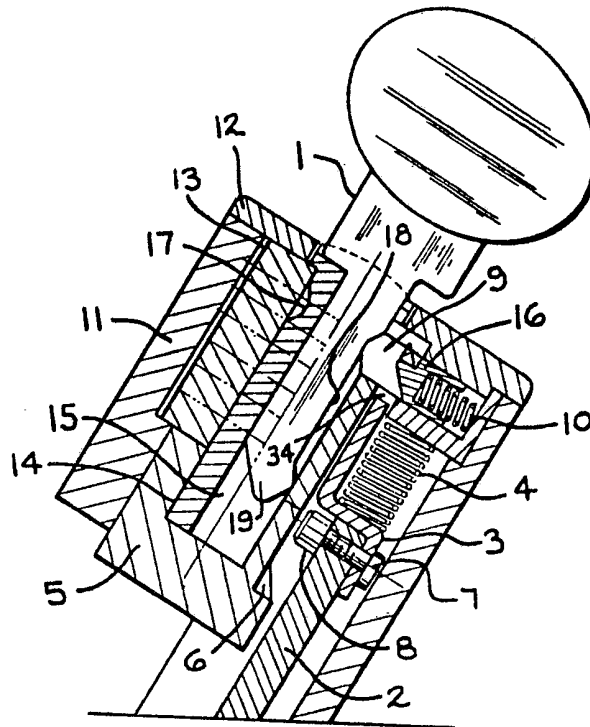


(21) Application No 7922491  
(22) Date of filing 28 Jun 1979  
(23) Claims filed 28 Jun 1979  
(30) Priority data  
(31) 68521  
(32) 28 Jun 1978  
(33) Italy (IT)  
(43) Application published  
16 Jan 1980  
(51) INT CL<sup>3</sup>  
E05B 65/12  
(52) Domestic classification  
E2A 404  
(56) Documents cited  
GB 1480708  
GB 1403867  
(58) Field of search  
E2A  
(71) Applicants  
Champion Spark Plug  
Company, 900 Upton  
Avenue, Toledo, Ohio,  
United States of America.  
(72) Inventor  
Giuseppe Maiocco  
(74) Agents  
Marks & Clerk

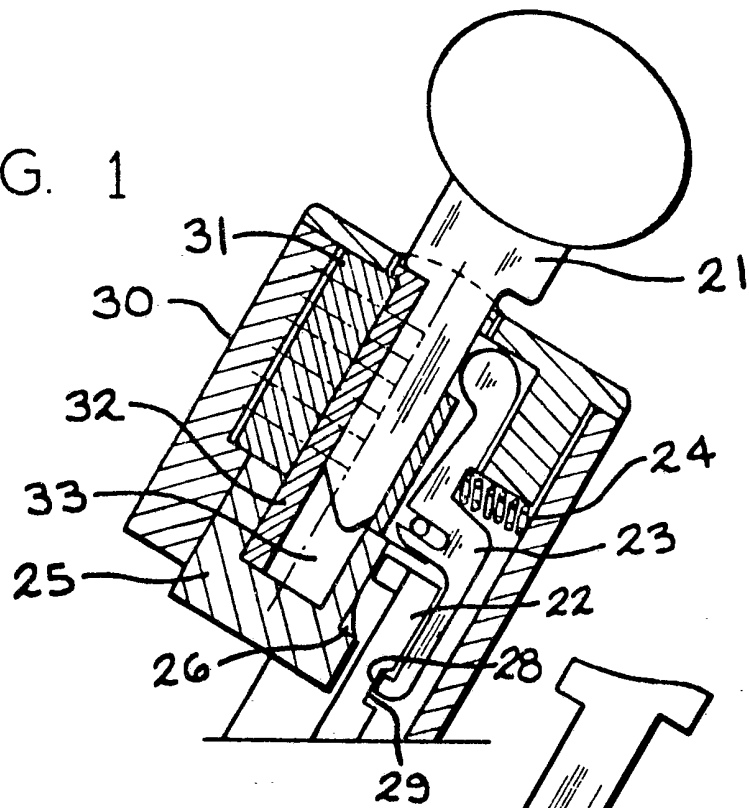
(54) **Steering column locks**

(57) A motor vehicle steering column lock including a sliding latch (2) mounted for movement between a position in which it locks the steering column and a withdrawn, non-locking, position and a secondary latch (16) comprising a slidable cam (9) having a camming surface which extends into the key slot (15) when the latter is rotationally aligned therewith and the sliding latch (2) is in the position in

