



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 0 774 554 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
21.05.1997 Bulletin 1997/21

(51) Int Cl. 6: **E05B 9/02**

(21) Application number: **96308392.8**

(22) Date of filing: **20.11.1996**

(84) Designated Contracting States:
DE FR GB IT

(72) Inventor: **Chevalier, John Phillip**
Hammersmith, London W6 9SR (GB)

(30) Priority: **20.11.1995 GB 9523688**

(74) Representative: **Maury, Richard Philip et al**
MARKS & CLERK,
57-60 Lincoln's Inn Fields
London WC2A 3LS (GB)

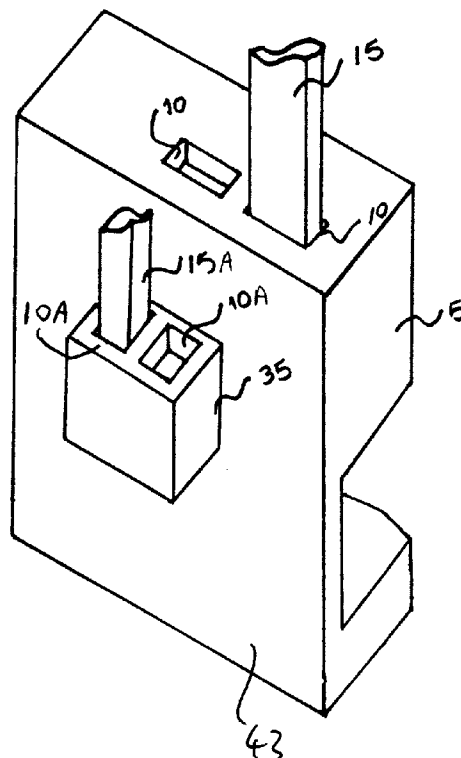
(71) Applicant: **Chevalier, John Phillip**
Hammersmith, London W6 9SR (GB)

(54) **Housing for automobile latch or latch actuator**

(57) A housing (5) for an automobile latch or latch actuator, comprising two hollow shells which are arranged to mate along mutually-opposed edge surfaces of open faces of the shells thereby to form a closed housing, characterised in that at least one of the shells (40) has at least one opening (10) for an arm (15) to pass through between the latch or actuator and an ex-

terior control, and in that one of the shells has internal integral locking formations (20) which are complementary with corresponding internal integral locking formations on the other shell when they are in mating engagement such that the shells are interlockable with a push fit and are then resistant mechanically to mutual separation without destruction of the integral formations.

Fig. 1



EP 0 774 554 A1

Description

This invention relates to a housing suitable for accommodating an automobile latch and/or latch actuator arrangement for securing automobile doors, bonnets, boots, hoods and so on.

Automobile door latches serve to effect a controlled movement of a latch bolt from a latched position, retaining a striker attached to the door, and an unlatched position, and vice versa. Latch and actuator housings are constructed to allow for the mechanical and electromechanical members of latches and actuators to be fixed securely therein and to be protected from the exterior environment. Housings are made from suitably shaped metal sheet or moulded materials. Conventional automobile door latch housings are costly and they do not provide sufficiently for the level of security and safety required by automobile manufacturers. The present invention provides a housing capable of satisfying these requirements.

The invention provides a housing for an automobile latch or latch actuator, comprising two hollow shells which are arranged to mate along mutually-opposed edge surfaces of open faces of the shells thereby to form a closed housing, characterised in that at least one of the shells has at least one opening for an arm to pass through between the latch or actuator and an exterior control, and in that one of the shells has internal integral locking formations which are complementary with corresponding internal integral locking formations on the other shell when they are in mating engagement such that the shells are interlockable with a push fit and are then resistant mechanically to mutual separation without destruction of the integral formations.

A housing embodying the invention is capable of providing an unprecedented level of security, since access to its contents is completely denied. It can also be made strongly resistant to crushing, torsion and fracture. The invention also provides for significant simplification in the process of assembly, since it requires fewer parts and these parts can be assembled very easily.

