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(54) **Internal protector for locking cylinders**

(57) An internal protector (21) is provided for locking cylinders (20) that have their front part on the outside of the door and - in some cases - an external shield (32) and that have their rear part on the inside of the door, characterised in that it is a hollow body that completely surrounds the cylinder component (20), with the shape

of its internal part matching the shape of the cylinder (20) and being operationally situated in front of the rotating cam (30), having at least one blind channel (22) from the rear side, running longitudinally to the cylinder (20) and interacting with at least one corresponding protrusion (23) on the lower side of the cylinder (20).

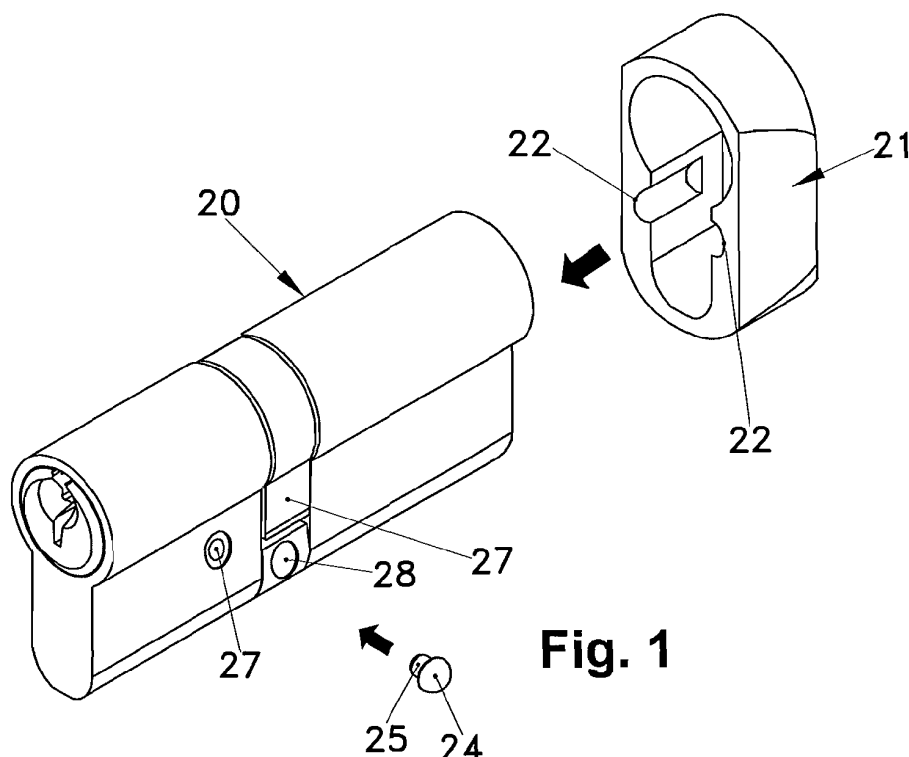


Fig. 1

Description

FIELD OF THE INVENTION

[0001] This invention concerns a device to provide security to protect against attempts to use aggressive methods to violate the cylinder of a lock that uses a set of pins to establish the code to open the lock.

[0002] Generally speaking, methods for violating locking cylinders aim - in one way or another, whether that method be destructive or non-destructive - to override the code established with the pins and thus to actuate the rotating cam that drives the lock mechanism until it opens or to act upon the fixation bore of the locking cylinder, specifically by causing it to buckle, whereby a plier-like tool is inserted and moved from the left to the right continuously.

PREVIOUS STATE OF TECHNOLOGY

[0003] As a result of limitations rotating to geometric issues and functional issues, cylinders with a pear-shaped or European profile have a weak central zone. This is because here the material of the block body of the lock cylinder has been removed to accommodate the rotating cam that acts on the lock and in addition there is a bore of at least 5 mm to accommodate the screw that will eventually fix the lock cylinder to the door.

[0004] The resulting section of resistant material is actually extremely weak when faced with vandalism of the type that occurs when the cylinder is gripped by its front with a plier-like tool and moved from right to left continuously until the lock cylinder breaks due to the fracturing of the aforementioned central part.

