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Locks.

- A double cylinder assembly for a mortice lock has two key-rotatable plugs 2 in respective ends of a cylinder body 1, each adapted to turn a central thrower 8. The thrower 8 is made from two interfitting parts 14,17 which are assembled together so as to collectively define circumferential rims 16,19 embracing external annular flanges 5 formed on the inner ends of the plugs 2, the parts 14,17 being fastened together by means of a pin 22 through aligned lug extensions 15,18. By virtue of this assembly, any axial load which is applied to either plug 2 tending to extract it from the body 1 will be transferred through the thrower 8 to the other plug 2 and thereby firmly resisted, irrespective of the relative angular orientation of the plugs.

Fig.3.

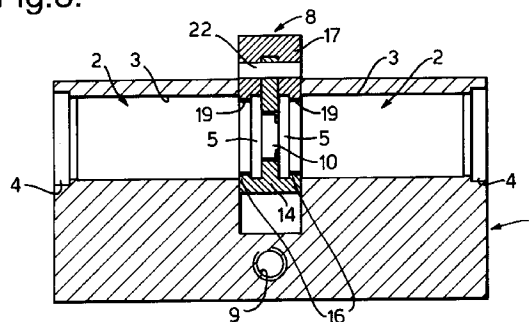
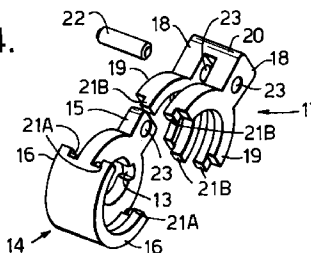


Fig.4.



The present invention relates to locks and particularly, though not exclusively, is concerned with double cylinder assemblies for mortice locks.

A typical double cylinder assembly comprises a cylinder body adapted to be mounted transversely through a lock case and bearing a central rotatable thrower (or "cam") for extending and retracting a bolt borne by the associated lock case in accordance with the sense in which the thrower is turned. At each end the body bears a cylinder mechanism comprising a rotatable plug and an array of pin, disc or other tumblers by which the respective plug is normally locked to the body. Insertion of a proper key into either plug, however, sets the respective tumblers to release the plug which can then be turned by the key to rotate the thrower. A clutch assembly associated with the thrower ensures that the released plug can be coupled rotationally to the thrower while the other plug remains locked to the cylinder body. The purpose of these cylinder assemblies is, obviously, to provide key operation of the associated lock bolt from both sides of the door or other closure to which the lock is fitted. In an alternative form, however, one of the cylinder mechanisms is replaced by a plug equipped with a knob or the like which can be turned freely by hand to permit operation of the bolt from one side without a key.

It is recognised that, in use, such cylinder assemblies may come under attack in an attempt to manipulate the associated lock bolt to its retracted position. Such attacks may involve the forcible extraction of the outside plug from the cylinder body, thereby providing access to turn the thrower with a suitable tool. Alternatively an attempt may be made to fracture the cylinder body itself, at the central part which bridges its two halves. This part of the cylinder body is usually the thinnest and hence weakest, because it is relieved to accommodate the rotation of the thrower. A tapped hole to receive a set screw to fix the cylinder assembly in the lock case also usually penetrates the cylinder body at this point, still further weakening it. If this part of the cylinder body can be fractured, then the whole of the outside half of the assembly may be extracted unless particular measures are taken in the construction of the assembly to counter this threat.

In Swiss patent specification No. 674543 there is disclosed a double cylinder assembly in which the two cylinder plugs are connected together axially through the thrower, so that an extraction force applied to either one of the plugs can be resisted by the other. A bayonet type of connection is made between the thrower and each cylinder plug, however, which means that axial loads can be transmitted between the plugs over only part of a complete revolution. In recognition of this, additional radial screws are used to locate the plugs axially in the cylinder body, increasing the overall cost and complexity of the assembly. The bayonet connections also apply constraints on the assembly procedure, meaning in particular that the installation

of the thrower must be integrated with that of the plugs.

The present invention seeks to provide a cylinder assembly having resistance to the forms of attack referred to above, while avoiding the drawbacks of the assembly disclosed in the aforesaid Swiss specification. Although developed principally with a view to double cylinder assemblies the invention may also be applicable to the security of single cylinder assemblies and embodiments of the latter are equally included within the scope of the invention.

