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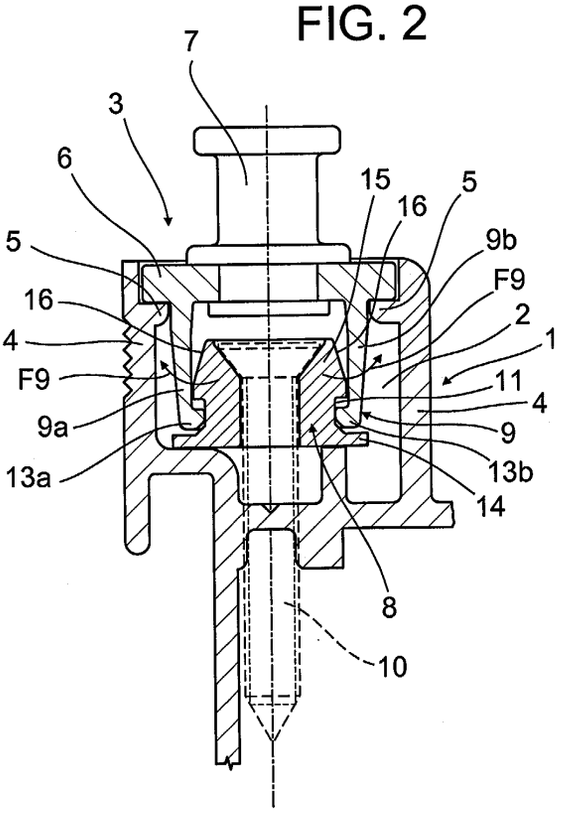
(54) An operating unit for doors and windows

(57) Described is an operating unit for doors or windows, especially for doors or windows comprising a fixed frame and a mobile frame (1); the mobile frame (1) has a U-shaped channel (2) for positioning and fitting the operating unit (3); the unit (3) comprises transmission means (6) which are mobile in the channel (2) in a direction parallel to it and which are connected to a handle designed to move the transmission means (6) in both directions; the transmission means (6) present locking and/or operating elements (7) actuated by the handle so as to enable the mobile frame (1) to be moved into the open and closed configurations. The operating unit (3) further comprises means (8) for retaining the transmission means (6) and fitted stably inside the channel (2); and at least one operating element (6) constituting the transmission means and equipped with quick-release snap fitting means (9) for connection to the retaining means (8); the operating element (6) is insertable into the channel (2) from the front so as to permit the sliding of the operating element (6) in the channel (2) in both directions.

FIG. 2



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Description

[0001] The present invention relates to an operating unit for doors and windows, in particular doors and windows with frames made of metal, wood or synthetic materials such as PVC.

[0002] At present, the technology relating to operating units of this type, that is to say, the transmission and control systems for opening and closing doors and windows is divided into two different constructional philosophies: one for door and window frames made of metal, and the other for door and window frames made of wood and/or synthetic materials such as PVC.

[0003] At present, the difference in the production of these accessories (which usually comprise rods, contact and transmission elements controlled by operating units with handles) is due to the presence of different profiles on the door or window frame.

[0004] In the case of doors and windows with frames made of metal, the profile presents an open channel (usually defined by a pair of L- or T-shaped profiles protruding from the bottom of the body and facing each other. The channel acts as a guide and retains the rods which slide in it under the action of the operating unit to actuate the closing and contact elements (protruding from the channel and usually directly attached to or made as one with the rods) in such manner as to permit opening and closing of the door or window.

[0005] In the case of doors and windows with frames made of wood, synthetic material or aluminium and wood, the profile forming the vertical member of the frame is appropriately slotted (see Figure 1, which shows a prior art solution with a profile made of metal or synthetic material with a wooden covering, represented by the dashed line). The slots are open to the outside and used for fitting a profile P presenting a main chamber C delimited, at the sides, by two parallel wings A1 and, at the top, by two transversal ledges A2 made on the parallel wings A1 and forming an upper supporting surface.

[0006] When the door or window is assembled, this profile is fitted with a preassembled kit comprising an operating unit consisting of a rack and pinion device (to which a handle is then connected) and some rods built into or connected to the operating unit. The rods are in turn slidably mounted in a longitudinal cover-like supporting element usually of predetermined length (greater than the length of the vertical member of the frame and adapted on assembly). This cover is positioned on the above mentioned upper supporting surface and screwed directly to the profile chamber.