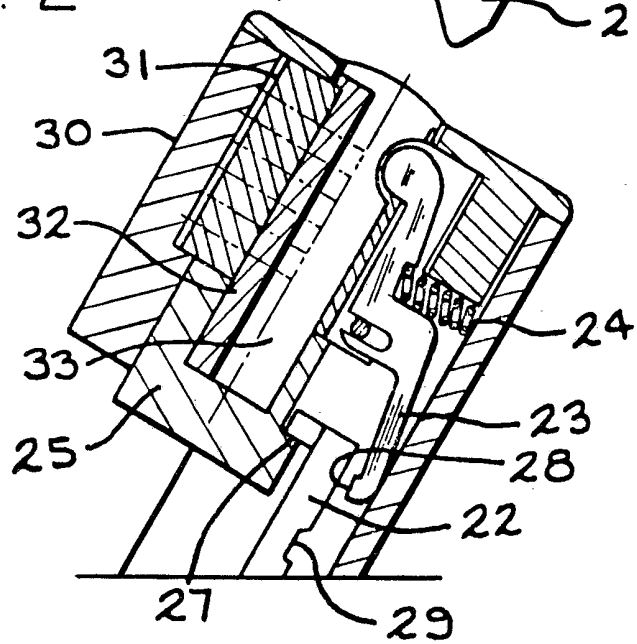
which it locks the steering column. A co-operating key (1) has a recess (18) in its rear side which receives said camming surface (38) when the key (1) is fully inserted in the key slot (15). The key (1) also has a camming surface (19) near its end which is operable when the key (1) is removed from the key slot (15) by co-operating with the camming surface of the slidable cam (9) to slide the latch (16) to a position in which it is not operable to lock the sliding latch (2).

