, line 60 * * figures 1-6 *	1-6	E05D1/04 E06B3/48
Y	GB-A-2 072 248 (BOSTWICK DOORS (UK) LIMITED) * page 1, line 91 - page 2, line 19 * * figures 1-3 *	1-6	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			E05D E06B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 05 SEPTEMBER 1991	Examiner VAN KESSEL J.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application I : document cited for other reasons & : member of the same patent family, corresponding document			

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