[0007] Elements for closing and operating the frame (usually contact pins and bolts) are connected to or made as one with the rods and protrude from the cover, the latter having suitable openings or slots made in it to permit the movement of the operating and closing elements under the action of the rods).

[0008] Operating units of this kind are unsatisfactory in terms of flexibility and adaptability of assembly to different door and window frame structures.

[0009] That is because, as mentioned above, each unit is preassembled and the operating elements are located at specific points on the rods: that means a large number of operating units of different or standard sizes must be kept in stock.

[0010] This is contrary to market demand which, as in the case of doors and windows with metal frames, calls for adaptability and fast fitting using an all-purpose bar and appropriate tools which can also be used to automatically fasten the operating elements at predetermined positions.

[0011] The lack of flexibility in terms of the size of the operating unit constitutes an especially serious drawback in the sector of doors and windows with frames made of wood and synthetic materials, where sizes are more diversified and assembling situations less standard: this considerably increases the overall costs of making and assembling the doors or windows precisely because dedicated units are required.

[0012] Furthermore, there is increasing demand for interchangeable kits (that is to say, kits that can be used not only in metal profiles but also in profiles for frames made from other materials such as wood and aluminium, wood or synthetic material).

[0013] This may be accomplished more easily by the use of simplified profile geometry that is the same for all types of door and window frames available on the market.

[0014] For this reason, the Applicant has invented and designed an operating unit for doors and windows whose structural characteristics are such that it can be fitted quickly and easily to frames made of metal, wood, synthetic material, or wood and aluminium, with or without standard profiles, combined with a high degree of adaptability to different sizes and final configuration of the elements making up the operating unit.

[0015] Accordingly, the present invention provides an operating unit for doors or windows of the type comprising a fixed frame and a mobile frame; the mobile frame having a U-shaped channel for positioning and fitting the operating unit; the unit comprising transmission means which are mobile in the channel in a direction parallel to it and which are connected to a handle designed to move the transmission means in both directions; the transmission means presenting locking and/or operating elements actuated by the handle so as to enable the mobile frame to be moved into the open and closed configurations; the operating unit further comprising means for retaining the transmission means and fitted stably inside the channel; and at least one operating element constituting the transmission means and equipped with quick-release snap fitting means for connection to the retaining means; the operating element being insertable into the channel from the front so as to permit the sliding of the operating element in the channel in both directions.

[0016] The technical characteristics of the invention, with reference to the above aims, are clearly described in the claims below and its advantages are apparent from the detailed description which follows, with reference to the accompanying drawings which illustrate a preferred embodiment of the invention provided merely by way of example without restricting the scope of the inventive concept, and in which:

- Figure 1 is a cross section of a prior art channel presented by frames made of metal, wood and/or synthetic material;
- Figure 2 is a cross section, with some parts cut away in order to better illustrate others, of the operating unit for doors and windows fitted to a sliding channel;
- Figure 3 is an exploded perspective view, with some parts cut away in order to better illustrate others, of the operating unit and sliding channel of Figure 2.

[0017] With reference to the accompanying drawings, in particular Figure 2, the operating unit according to the invention is fitted to door and window frames made of metal, wood and/or synthetic material such as PVC, or wood and aluminium, as a non-restricting example of the invention.

[0018] The door or window comprises a fixed frame (of known type and not illustrated) and a mobile frame 1 (also of known type and illustrated only insofar as is relevant to the present invention). The mobile frame 1 presents a channel 2 for positioning and fitting the operating unit 3, the channel 2 being open at the front to form a U shape and located or made at the vertical member of the mobile frame 1. It will be understood that the shape of the channel 2 just described is merely an example of the solution according to the invention.

[0019] In this type of door or window frame, the channel 2 may be defined directly by the basic profile made of wood-covered synthetic material or it may be inserted into matching slots made in a wooden frame or it may be machined as a feature directly in a wooden frame or made directly in an aluminium extrusion.

