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(54) Securing a lock barrel to a vehicle door.

(57) A securing clip 32 is used to secure a lock barrel 24 in a vehicle door. The barrel 24 is inserted through an aperture in the door and the clip 32 is then put on the back of the barrel and rotated to perform a locking function. The securing clip has two portions, one of which 36 rotates to perform the locking so that lugs 46 on this portion engage under shoulders 48 on the lock barrel.

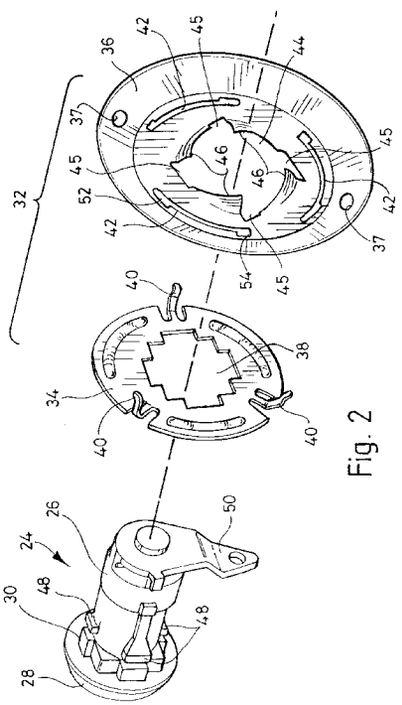

Fig. 2

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This invention relates to an arrangement for securing a lock barrel to a vehicle door.

Vehicle door lock barrels and the surrounding area of the vehicle door are targets for thieves. Thieves may try to force the lock barrel out of the vehicle door, or they may try to pierce the door skin to obtain direct access to the door latch operating cables and rods inside the door.

It is an object of the invention to make it more difficult for thieves to defeat the door lock system.

According the present invention there is provided a securing clip for securing a lock barrel to a vehicle door, the clip comprising a first portion adapted to fit over the shank of a lock barrel and to engage non-rotatably therewith, and a second portion also adapted to fit over the shank but able to rotate relative to the shank, the second portion having radially inwardly directed lugs which can be rotated to engage behind the shoulders on the lock barrel.

Preferably the radially inwardly directed lugs extend axially as well as radially and are tapered in a circumferential direction so that as the second portion is rotated, the lugs perform a camming action against the shoulders to pull the head of the lock barrel against the surface of the door.

The second portion preferably has a circular periphery of diameter substantially larger than that of the lock barrel head. The second portion is preferably also dished so that its outer periphery is spaced away from the inner surface of the door skin.

The second portion is also preferably made of spring steel.

The first and second portions may be interengageable to form a single security clip, and axially extending arms on the first portion can engage in circumferentially extending slots in the second portion so that the possible rotation of the second portion relative to the first is limited by the length of the slots. The slots may also include notches into which the arms can fit at the end of the rotational movement, thus preventing accidental rotation of one component relative to the other in an unintended direction.

The arrangement is adapted for use with a vehicle door construction where the door has an outer skin in which the lock barrel is mounted, the outer skin being pierced by a non-round hole the shape of which is complementary to a non-round formation formed on the lock barrel shank below the head. The first portion of the securing clip may also have a complementarily shaped aperture so that it can also be held against rotation by engagement on the shaped part of the lock barrel.

The invention extends to an arrangement for securing a lock barrel to a vehicle door, the arrangement comprising a lock barrel having a head, a shank and radially extending shoulders around the shank, the cross-sectional area of the head being larger than that of the shank so that the shank and shoulders can pass through an aperture in a door through which the head cannot pass, the arrangement also including a security clip which has a first portion adapted to fit over the shank and to engage non-rotatably therewith, and a second portion also adapted to fit over the shank but able to rotate relative to the shank, the second portion having radially inwardly directed lugs which can be rotated to engage behind the shoulders on the lock barrel.