Preferably, the edge surfaces of the open faces of the shells are generally planar, and the shells are mutually engageable by a sliding push fit normal to the parallel planes of both said edge surfaces. This enables simple assembly, by locating the latch/actuator components in the appropriate shell or shells, and then sliding the shells together with a push fit, allowing the link arm or arms to pass through the respective opening or openings in the shell or shells.

The respective shells preferably comprise mutually co-operative male and female internal integral formations which are elongate in the said normal direction so as to guide the shells slidingly together. This assists assembly, and also provides extra resistance to crushing, torsion and fracture in the final assembly.

The locking formations preferably comprise hook-shaped projections extending transversely to the said

normal direction such that they deform resiliently upon normal sliding engagement of the shells and they then interlock and prevent separation of the shells. This provides for the push fit and for the resistance to reopening of the housing, and it therefore enhances the simplicity of assembly and the resistance to subsequent access to the contents of the housing. This security is particularly important in automobile door latch and actuator arrangements, which in the past have been prone to tampering for theft.

In order to enhance resistance to crushing, at least one of the shells preferably comprises internal shoulder projections from its side walls whose edges define the said open face, which are arranged to abut against corresponding projections from walls of the other shell at the point of mating engagement of the shells, so that the shoulder projections resist further compression of the two shells together.

Latch and actuator arrangements often require linkage to two or more control members, such as a key mechanism, an interior lock control knob, and a door handle. The linkage may be articulated arms, or cable, for example. This makes it convenient to have one or more lateral projections to a box-shaped housing, the projection or projections accommodating a respective link arm or arms. However, in some cases it will be sufficient to have, for example, a linking cable projecting through a hole in a different wall of the housing from the wall in which the said opening is made. Accordingly, the two shells of the housing may together define a box-shaped housing, each shell having four side walls and an end face, the edges of the four side walls being coplanar, and one shell may have an external housing projecting integrally from one of its side walls, the exterior housing having at least one opening for the passage of a further arm from the latch or actuator from an external control.

Conveniently, each shell is a unitary plastics moulding. The various formations, internal and/or external, can be moulded integrally to suit the particular application required. These formations would typically include projections and recesses for accommodating and locating specific latch/actuator components.

In some applications, particularly where the shells are plastics mouldings, it may be advantageous to form at least one of the shells with at least one backing plate, preferably of metal, for strengthening purposes.

At least one of the faces of at least one of the shells may be formed with corrugations so as to enhance its rigidity.

The invention also provides an automobile door latch arrangement comprising a latch or latch actuator, at least one link arm extending from the latch or actuator, and a housing as defined above, with the or each arm extending through its opening or openings.

The housing is primarily intended to accommodate an automobile door latch, an actuator, or a combined latch and actuator arrangement.

In order that the invention may be better understood, a preferred embodiment will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a housing for an automobile door latch, constructed as a mono-block unit; and

Figure 2 is a partly broken away perspective view of one corner of one shell of the housing of Figure 1, drawn to an enlarged scale.

The housing 5 of Figures 1 and 2, for an automobile door latch, is generally box-shaped, but has a transverse projection 35 from one end surface 43. The latch/actuator mechanism is conventional and only its link arms 15, 15A are shown. These connect the latch/actuator with exterior controls which would be either a key mechanism, an interior lock control knob or a door handle. One of these link arms 15 projects through one of two rectangular openings 10 in one of the side walls of the housing 5. The other link arm 15A is arranged to project through one of two openings 10A in one wall of the projecting housing 35. With these exterior projections to the housing, the housing is capable of being fitted onto the inside or the outside of an automobile door cassette without the need to make any modifications to that cassette. The exterior projection however is not necessary in every case, and the shape of the housing can be adapted appropriately. Generally, the number of openings 10A will correspond to the number of link arms, but there will sometimes be redundant openings so that the same design of housing can be used with a variety of different latches and latch actuator arrangements.