[0020] The operating unit 3 comprises transmission means 6 which are mobile in the channel 2 in a direction parallel to it and which are connected to a handle (not shown since it is of known type) designed to move the transmission means 6 in both directions (see arrows F in Figure 3).

[0021] The transmission means 6 present locking and/or operating elements 7 actuated by the handle so as to enable the mobile frame 1 to be moved into the open and closed configurations, through coupling and/or interference with matching slots in the fixed frame.

[0022] The operating unit 3 also comprises:

- means 8 for retaining the transmission means 6 and fitted stably inside the channel 2; and
- at least one operating element 6 constituting the transmission means 6 and equipped with quick-release snap fitting means for connection to the retaining means 8.

[0023] Thanks to this structure, the operating element 6 is insertable into the channel 2 from the front so as to permit the sliding of the operating element 6 in the channel 2 in both directions during use.

[0024] In the accompanying drawings, the channel 2 is defined, again by way of a non-restricting example, by a first pair of lateral wings 4 and a second pair of inward-facing ledges 5, transversal to the first pair of wings 4 and delimiting the front portion of the channel 2.

[0025] The aforementioned means for retaining the operating element 6 comprise at least one plug 8 (shown in Figures 2 and 3) that can be attached by screw fastening means 10 (for example, self-tapping screws) to the bottom of the channel 2.

[0026] The operating element comprises at least one rod 6 positioned and slidable, in the embodiment illustrated, on the second pair of leges 5, the locking and/or operating elements 7 being made on and/or protruding from the rod 6 itself. In Figure 2, the operating elements 7 are shown with a contact pin or bolt associated with the rod 6 and designed to enable the door or window frame to move into the open and closed configurations thanks to the sliding movement of the rod 6.

[0027] Depending on the size of the mobile frame 1, the means for retaining the operating rod 6 may comprise at least one pair of separate plugs 8, 8' that can be attached by screw fastening means 10, 10' to the bottom of the channel 2 (see Figure 3).

[0028] In a first embodiment of the invention, shown in Figure 2, each plug 8 presents two side recesses 11 defining respective sockets for irreversibly coupling the snap fitting means 9 presented by the operating rod 6.

[0029] In a second embodiment of the invention, shown in Figure 3, each plug 8 presents two side protuberances 12 defining respective undercuts for irreversibly coupling the snap fitting means 9 presented by the operating rod 6.

[0030] The snap fitting means 9 may comprise two protrusions 9a, 9b projecting from the free surface of the rod 6 and extending along the full length of the rod 6 itself.

[0031] The protrusions 9a, 9b may have respective enlarged, inward-facing ends 13a, 13b designed to be coupled with the matching side recesses 11 or undercuts 12 of the plug 8 when the rod 6 is frontally positioned in the channel 2.

[0032] For irreversibly snap fitting the protrusions 9a and 9b, each plug 8 has a body with flat base 14 that rests on the bottom of the channel 2 and a head 15 whose cross section is substantially in the shape of a parallelepiped and which, between the large base of the parallelepiped 15 and the flat base 14, forms the aforementioned coupling recesses 11 (of the first embodiment) and two inclined sliding surfaces 16 for elastically

deforming the protrusions 9a and 9b of the rod 6 when the plug 8 and rod 6 are irreversibly snapped into the channel 2 (see arrows F9 in Figure 2).

[0033] As shown in Figure 3, each plug 8 may be equipped with stop means 17 for preventing the plug 8 itself from turning inside the channel 2 during use.

[0034] The stop means 17 may comprise two tabs 18 protruding from the front and rear ends of the plug 8 and being wider than the plug 8 itself so as to form a side stop with the first pair of lateral wings 4 defining the channel 2.

[0035] Each of the tabs 18 has a first portion 18a parallel to the plug 8 and associated to the plug 8, and a second portion 18b protruding from the plug 8 and inclined in the direction of the rod 6 in such a way that it is plastically deformed when the plug 8 and the element 6 are snapped together.

[0036] The operating unit made in this way achieves the preset aims thanks to an extremely simple and effective structure that can be fitted quickly and easily irrespective of the type of profile and of the type of material of which the vertical member of the mobile frame is made.

[0037] This result is accomplished by the plugs which create a sliding surface that retains the operating rod without requiring any further retaining elements in the channel of the mobile frame.