As a result of some or all of the features set forth above, improved lock security can be achieved. In particular the presence of the first securing clip portion immediately behind the door outer skin helps to prevent thieves destroying the edges and corners of the non-round aperture in the door panel and therefore helps to prevent the lock barrel being rotated bodily. The presence of the second portion of the securing clip, behind the door skin makes it more difficult for a thief who pierces the door skin to obtain access to any door latch operating components inside the door.

The arrangement also facilitates mounting of the lock barrel on the door because the barrel can be located in place without the use of tools. The barrel may then be secured by rotating the second portion of the securing clip with the aid of a tool.

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

Figure 1 is a schematic illustration of a vehicle door;

Figure 2 is an exploded view of a lock barrel securing arrangement in accordance with the invention;

Figure 3 shows a non-round aperture in the door skin; and

Figures 4 & 5 show two sequential stages in the fitting of the lock barrel securing arrangement of the invention.

The vehicle door shown in Figure 1 has an outer door skin 12 on which a door handle 14 is mounted. Below the handle 14 is a lock barrel aperture 16. Above the handle is a window 18. An inner door skin panel 20 is mounted behind the external skin 12 and the two panels are clinched together around their periphery. A door latch 22 is mounted in the inner panel 20.

Figure 3 shows the shape of the lock barrel aperture 16 in more detail. It will be seen that this shape is non-round and has a number of surfaces 15 and corners 17 which will resist any attempt to rotate a lock barrel inserted through the aperture, about the axis of the barrel.

The lock barrel itself is shown at 24 in Figure 2. The barrel has a shank 26 and a head 28. Behind the head 28 is a shaped shank portion 30 the shape of which is complementary to the shape of the aperture 16 so that when the barrel is inserted through the

aperture 16 the shaped portion 30 engages with the edges of the aperture to resist rotation.

The axial extent of the shaped portion 30 on the lock barrel is greater than the thickness of the external skin 12 so that once the barrel has been inserted through the door skin, part of the shaped portion 30 extends into the interior of the door. This shaped area is used to retain a securing clip 32 in a manner that will now be described.

The securing clip comprises two parts, namely a first portion 34 and a second portion 36. The first portion 34 is generally flat, in the form of a disk with a central aperture 36 having a shape complementary to that of the shaped portion 30 of the lock barrel shank. When the first portion 34 is fitted over the shank 26 and onto the shaped portion 30, it will be prevented from rotating.

The first portion 34 also has punched out axially extending arms 40. These arms extend through correspondingly positioned slots 42 in the second portion 36. The portion 36 can therefore rotate relative to the portion 34, to the angular extent dictated by the length of the slots 42. The arms 40 also hold the two portions together so that they can be handled as a single unit 32.

The second portion has a central aperture 44, the periphery which is bounded in part by squared notches 45 and in part by lugs 46.

In addition to the shaped portion 30 the shank 26 also has radially extending shoulders 48. When the securing clip 32 is fitted over the shank, the notches 45 in the second portion 36 can fit over the shoulders 48. When the second portion is rotated relative to the first portion, in a clockwise direction as seen in Figure 2, a narrow end of each lug 46 enters behind each shoulder 48 and as rotation continues a wider part of the lug engages behind the shoulder 48 so that when the rotation is complete the shape of each lug 46 (see Figure 4) produces a clamping force between all the components and the result of this clamping force is that the head 28 of the lock barrel is pulled up firmly against the outer surface of the outer skin panel 12.

When the assembly is complete and the lock barrel is secured to the vehicle door as shown in Figure 5, various security advantages are achieved.

The Figures show that the lock barrel is fitted at its inner end with an actuating lever 50. When the correct key is inserted in the lock barrel and turned, then the actuating lever 50 will be turned to actuate a latch which holds the door closed and/or locked. Figure 5 shows that the diameter of the second securing clip portion 36 is larger than the radial extent of the lever 50 so that if a thief penetrates through the skin panel 12 one side of the lock, he will still be prevented from reaching the lever 50 by the presence of the clip portion 36. Since the clip portion 36 will be made of spring steel, it will be difficult for the thief to penetrate this component.

Furthermore the presence of the first clip portion 34 immediately behind and backing up the aperture 16 will make it more difficult for a thief to interfere with the edges of the aperture, that is to free the lock to make the lock rotate as a whole.