In one aspect the invention accordingly resides in an assembly comprising a cylinder body having two end portions joined by an intermediate portion; a pair of plugs borne in respective end portions of said body, at least one such plug having an associated tumbler mechanism and being rotatable by a proper key; and a thrower adapted to be rotated by said rotatable plug(s), in a plane intersecting said intermediate portion of the body; wherein each plug is configured at its axially inner end with an external annular flange or the like projecting circumferential formation; and the thrower comprises two interfitting parts, assembled with the plugs from diametrically opposite positions, at least one and preferably both of said parts embracing the said formations of both plugs over a respective arc, and means fastening said two parts together; whereby, in use, an axial load applied to a said rotatable plug tending to extract the same will be transferred through said thrower to the other plug, irrespective of the relative angular orientation of the plugs.

In the case of a double cylinder assembly in accordance with the invention providing key operation from both sides, both of the aforesaid plugs will have associated tumbler mechanisms and be rotatable by the proper key. In the case of a double cylinder assembly in accordance with the invention providing key operation from one side and manual operation from the other side, the "other" plug will have no tumbler mechanism but will be equipped with a knob or the like similarly to known assemblies providing equivalent operation. In the case of a single cylinder assembly in accordance with the invention, the "other" end of the cylinder body may be suitably truncated and bear a fixed plug.

The invention will now be more particularly described, by way of example, with reference to the accompanying drawings, in which:-

Figure 1 is an axial cross-section through a preferred embodiment of double cylinder assembly in accordance with the invention;

Figure 2 is a section on the line II-II of Figure 1;

Figure 3 is a simplified axial cross-section through the assembly of Figure 1 with the thrower in course of rotation;

Figure 4 is an "exploded" view of the thrower components; and

Figure 5 illustrates the thrower in course of as-

sembly with the cylinder plugs.

With reference to Figures 1 and 2 the illustrated assembly comprises a machined cylinder body 1, in this example of "Europrofile" section, with a pair of identical cylinder plugs 2 mounted in respective bores 3 in opposite ends of the body. Each plug 2 has a front flange 4 received in the stepped entrance to the respective bore 3 and a rear flange 5 (see also Figure 3) of smaller diameter to permit endwise insertion of the plugs into their bores. Each half of the assembly incorporates a tumbler mechanism, which in the illustrated example comprises five rows of conventional two-part pin tumblers 6 and bias springs 7, although any known form of cylinder tumbler mechanism could be used. The tumblers 6, of course, serve to block the respective plug 2 against rotation in the body 1 unless they are set by a proper key to the respective positions in which their splits coincide with the shear line between plug and body, as is shown for the left-hand cylinder in Figure 1.

Mounted centrally of the assembly, between the plugs 2, is a rotatable thrower 8. As will be apparent to those skilled in the art, the assembly is in use mounted transversely through a mortice lock case so that the thrower 8 is positioned to extend and retract a dead bolt in accordance with the sense in which it is turned (through 360°). The assembly will be fixed in this position by means of a set screw passing from the forend of the lock case through a tapped hole 9 in the portion of the cylinder body 1 which bridges its two halves. More particularly, either one of the plugs 2 can be coupled rotationally to the thrower 8 at any time by means of a clutch assembly comprising a pair of rectangular-section elements 10 axially located by a rivet 11 but rotatable about the rivet independently of each other. Each clutch element 10 is received in a complementary non-circular recess 12 in the rear of a respective plug 2 (Fig.2) and the clutch as a whole can be shifted by the tip of a proper key inserted into either plug so that the clutch element for that plug also lies within a similar recess 13 in the thrower 8, thereby to transfer rotation from the plug to the thrower, while the other clutch element lies outside the thrower recess 13.

As thus far described, the construction and operation of the cylinder assembly is generally in accordance with known practice. The thrower 8, however, is of a novel construction to confer upon the assembly enhanced resistance to certain forms of forcing attack, as will now be described.