[0038] The possibility of using a simple operating rod of a type much like a traditional one confers a high degree of flexibility in the production of the rods which can be made quickly and precisely from continuous bars using existing machines that make the rods only for metal profiles.

[0039] The use of rods that are similar to those already used for metal frames makes it possible, by simply acting on the machine program used to make the rod, to insert the closing and contact points on the rod according to the type of door or window frame to be made.

[0040] The structure of the unit also allows the rod to be fixed from the front, with obvious advantages in terms of speed and ease of fitting, plus the fact that positioning the retaining plugs inside the channel does not require a high degree of assembling precision.

[0041] This means that the operating unit according to the invention can be fitted quickly and easily on any type of door or window frame whatever the type of profile.

[0042] It will be understood that the invention described may be useful in many industrial applications and may be modified and adapted in several ways without thereby departing from the scope of the inventive concept. Moreover, all the details of the invention may be substituted by technically equivalent elements.

Claims

1. An operating unit for doors or windows of the type comprising a fixed frame and a mobile frame (1); the mobile frame (1) having a channel (2) for positioning and fitting the operating unit (3), the channel (2) being defined by a front opening and a bottom; the unit (3) comprising transmission means (6) which are mobile in the channel (2) in a direction parallel to it and which are connected to a handle designed to move the transmission means (6) in both directions; the transmission means (6) presenting locking and/or operating elements (7) actuated by the handle so as to enable the mobile frame (1) to be moved into the open and closed configurations; the operating unit (3) being **characterised in that** it further comprises:

- means (8) for retaining the transmission means (6) and fitted stably inside the channel (2);
- at least one operating element (6) constituting the transmission means and equipped with quick-release snap fitting means (9) for connection to the retaining means (8); the operating element (6) being insertable into the channel (2) from the front so as to permit the sliding of the operating element (6) in the channel (2) in both directions.

2. The unit according to claim 1, **characterised in that** the means for retaining the operating element (6) comprise at least one plug (8) that can be attached by screw fastening means (10) to the bottom of the channel (2).

3. The unit according to claim 1, where the channel (2) is U-shaped and defined by a first pair of lateral wings (4) and a second pair of inward-facing ledges (5) transversal to the first pair of wings (4) and delimiting the front portion of the channel (2), the unit being **characterised in that** the operating element comprises at least one rod (6) positioned and slidable on the second pair of ledges (5), the locking and/or operating elements (7) being made on and/or protruding from the rod (6) itself.

4. The unit according to claim 1, **characterised in that** the means for retaining the operating element (6) comprise at least one pair of separate plugs (8, 8') that can be attached by screw fastening means (10, 10') to the bottom of the channel (2).

5. The unit according to claim 2 or 4, **characterised in that** each plug (8) presents two side recesses (11) defining respective sockets for irreversibly coupling the snap fitting means (9) presented by the operating rod (6).

6. The unit according to claim 2 or 4, **characterised in that** each plug (8) presents two side protuberances (12) defining respective undercuts for irre-

versibly coupling the snap fitting means (9) presented by the operating rod (6).

7. The unit according to claim 5 or 6, **characterised in that** the snap fitting means (9) comprise two protrusions (9a, 9b) projecting from the free surface of the rod (6) and extending along the full length of the rod (6) itself; the protrusions (9a, 9b) having respective inward-facing enlarged ends (13a, 13b) and designed to be coupled with the matching side recesses (11) or undercuts (12) of the plug (8) when the rod (6) is frontally positioned in the channel (2).

8. The unit according to claim 7, **characterised in that** each plug (8) has a flat base (14) that rests on the bottom of the channel (2) and a head (15) whose cross section is substantially in the shape of a parallelepiped and which, between the large base of the parallelepiped (15) and the flat base (14), forms the coupling recesses (11) and two inclined sliding surfaces (16) for elastically deforming the protrusions (9a, 9b) of the rod (6) when the plug (8) and rod (6) are irreversibly snapped into the channel (2).

9. The unit according to claim 5 or 6, **characterised in that** each plug (8) is equipped with stop means (17) for preventing the plug (8) itself from turning inside the channel (2) during use.