In order to provide a seal between the head 28 of the barrel and the door panel 12, a hard plastic washer 29 will normally be placed between these components.

The securing clip 32 has two opposite end positions. In its first end position the clip can be slipped over the end of the barrel shank 26 with the notches 45 aligned with the shoulders 48 and with the shaped portion 30. The two clip portions 34 and 36 will initially be retained in this assembly position by engagement of the arms 40 in an enlarged portion 52 at one end of each slot 42.

To secure the lock barrel in the door the second portion 36 is rotated using a tool which locates in the tool engagement holes 37 in the second portion 36, and when full rotation is achieved, resulting in complete securing of the barrel in the door, the arms 40 will drop into a second recess 54 at the opposite end of the slot 42 and this will prevent the two portions of the securing clip from coming undone during normal vehicle operation.

The clip described thus allows easy assembly and gives good security against attempted forcing of the lock or destruction of the associated vehicle lock components.

Claims

1. A securing clip for securing a lock barrel to a vehicle door, the clip comprising a first portion (34) adapted to fit over the shank (26) of a lock barrel and to engage non-rotatably therewith, and a second portion (36) also adapted to fit over the shank but able to rotate relative to the shank, the second portion having radially inwardly directed lugs (46) which can be rotated to engage behind the shoulders (48) on the lock barrel (24).

2. A clip as claimed in Claim 1, wherein the radially inwardly directed lugs (46) extend axially as well as radially and are tapered in a circumferential direction so that as the second portion (36) is rotated with the clip positioned around a lock barrel, the lugs perform a camming action against shoulders (48) of the lock barrel to pull the head (28) of the lock barrel (24) against the surface of the door.

3. A clip as claimed in any preceding claim, wherein the second portion (36) is dished so that, in use, its outer periphery is spaced away from the inner surface of the door skin.

4. A clip as claimed in any preceding claim, wherein the first and second portions (34,36) are made of spring steel.

5. A clip as claimed in any preceding claim, wherein the first and second portions (34,36) are inter-engageable to form a single security clip (32), and axially extending arms (40) on the first portion (34) engage in circumferentially extending slots (42) in the second portion so that the possible rotation of the second portion relative to the first is limited by the length of the slots.

6. A clip as claimed in Claim 5, wherein the slots (42) include notches (54) into which the arms (40) can fit at the end of the rotational movement, thus preventing accidental rotation of one component relative to the other in an unintended direction.

7. An arrangement for securing a lock barrel to a vehicle door (12), the arrangement comprising a lock barrel (24) having a head (28), a shank (26) and radially extending shoulders (30,48) around the shank, the cross-sectional area of the head being larger than that of the shank so that the shank and shoulders can pass through an aperture (16) in a door through which the head cannot pass, the arrangement also including a security clip (32) which has a first portion (34) adapted to fit over the shank (26) and to engage non-rotatably therewith, and a second portion (36) also adapted to fit over the shank but able to rotate relative to the shank, the second portion having radially inwardly directed lugs (46) which can be rotated to engage behind the shoulders (48) on the lock barrel (24).

8. An arrangement as claimed in Claim 7, wherein the second portion (36) has a circular periphery of diameter substantially larger than that of the lock barrel head (28).

9. A vehicle door with a lock barrel secured to the door, wherein the door has an outer skin (12) in which the lock barrel (24) is mounted, the outer skin being pierced by a non-round hole (16) the shape of which is complementary to a non-round formation (30) formed on the lock barrel shank below the head, and wherein the lock barrel is secured to the door by a clip (32) as claimed in any one of Claims 1 to 6.

10. A vehicle door as claimed in Claim 9, wherein the first portion (34) of the securing clip has a complementarily shaped aperture so that it can be held against rotation by engagement on the shaped part of the lock barrel.