[0005] Structural reinforcement bars are used to act as security elements to protect against such vandalism. The solution of using a structural steel bar is, in principle, logical and straightforward, since it is a simple matter of replacing the material in the weak zone so that steel is used instead of brass, multiplying the torsion resistance in this zone by three. However, this solution has the disadvantage of moving the weak zone to the fixation system used to fix this structural bar to the rotor. This system consists of a fixation mechanism comprising transverse pins between the bar and rotor. Ultimately, these pins are built into a section of brass, which means that the connection point is still a weak zone.

DESCRIPTION OF THE INVENTION AND ITS ADVANTAGES

[0006] In light of the above, this invention now proposes an internal protector for locking cylinders that have their front part on the outside of the door and that sometimes have an external shield and that have their rear part on the inside of the door, **characterised in that** the protector has a hollow body that completely surrounds the cylinder, with the shape of its internal part matching

the outline of the cylinder, being operationally situated in front of the rotating cam and having at least one blind channel from the rear side, running longitudinally to the cylinder, which interacts with at least one corresponding protrusion on the lower side of the cylinder.

[0007] This configuration means that the internal protector remains at the front of the weak central zone where the rotating cam and fixation bore are located, completely surrounding the cylinder component in this area. The blind channel that runs longitudinally to the cylinder in the internal protector enables the accommodation of the protrusion determining the correct position of the internal protector on the cylinder. In this way, the amount of high-strength material in the weak zone of the cylinder is increased significantly and the entry of destructive tools is blocked. As a result of this extra thickness, professional thieves are prevented from accessing the fixation of the cylinder or the rotating cam from the outside using a plier-like gripping tool to exert force from the right to the left until the cylinder breaks due to the fracturing of the central part.

[0008] Along the same lines, another feature of this invention is that the said protrusion is an insert with a body that resembles a mushroom and a stalk, accommodated in a blind hole in the cylinder, making its incorporation and manufacture straightforward and economical.

[0009] This protrusion is inserted into a blind hole by means of pressure in front of the weak central zone of the cylinder at the optimum point to act upon the blind channel and thus entirely fix the internal protector to the cylinder, thus preventing the extraction of the internal protection shield from the outside by criminals. This means that the internal protector remains completely fastened at the front of the weak central zone, which is where the rotating cam and fixation bore are located. The protruding layout of the lock mechanism prevents the internal protector from moving backwards. In addition, the mushroom shape of the protrusion enables the accommodation thereof in the cylinder without requiring a deep bore while still securely fixing it into place.

DRAWINGS AND LEGEND

[0010] To better illustrate the nature of the present invention, the enclosed drawings show a representative manner of industrial realization as an example; they are purely illustrative and are not exclusive.

Figure 1 shows an exploded view of the invention, i.e. the internal protector (21) outside the cylinder (20) with an arrow indicating how it is inserted when assembled. An arrow also shows how the protrusion (23) that resembles a mushroom (24) and a stalk (25) is inserted into the blind hole (27) in the cylinder (20).

Figure 2 shows a view of the internal protector (21) when it is installed in the cylinder (20) but not yet in

its final position.

Figure 3 is a section of a side view of the frame of a door, with the internal protector (21) located in the cylinder (20).

Figure 4 is a top view of the internal protector (21).

Figure 5 shows a section of the cylinder (20) with the pin (26) and through-hole (28).

[0011] The numbers in these figures refer to the following components:

- 20.- Cylinder
- 21.- Internal protector
- 22.- Blind channel
- 23.- Protrusion
- 24.- Mushroom
- 25.- Stalk
- 26.- Pin
- 27.- Blind hole
- 28.- Through-hole
- 29.- Lock mechanism
- 30.- Rotating cam
- 31.- Fixation bore
- 32.- External shield

EXPLANATION OF PREFERRED REALIZATION

[0012] With regard to the drawings and legend listed above, the attached plans illustrate a preferred method of execution for the object of the invention, that being an internal protector (21) for lock cylinders (20) with its front part on the outside of a door and, in some cases, an external shield (32), and having a rear part on the inside of the door. As shown in Figures 1, 2, and 3, this invention is characterised by the fact that it is a hollow body that completely surrounds the cylinder (20), with the shape of its internal part matching the outline of the cylinder (20), being operationally situated in front of the rotating cam (30) and having at least one blind channel (22) from the rear side, running longitudinally to the locking cylinder (20), which interacts with at least one corresponding protrusion (23) on the lower side of the cylinder (20).