Referring to Figures 4 and 5, the thrower 8 is formed in two interfitting parts. The first part 14 has a central disc-like section formed with the clutch recess 13 and a lug extension 15, and two side sections each with an inwardly stepped rim 16 extending over an approximately 180° arc. The second part 17 has two side sections each with a lug extension 18 and an inwardly stepped rim 19 extending over an approxi-

mately 180° arc, and a web portion 20 joining the lug extensions 18. The thrower 8, together with the clutch assembly 10/11, is assembled with the cylinder plugs 2 as indicated in Figure 5, with the rims 16 and 19 of the parts 14 and 17 simply being passed, from diametrically opposite sides, over the flanges 5 on the ends of the plugs and the centre section of part 14 being received between the side sections of part 17 while the clutch elements 10 are received in the plug recesses 12. The ends of the thrower part rims are configured to interlock where indicated at 21A and 21B and the thrower assembly is finally secured by a roll pin 22 driven through aligned holes 23 in the lug extensions 15 and 18.

The resultant thrower 8 embraces the plug flanges 5 over their full circumferential extent, while permitting the necessary relative rotation between those components. Accordingly, if an attempt is made to forcibly extract one of the plugs 2 from its bore 3, or if the bridging part of the cylinder body 1 should become fractured and an attempt made to extract a complete half of the assembly, the axial connection between the plugs effected through the thrower means that the extraction forces can be firmly resisted by the other plug locked in the body 1, and irrespective of the relative angular orientation of the plugs.

Claims

1. A lock cylinder assembly comprising a cylinder body (1) having two end portions joined by an intermediate portion; a pair of plugs (2) borne in respective end portions of said body (1), at least one such plug (2) having an associated tumbler mechanism (6,7) and being rotatable by a proper key; and a thrower (8) adapted to be rotated by said rotatable plug(s) (2), in a plane intersecting said intermediate portion of the body (1); each plug (2) being configured at its axially inner end with a projecting circumferential formation (5); characterised in that the thrower (8) comprises two interfitting parts (14,17), assembled with the plugs (2) from diametrically opposite positions, at least one of said parts (14,17) embracing the said formations (5) of both plugs (2) over a respective arc, and means (22) fastening said two parts (14,17) together; whereby, in use, an axial load applied to a said rotatable plug (2) tending to extract the same will be transferred through said thrower (8) to the other plug (2), irrespective of the relative angular orientation of the plugs (2).
2. An assembly according to claim 1 wherein said projecting circumferential formations comprise substantially continuous annular flanges (5).
3. An assembly according to claim 1 or claim 2

wherein both of said parts (14,17) of the thrower (8) embrace the projecting circumferential formation (5) of both plugs (2) over a respective arc.

4. An assembly according to claim 3 wherein both of said parts (14,17) of the thrower (8) embrace the projecting circumferential formation (5) of both plugs (2) over a respective arc of approximately 180°. 5
5. An assembly according to any preceding claim wherein one (14) of the parts of the thrower (8) comprises a central disc-like section (13) with a lug extension (15) and two side sections (16) extending around part of the circumference thereof; the other (17) part of the thrower (8) has two spaced-apart part-circumferential side sections (19) each with a lug extension (18) and means (20) joining the lug extensions together; and the parts (14,17) are assembled by passing said central section (13) of the one (14) part between the side sections (19) of the other (17) part so that all three said lug extensions (15,18) are in registry and the side sections (16,19) of the parts (14,17) collectively define two substantially continuous circumferential rims. 10
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6. An assembly according to claim 5 wherein said two parts (14,17) of the thrower (8) are fastened together by means (22) extending through said lug extensions (15,18). 30
7. An assembly according to any preceding claim wherein both of said plugs (2) have associated tumbler mechanisms (6,7) and are rotatable by said proper key. 35
8. An assembly according to any one of claims 1 to 6 wherein the other of said plugs has no associated tumbler mechanism but is equipped with a manually-operable member for rotating the same. 40
9. An assembly according to any one of claims 1 to 6 wherein the other of said plugs has no associated tumbler mechanism and is borne by said body without being adapted to rotate said thrower. 45

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Fig.1.

