

The invention provides a modular designed push button switch, comprising an electrical contact module, an enlarged halo to accommodate a switch actuator and a legend plate, and a halo adapter interfacing the halo with the electrical contact module, whereby halo and halo adapter define a housing for the switch actuator which actuates via an axial movement the contact carrier of the electrical contact module.

Thus the push button assembly defined above provides easy assembling as well as disassembling from the back of a push button face plate, in order to replace damaged components and/or to change component colours, identifying legend plates and the like.

A push button assembly of this kind is known from the US-A-4 742 198. A face plate includes a single opening for each push button assembly, with the push button assembly including a halo which interfaces the assembly with the face plate, snugly extending into the face plate opening. A halo adapter interfaces the halo with an electrical switch which is actuatable via axial movement of a contact carrier. The halo and halo adapter nest to cooperatively define a housing for a switch actuator, eliminating the need for special tooling. The halo and halo adapter define first and second axial travel limits for the switch actuator, respectively, with the electrical switch biasing the switch actuator to the first travel limit. The switch actuator includes an actuating portion, which is completed by a lens. The lens is suitably fixed to the actuating portion, such as by ultrasonic welding. In illuminated embodiments actuating portion and lens are translucent to transmit light to indicate to the user that the button has been actuated, e.g., that an elevator call has been registered, when the push button assembly is used in an elevator application.

The main disadvantage of this prior art push button assembly lies in that the lens is fixed to the actuating portion. To fix the lens permanently to the actuating portion means additional manufacturing labour. Another disadvantage is that once manufactured there is no way to combine different lenses and buttons to comply with the need of combining different identifying legends, shapes and/or colours.

The invention has the purpose of the creation of a push button switch expanding the field of application of the modular concept and enabling an economical and simple production of the push button components.

The advantage attained by the invention is to be seen substantially in that there is only one type of button and lens necessary to quickly and easily assemble push buttons with different legends and colours without the use of special tools.

The following is a description of the same

specific embodiment of the invention reference being made to the accompanying drawings in which:

Fig. 1 is an exploded perspective view of a push button switch according to the invention comprising an improved modular concept of the push button,

Fig. 2 is a perspective view of the visible portion of the push button switch of Fig. 1 disposed in a panel or face plate and

Fig. 3 is a cross sectional view of the push button switch shown in Fig. 1, taken between the arrows I-I.

In the Figs. 1 to 3 the push button switch comprises an electrical contact module 1, a halo adapter 2, a switch actuator 3 and an enlarged halo 4. Electrical contact module 1, halo adapter 2 and the enlarged halo 4 are described in detail in the document US-A-4 504 713 and in the document US-A-4 742 198. A face plate 5 includes an opening 5.1 and fastener means 5.2 fixed to the inner surface for securing the push button switch. As illustrated, opening 5.1 has a substantially rectangular configuration with half circle endings. Halo 4 and halo adapter 2 are constructed to nest snugly together to form a switch actuator housing within which the switch actuator 3 is disposed in a snug but axially slidable guided relationship relative to the halo elements. The halo 4 includes a flange 4.1 carrying a first projection 4.2 and a second projection 4.3 surrounding a push button opening 4.5. The first projection 4.2 has a substantially square configuration and is configured to snugly enter halo adapter 2 to form the switch actuator housing. The second projection 4.3 is configured to snugly enter opening 5.1 in the face plate. The depth of the second projection 4.3 is at least equal to the thickness of the face plate 5. Electrical contact module 1, halo adapter 2 and enlarged halo 4 show mounting ears 1.1; 2.1; 4.4 with fastener means receiving openings which are aligned with the fastener means 5.2. To the left of the push button opening 4.5 the second projection 4.3 is recessed inwardly to define a recess 4.6 for receiving a legend plate 4.7 which fits snugly into recess 4.6. Suitable fastener means are provided for securing the legend plate 4.7 via a legend plate opening 4.8. The switch actuator housing part of the halo adapter 2 is formed by a recess 2.2 having a square configuration and by a wall 2.3. The wall 2.3 shows on each side a rectangular opening 2.4 enabling the actuating function of the push button. A lamp 1.2 illuminates the switch actuator 3 through a central opening 2.5 in the wall 2.3.