With reference particularly to Figure 2, the box-shaped housing of Figure 1 is formed from two shells, each of which has an end face, and four side walls. The edges of the side walls are coplanar and define the interface for mating engagement with the other shell. One corner of one such shell is shown in Figure 2. The shell 40 has an end wall 43, and the corner illustrated has components of two of the side walls, 41 and 42.

In order to guide the shells slidingly together, shell 40 has an elongate projecting tongue 25, arranged in the normal direction, perpendicular to the plane of the interface between the shells, and parallel to the direction of sliding. This tongue 25 extends fully from the interface to the wall 43, along the inner surface of side wall 41. A similar tongue-shaped projection 21 is formed on the inner surface of the adjacent wall 42, except that this extends only part of the way from the interface towards the wall 43. The side wall 42 is also formed with an inner projection 22 which defines a groove, extending from the interface all the way down to the wall 43, and generally complementary in shape to the tongue-shaped projections 21 and 25. Further rectangular projecting shoulders 23, 24 are formed on the inner surface of the

projection 22, but these extend from the end wall 43 only part way towards the interface.

Each of these male projections 21 and 25, and the projection 22 with the female groove, co-operates with a complementary formation on the inner surface of the other shell. Tongue 25 co-operates with a groove similar to the groove formed in projection 22, and slides fully along the grooves when the shells are pushed together. Tongue 21 enters a corresponding groove, and abuts against corresponding shoulders, similar to shoulders 23 and 24, on a projection formed in the other shell. In this way, the tongue 21 assists in guiding the shells sliding together, and then acts as a stop, preventing further sliding movement, enhancing the crush-resistance of the assembled housing. The groove in projection 22 accommodates a complementary tongue in the other shell, similar to tongue 21.

The side wall 41 and the end wall 43 are also formed with the more complex projection 33. On the end wall 43, this comprises a stepped formation, the lower portion of which has a rectangular recess 25, and the upper portion of which has a prismatic projection 32. These arrangements are intended to accommodate components of the latch/actuator.

On the side wall 41, the projection comprises a step 31 and a hook-shaped projection 20, together defining an undercut groove extending transversely to the normal direction, and parallel to the interface plane. This groove is intended to accommodate a complementary hook-shaped projection formed on the corresponding wall of the other shell, so that the two formations interengage and interlock with a push fit as the two shells are slid together. Thus the projection from the other face (not shown) slides over the projection 20, resiliently deforming the wall 41 slightly as it does so, and then it slips into the groove between formations 20 and 31. This causes the push fit of one shell against the other shell, and it provides the interlock which prevents separation of the shells unless, of course, the projections are sheared forcibly. With a sufficient number of such interlock arrangements around the perimeter of the box, and with a sufficient length and strength of each interlock arrangement, an appropriate resistance to destructive separation can be provided.

All the formations 20, 21, 22, 23, 24, 25, 31, 32 and 33 described above are integral formations. The housing components are preferably formed as plastics mouldings. They may be strengthened by using metallic plates or other structural plates, secured to one or more of the walls of the or each shell. Further strengthening can be afforded by shrouding the housing with a further shell, partially or completely. In some cases, however, it may be convenient to make the entire housing from metal sheet, and to provide the appropriate formations by securing them to the inner surface of the sheet material, by riveting or otherwise.