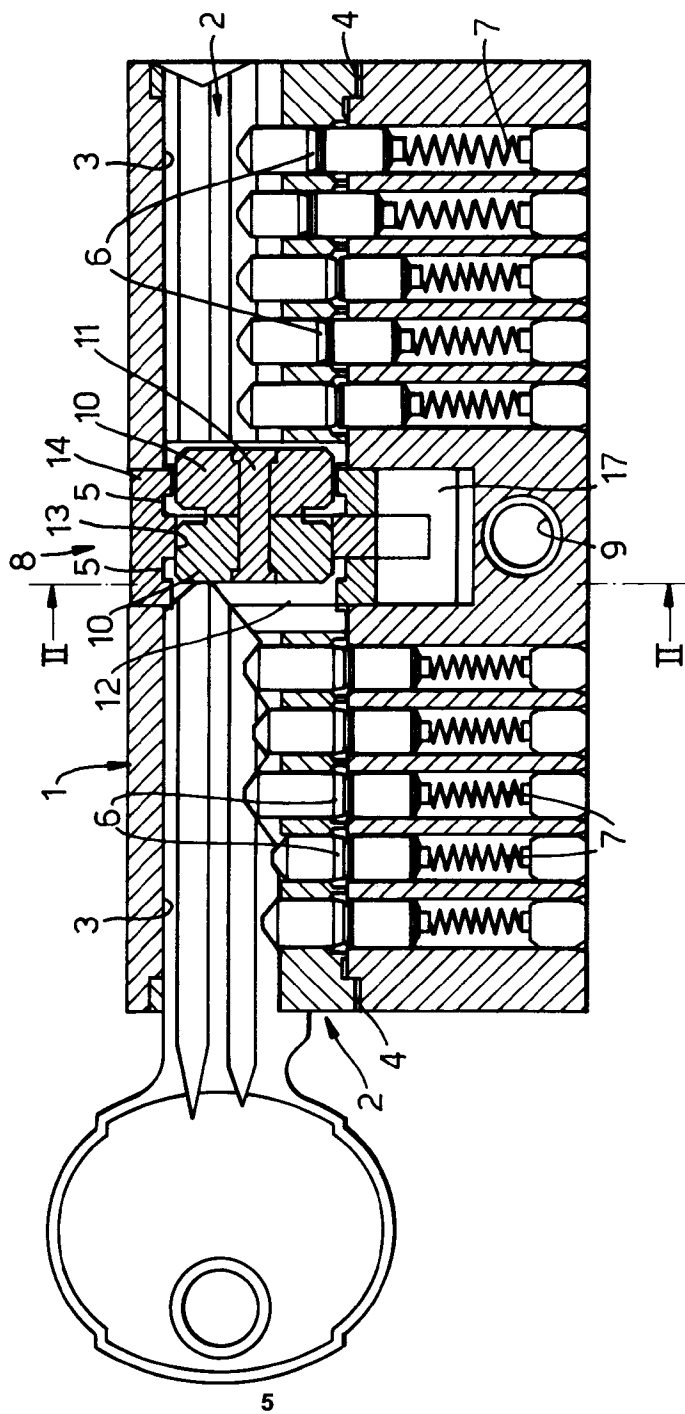


Fig.2.

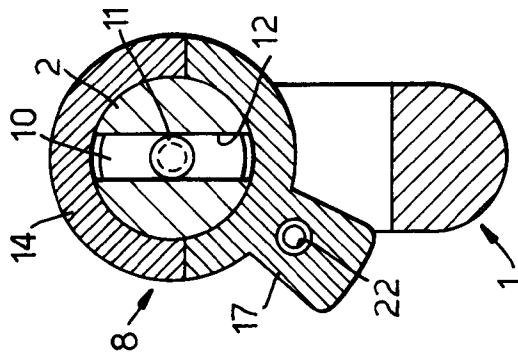


Fig.3.