The switch actuator 3 or push button includes a base portion 3.1 having on the halo adapter end actuating legs 3.2 and on the halo end an actuating portion 3.3. The actuating legs 3.2 extend out-

wardly from the halo adapter end and engage via the rectangular openings 2.4 a spring biased contact carrier 1.3. A cylindrical lens cap 3.4 is snugly but slidably placed over the round actuating portion 3.3. On the halo end a lens 3.5 configured by a radius on the top surface of the lens cap 3.4 completes the lens cap 3.4 which is dimensioned to slidably enter the push button opening 4.5 in halo 4. The lens 3.5 transmits the indicating light of the lamp 1.2 to the user. A collar 3.6 surrounds the opening of the lens cap 3.4 and transmits an actuating force applied to the lens 3.5 to the base portion 3.1. As illustrated actuating portion 3.3, lens cap 3.4 and push button opening 4.5 have a round configuration. However, the teachings of the invention apply equally to alternative configurations, such as square.

Fig. 3 depicts the assembled push button switch as hereinbefore explained. The cross sectional view shows the switch actuator 3 disposed in the switch actuator housing. In the assembly, actuating legs 3.2 engage the spring biased contact carrier 1.3 and the contact carrier 1.3 thus pushes the switch actuator 3 against the first projection 4.2 of the halo 4, whereby the collar 3.6 of the lens cap 3.4 is pressed against the first projection 4.2 by the base portion 3.1. An actuating force applied to the lens 3.5 overcomes the bias of the contact carrier 1.3 causing the switch actuator 3 to travel a pre-determined distance inside the switch actuator housing. The switch actuator 3 comes to rest as soon as the base portion 3.1 reaches the wall 2.3 of the halo adapter 2, preventing an excess pressure on the contact carrier 1.3. The surface of the top of the actuating portion 3.3 is flat so that legends can be printed, hot stamped or engraved on it. The transparent lens cap 3.4 is placed over the actuating portion 3.3 to protect the legends. All the plastic components of this push button switch are moulded using polycarbonate in different colors.

Claims

1. Push button switch comprising an electrical contact module (1), an enlarged halo (4) to accommodate a switch actuator (3) and a legend plate (4.7), and a halo adapter (2) interfacing the halo (4) with the electrical contact module (1), whereby halo (4) and halo adapter (2) define a housing for the switch actuator (3) which actuates via an axial movement the contact carrier (1.3) of the electrical contact module (1), characterized thereby, that the switch actuator (3) is configured by modular means enabling a toolless assembling of the switch actuator (3).
2. Push button switch according to claim 1, characterized thereby, that the switch actuator (3) comprises a lens cap (3.4) snugly but slidably placed over an actuating portion (3.3) extending outwardly from a base portion (3.1).
3. Push button switch according to claim 1 and 2, characterized thereby, that the visible portion of the lens cap (3.4) is completed by a lens (3.5) transmitting indicating light to the user.
4. Push button switch according to claim 1 and 2, characterized thereby, that the opening of the lens cap (3.4) is surrounded by a collar (3.6) transmitting an actuating force applied to the lens (3.5) to a base portion (3.1).
5. Push button switch according to claim 1 and 2, characterized thereby, that legends are provided on the flat surface of the actuating portion (3.3).
6. Push button switch according to claim 1 and 2, characterized thereby, that the lens cap (3.4) and the actuating portion (3.3) have a round configuration.
7. Push button switch according to claim 1 and 2, characterized thereby, that the lens cap (3.4) and the actuating portion (3.3) have a square configuration.
8. Push button switch according to claim 1, characterized thereby, that the switch components are provided in different colours to comply with esthetic requirements of the building.
9. Push button switch according to claim 3, characterized thereby, that the lens (3.5) is configured by a radius on the top surface of the lens cap (3.4).