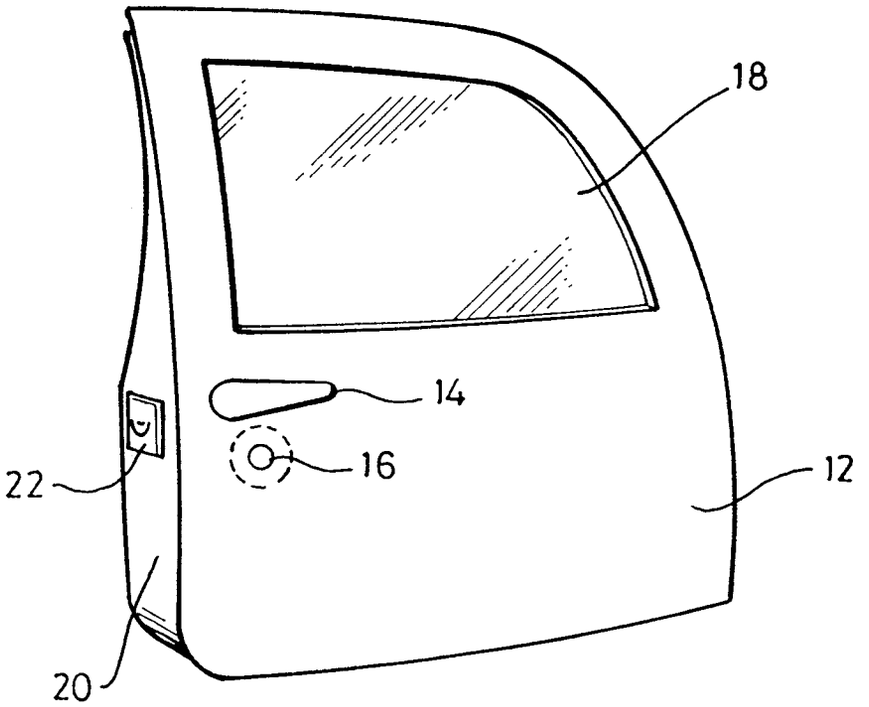

Fig. 1

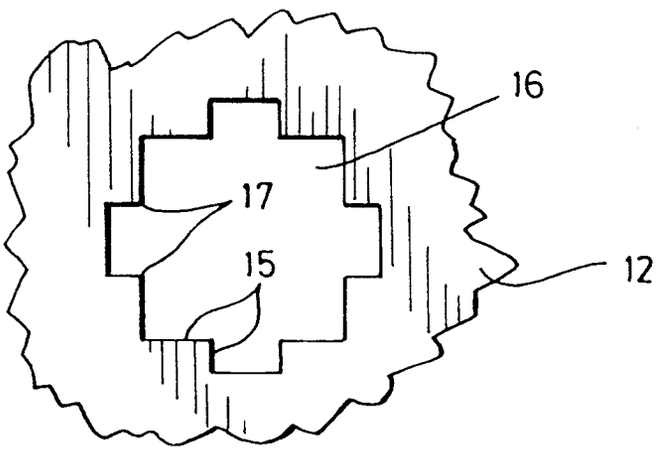

Fig. 3