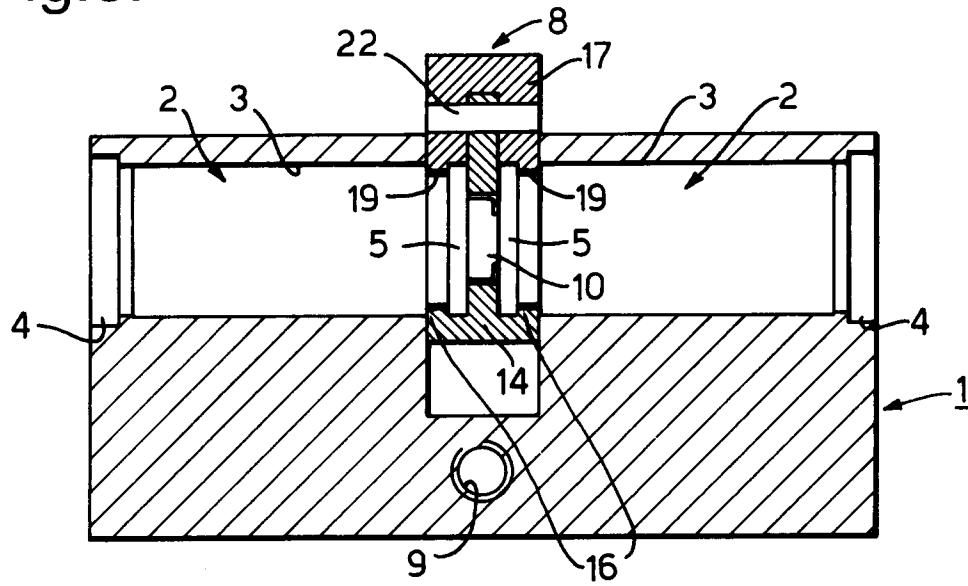
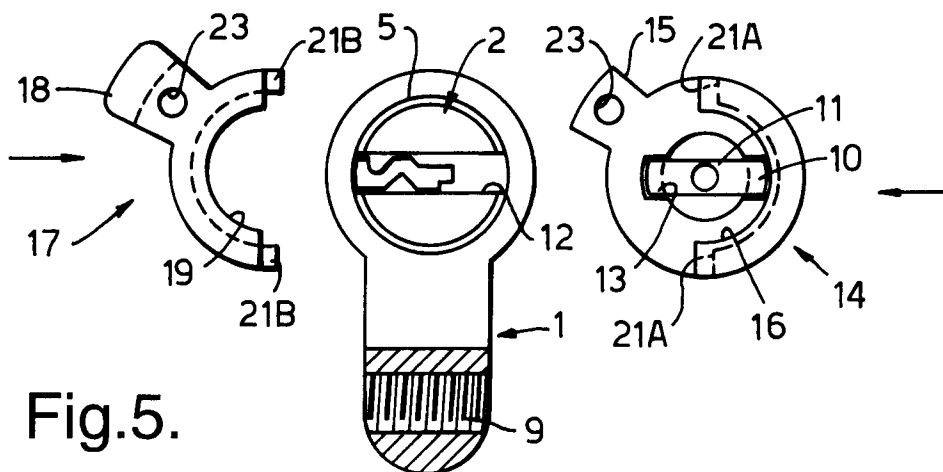
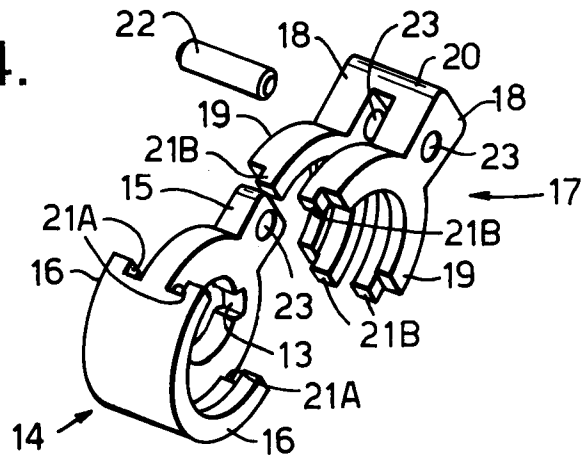


Fig.4.





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 95 30 2155

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	DE-A-34 18 680 (ZEISS IKON AG) 21 November 1985 * the whole document *	1-4,7	E05B9/10
X	DE-U-91 15 601 (IKON AG) 2 April 1992 * the whole document *	1-4,7	
X	DE-U-86 32 770 (BKS) 19 March 1987 * the whole document *	1-4,7	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			E05B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 8 June 1995	Examiner Verelst, P
CATEGORY OF CITED DOCUMENTS		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	
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