Fig.1

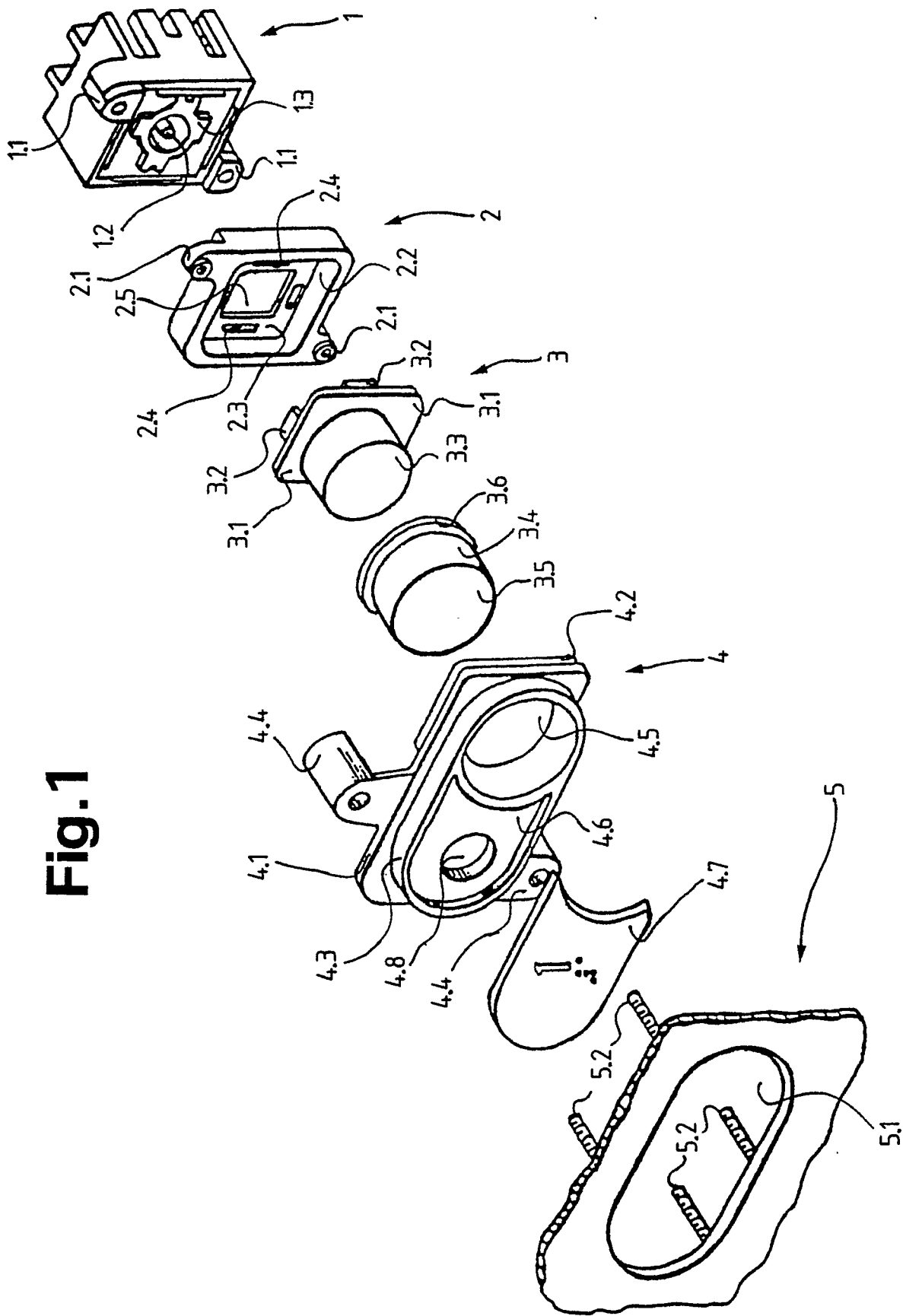


Fig.2

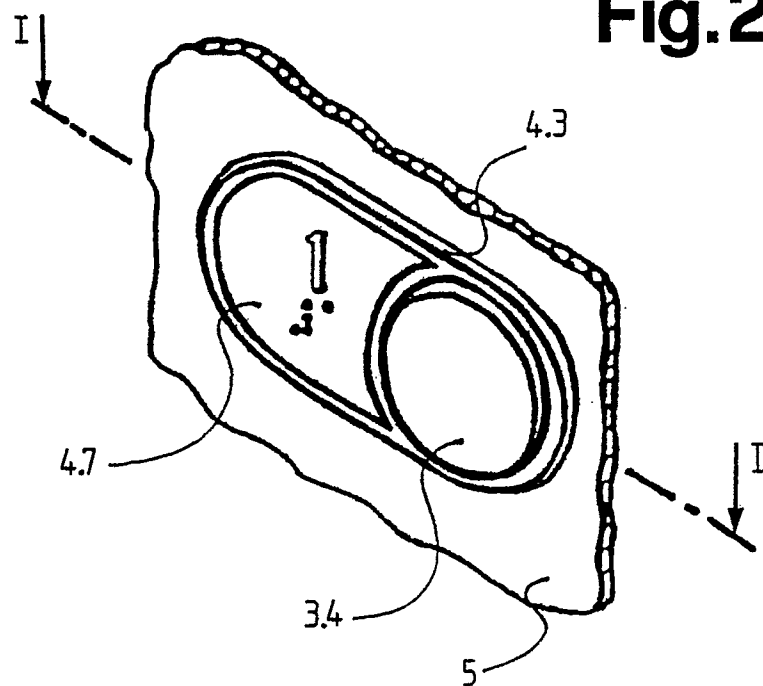
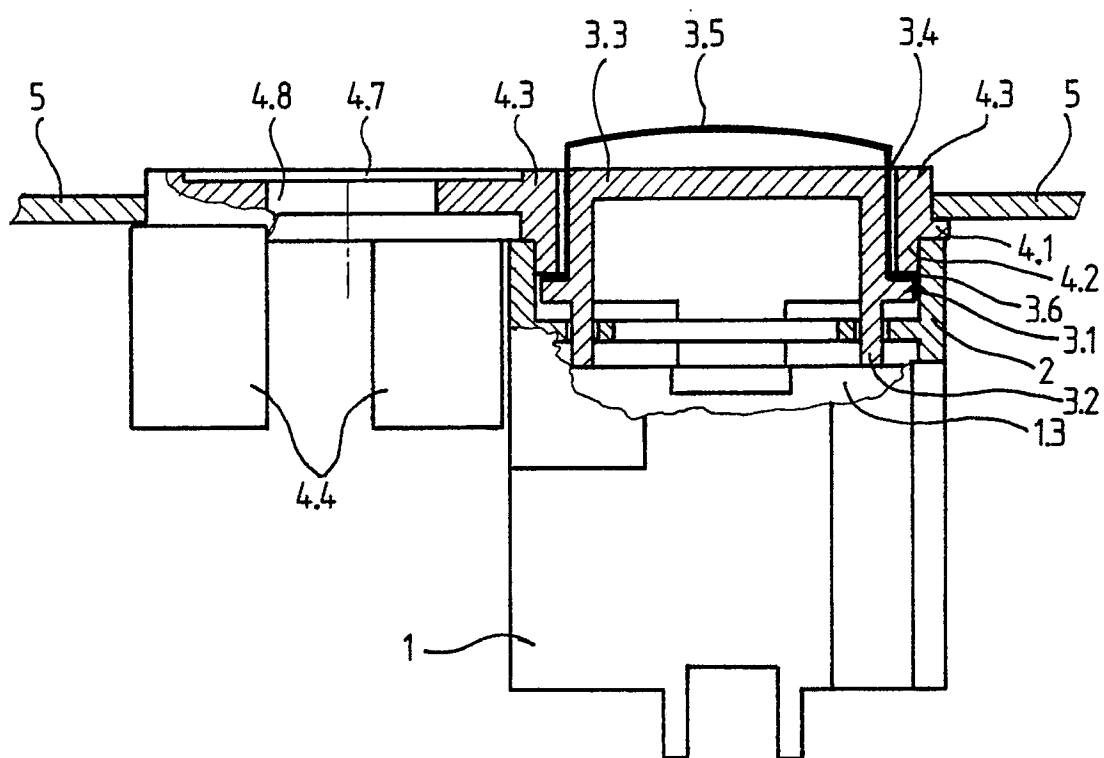


Fig.3





European
Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 90 12 5662

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)
A	US-A-4 283 758 (JAMES H. IRVING) * column 2, line 38 - column 3; figure 1 * - - -	1,2,7	H 01 H 13/02 H 01 H 9/18
A	DE-A-3 014 477 (SIEMENS AG) * page 16, line 26 - page 17, line 17; figures 1, 2 * - - -	1,2	
A	FR-A-1 385 601 (SOCIETE G.W.WALTON) * page 2, column 1, paragraph 8 * - - -	1,2,7	
A	DE-A-1 490 910 (GEBR. VEDDER) * claim 1; figures 1, 2 * - - -	1,2,3,5	
A	DE-A-2 833 679 (DEUTSCHE ITT INDUSTRIES) * figures * - - -	1,6,7	
A	WO-A-8 502 938 (ALLEN-BRADLEY COMPANY) * abstract * - - -	1	
D,A	US-A-4 504 713 (ADAMS ELEVATOR EQUIPMENT) * figures * - - - - -	1	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			H 01 H
Place of search		Date of completion of search	Examiner
The Hague		07 June 91	JANSSENS DE VROOM P.
CATEGORY OF CITED DOCUMENTS			
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A: technological background		L: document cited for other reasons	
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T: theory or principle underlying the invention			