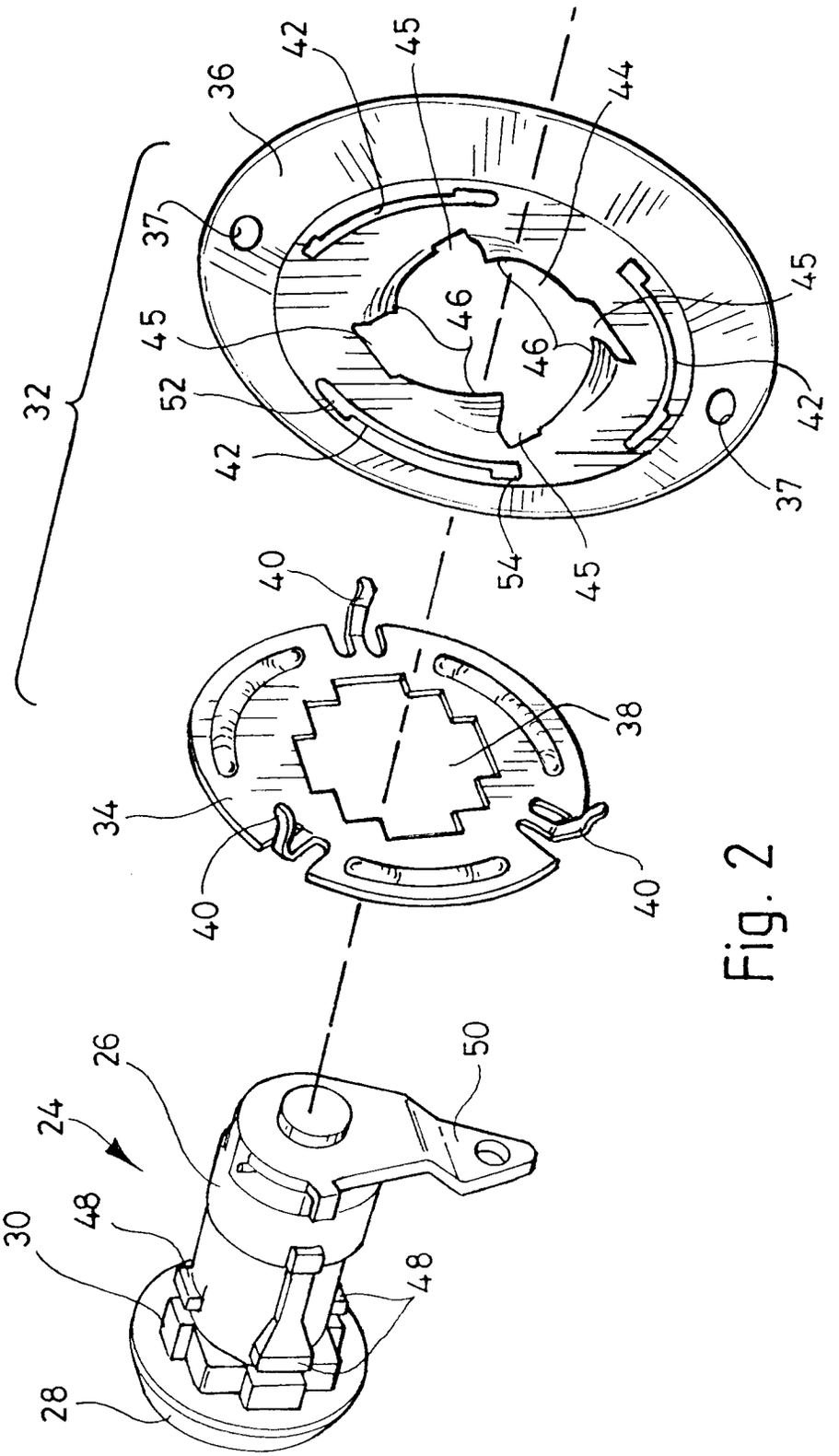
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Fig. 2