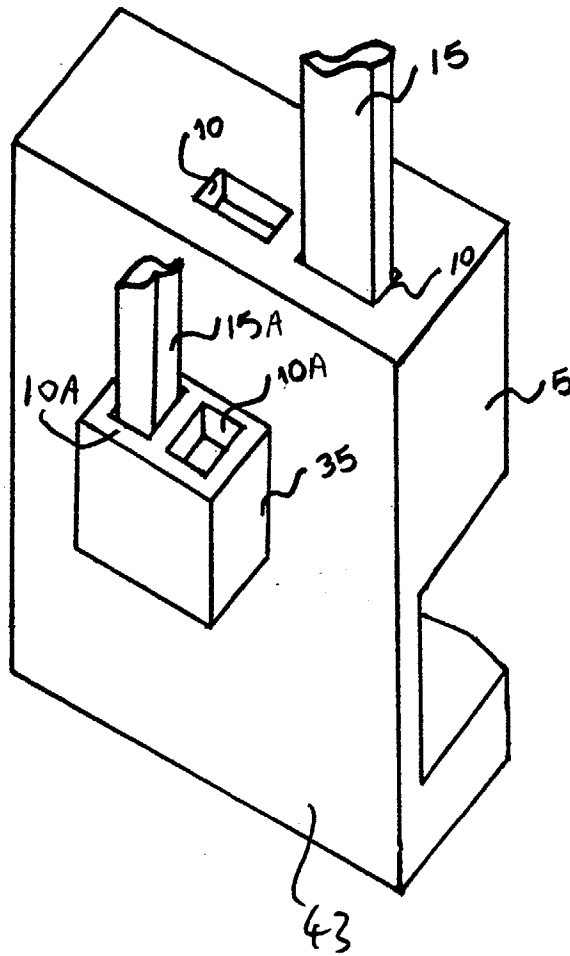
The rigidity of the housing may be enhanced, for example by corrugating one or more of the walls.

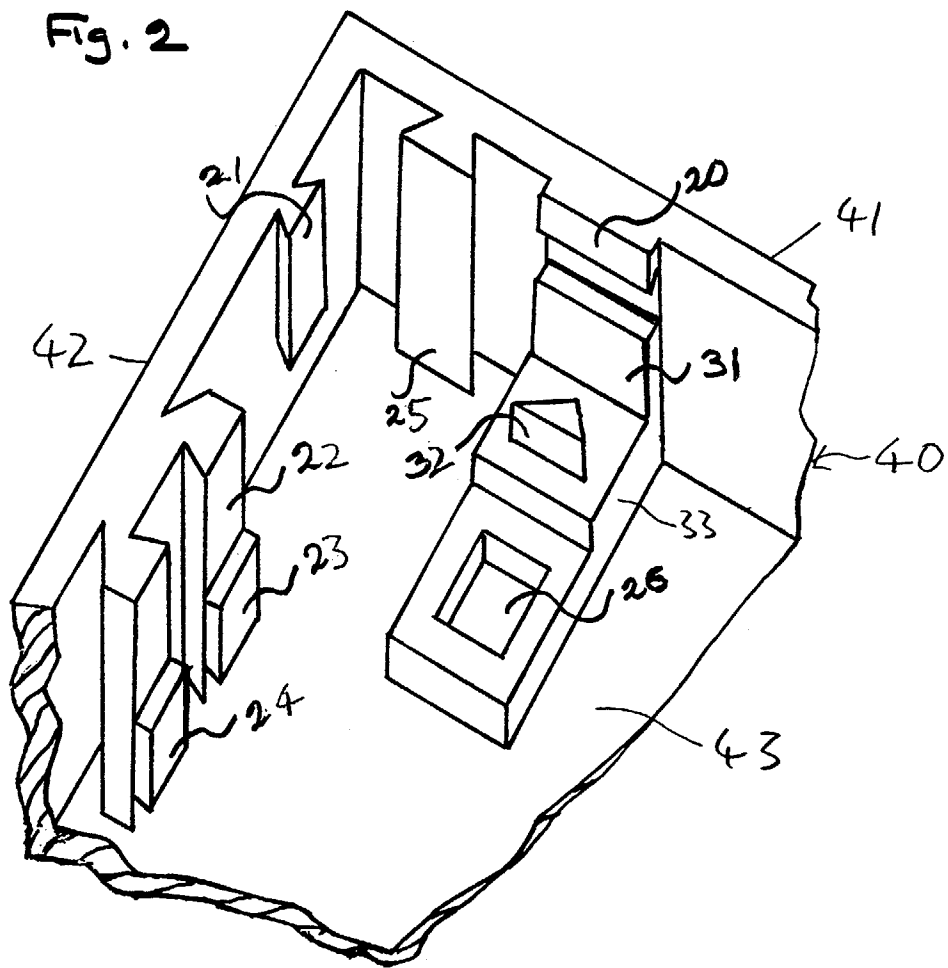
It will be appreciated that the example of Figures 1 and 2 is just one possibility of embodying the invention. There would be many alternative ways of providing an appropriate interlock between components of the housing, and many different ways of accommodating the latch/actuator components and of introducing extra rigidity torsion resistance and crash resistance in the assembly.