[0013] This configuration means that the internal protector (21) remains at the front of the weak central zone, completely surrounding the cylinder component (20), since thanks to the longitudinal layout of the blind channel (22) in relation to the cylinder (20), the protrusion (23) that enables the proper positioning of the internal protector (21) can be accommodated, i.e. in front of the rotating cam (30) and the fixation bore (31). In this way, the amount of resistant material in the weak zone of the cylinder (20) is increased significantly and the entry of destructive tools is blocked. As a result of this extra thickness, professional thieves are prevented from attacking the cylinder (20) from the outside with a plier-like gripping tool to exert buckling force until the cylinder breaks due to the fracturing of the central part and from attacking the rotating cam (30) to make it revolve and activate the lock-

ing mechanism (29).

[0014] In addition, the proposed internal protector (21), while being compatible with the use of an external shield (32), is ideal for use when the cylinder (20) needs to be protected from vandalism but the configuration of the mounting of the cylinder (20) in the door makes it impossible or difficult to install the external shield (32), for example due to the installation of backing plates for handles.

[0015] In accordance with the invention, note that in Figure 1 the internal protector (21) for the locking cylinder (20) is characterised by the fact that the protrusion (23) is an insert with a body that resembles a mushroom (24) and a stalk (25), accommodated in a blind orifice (27) of the cylinder (20). This mushroom-shaped protrusion (23) is inserted into a blind hole (27) in front of the weak central zone of the locking cylinder (20) at the optimum point for it to interact with the blind channel (22), thus fixing the internal protector (21) on the cylinder (20) at the best possible point, i.e. as a shield for the rotating cam (30) and fixation bore (31). Thanks to the blind channel (22), the internal protector (21) cannot be extracted from the outside of the building as the perpendicular wall of the blind channel (22) acts as a stop. Furthermore, the protruding layout of the lock mechanism (29) prevents the internal protector (21) from moving backwards.

[0016] As is clearly shown in Figure 4, the internal protector (21) for the locking cylinder (20) differs in that there are preferably two blind channels (22) that can be used to accommodate two corresponding protrusions (23) on the lock cylinder (20).

[0017] As can be seen in Figure 5, the internal protector (21) for the locking cylinder (20) is **characterised in that** the protrusion (23) has a pin (26) which, when accommodated in a through-hole (28), is long enough to cross the body of the cylinder (20) and is retained by pressure resulting from the difference in the diameters of the pin (26) and through-hole (28) or by being riveted to the material of the cylinder (20) surrounding the through-hole (28) where the pin (26) is accommodated.

[0018] The function of the pin (26) is not only to retain the internal protector (21) so that it cannot be extracted from outside; in addition, it acts as an element that makes it more difficult to grip the cylinder (20) with a tool with intent to commit vandalism in installations where the door housing available to house the cylinder (20) is not large enough to cover the internal protector (21).

Claims

1. Internal protector (21) for locking cylinders (20) that have their front part on the outside of the door and - in some cases - an external shield (32) and that have their rear part on the inside of the door, **characterised in that** it is a hollow body that completely surrounds the cylinder component (20), with the shape of its internal part matching the shape of the cylinder

(20) and being operationally situated in front of the rotating cam (30), having at least one blind channel (22) from the rear side, running longitudinally to the cylinder (20) and interacting with at least one corresponding protrusion (23) on the lower side of the cylinder (20). 5

2. Internal protector (21) for locking cylinders (20) in accordance with the first claim but **characterised in that** this protrusion (23) is preferably an insert with a body that resembles a mushroom (24) and stalk (25) accommodated in a blind hole (27) on the cylinder (20). 10
3. Internal protector (21) for locking cylinders (20) in accordance with the first claim but **characterised in that** the protrusion (23) is a pin (26) which, when accommodated in a through-hole (28), is long enough to cross the body of the cylinder (20) and is retained by pressure resulting from the difference in the diameters of the pin (26) and through-hole (28) or by being riveted to the material of the cylinder (20) surrounding the through-hole (28) where the pin (26) is accommodated. 15 20 25
4. Internal protector (21) for locking cylinders (20) in accordance with any of the previous claims but **characterised in that** it shall preferably have two blind channels (22) that can accommodate two corresponding protrusions (23) on the locking cylinder (20). 30

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