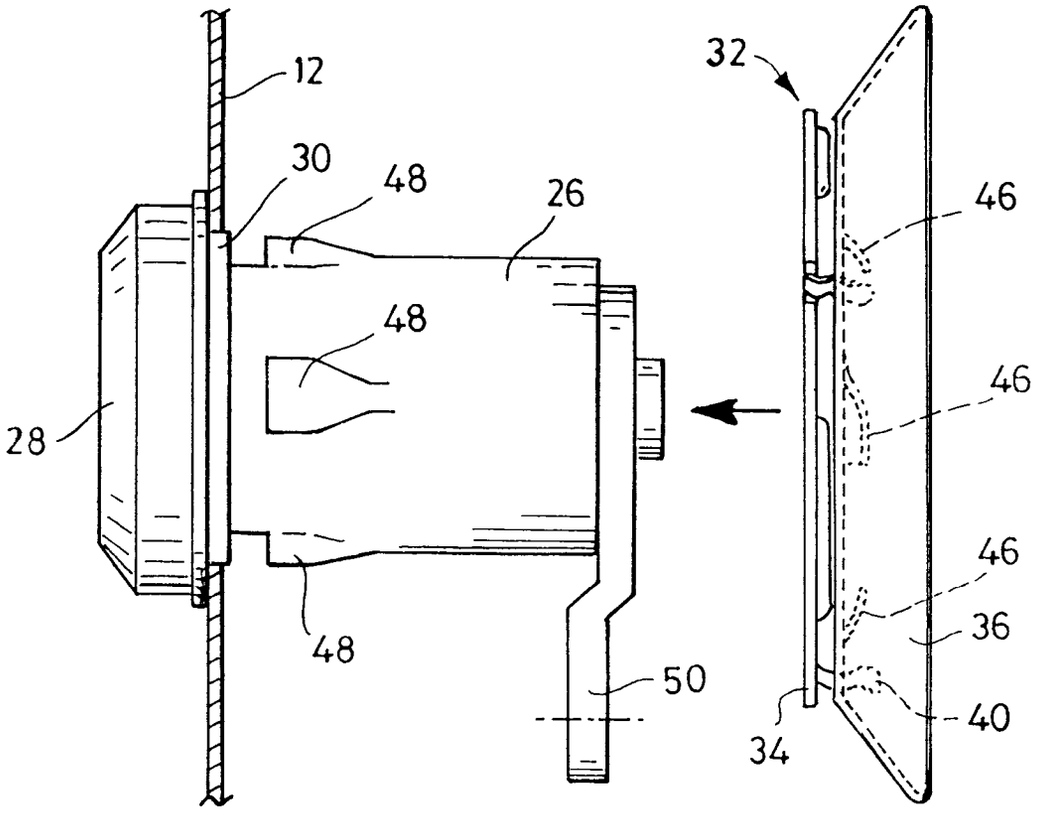

Fig. 4

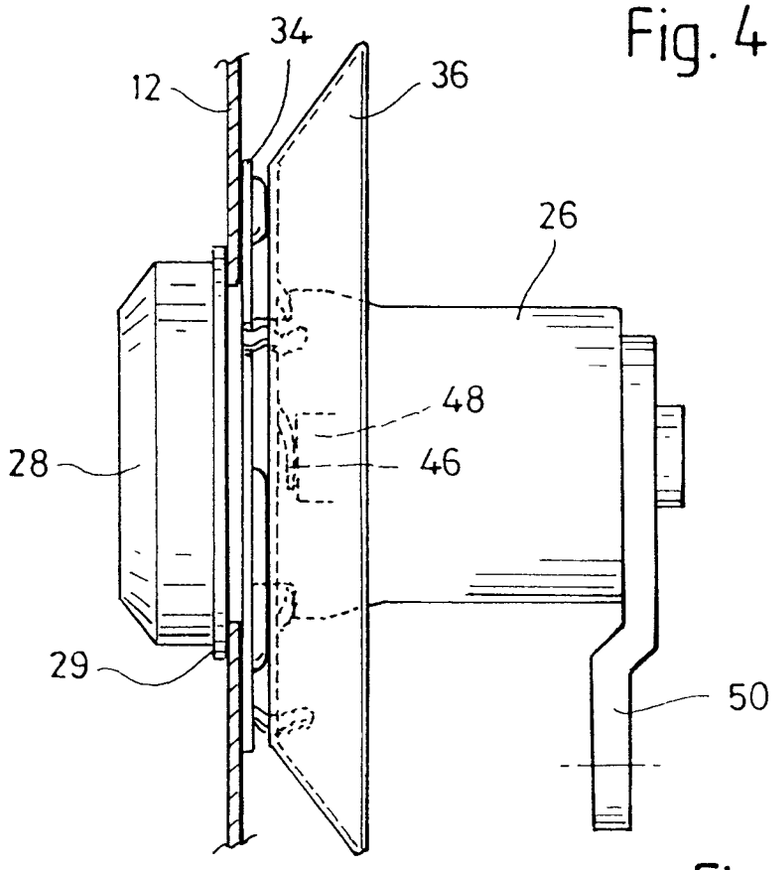

Fig. 5