Claims

1. A housing (5) for an automobile latch or latch actuator, comprising two hollow shells which are arranged to mate along mutually-opposed edge surfaces of open faces of the shells thereby to form a closed housing, characterised in that at least one of the shells (40) has at least one opening (10) for an arm (15) to pass through between the latch or actuator and an exterior control, and in that one of the shells has internal integral locking formations (20) which are complementary with corresponding internal integral locking formations on the other shell when they are in mating engagement such that the shells are interlockable with a push fit and are then resistant mechanically to mutual separation without destruction of the integral formations.
2. A housing according to Claim 1, in which the said edge surfaces of the open faces of the shells are generally planar, and the shells are mutually engageable by a sliding push fit normal to the parallel planes of both said edge surfaces.
3. A housing according to Claim 2, in which the respective shells comprise mutually co-operative male and female internal integral formations (21, 22, 25) which are elongate in the said normal direction so as to guide the shells slidingly together.
4. A housing according to Claim 2 or 3, in which the locking formations comprise hook-shaped projections (20) extending transversely to the said normal direction such that they deform resiliently upon normal sliding engagement of the shells and they then interlock and prevent separation of the shells.
5. A housing according to any preceding claim, in which at least one of the shells comprises internal shoulder projections (23, 24) from its side walls (41, 42) whose edges define the said open face, which are arranged to abut against corresponding projections from walls of the other shell at the point of mating engagement of the shells, so that the shoulder projections resist further compression of the two shells together.
6. A housing according to any preceding claim, in which the two shells together define a box-shaped housing (5), each shell having four side walls and an end face, the edges of the four side walls being coplanar, and in which one shell has an external housing (35) projecting integrally from one of its side walls, the external housing having at least one opening (10A) for the passage of a further arm (15A) from the latch or actuator to an external control.
7. A housing according to any preceding claim, in which each shell is a unitary plastics moulding.
8. A housing according to any preceding claim, in which at least one of the shells is formed with at least one backing plate for strengthening.
9. A housing according to any preceding claim, in which at least one of the shells has at least one of its faces formed with corrugations so as to enhance its rigidity.
10. An automobile latch/actuator arrangement comprising a latch or latch actuator, at least one link arm (15) extending from the latch/actuator, and a housing (5) according to any of the preceding claims and enclosing the latch/actuator with the or each arm extending through its opening or openings (10,10A).

Fig. 1







European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 96 30 8392

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.6)	
X Y A	DE 717 309 C (LÜLING) * the whole document *	1,2,4 5-10 3	E05B9/02	
Y A	GB 2 275 497 A (KIEKERT GMBH CO KG) 31 August 1994 * page 2, line 4 - page 3, line 17 * * page 5, line 10 - page 7, line 28; figures *	5 1-3,6-8,10		
Y A	DE 85 21 379 U (KIEKERT GMBH & CO KG) 4 December 1986 * page 7, line 2 - page 8, line 29; figures *	6,10 1,7,8		
Y A	DE 705 503 C (SCHLOSSFABRIK SCHULTE SCHLAGBAUM A.G.) * the whole document *	7-9 1		
A	US 5 183 302 A (PELACHYK RICHARD ET AL) 2 February 1993 * column 2, line 20 - column 3, line 14; figures *	1,2,4,5		TECHNICAL FIELDS SEARCHED (Int.Cl.6)
A	GB 950 594 A (NYSTROM) * page 1, line 80 - page 2, line 123; figures 2,6 *	3		E05B
The present search report has been drawn up for all claims				
Place of search THE HAGUE		Date of completion of the search 5 March 1997	Examiner Henkes, R	
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 L : document cited for other reasons & : member of the same patent family, corresponding document		

EPO FORM 1501 03.92 (P04C01)