10. The unit according to claim 9, **characterised in that** the stop means (17) comprise two tabs (18) protruding from the front and rear ends of the plug (8) and being wider than the plug (8) itself so as to form a side stop with the first pair of lateral wings (4) defining the channel (2); each of the tabs (18) presenting a first portion (18a) parallel to the plug (8) and associated to the plug (8), and a second portion (18b) protruding from the plug (8) and inclined in the direction of the rod (6) in such a way that it is plastically deformed when the plug (8) and the element (6) are snapped together.

FIG. 1

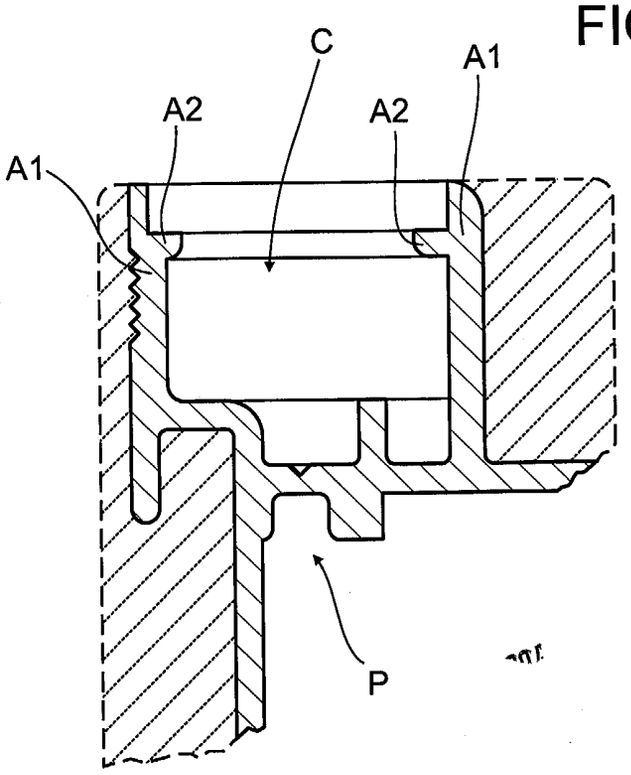

FIG. 2

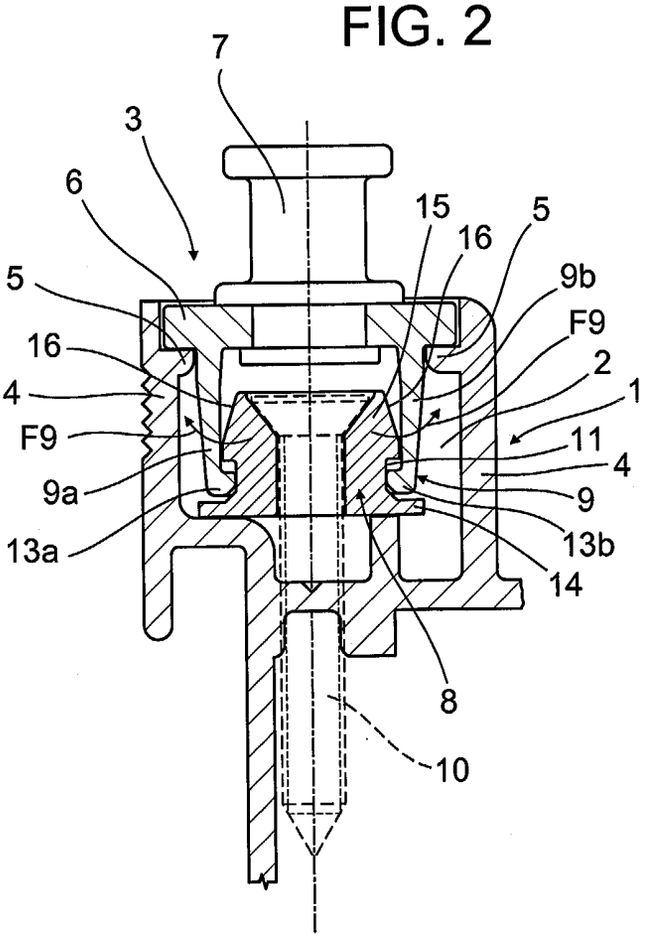

FIG.3