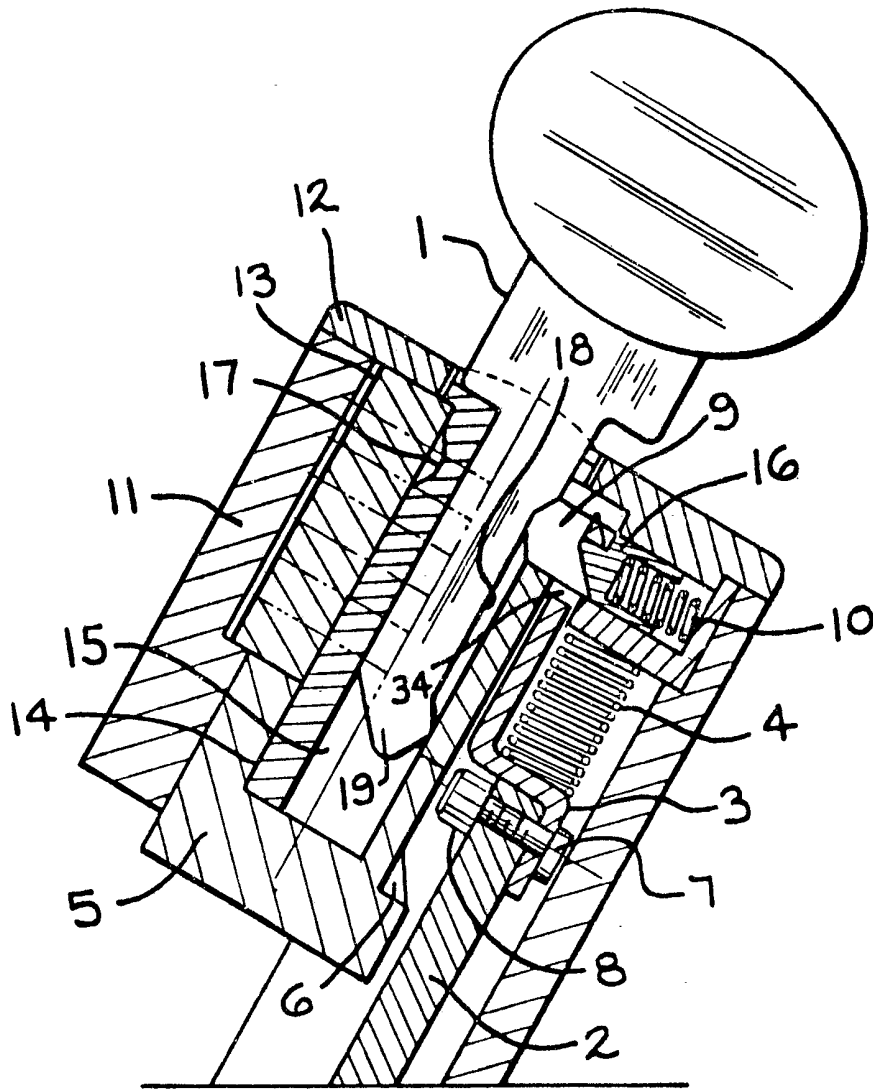


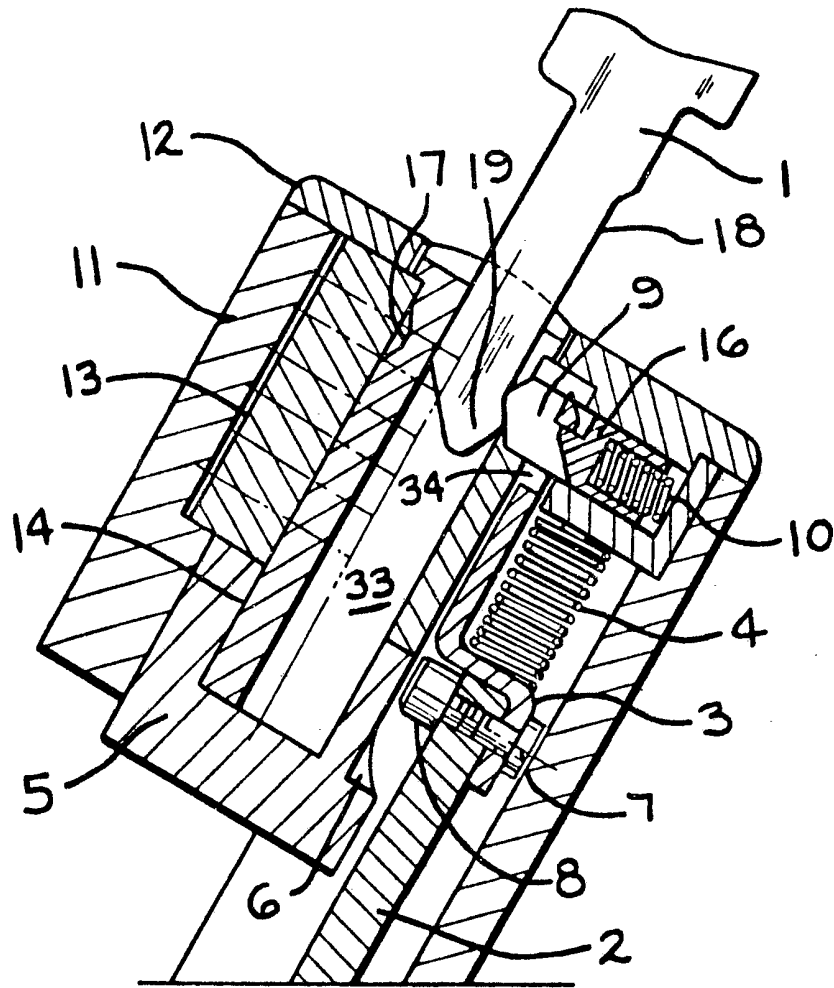
—FIG. 1



—FIG. 2

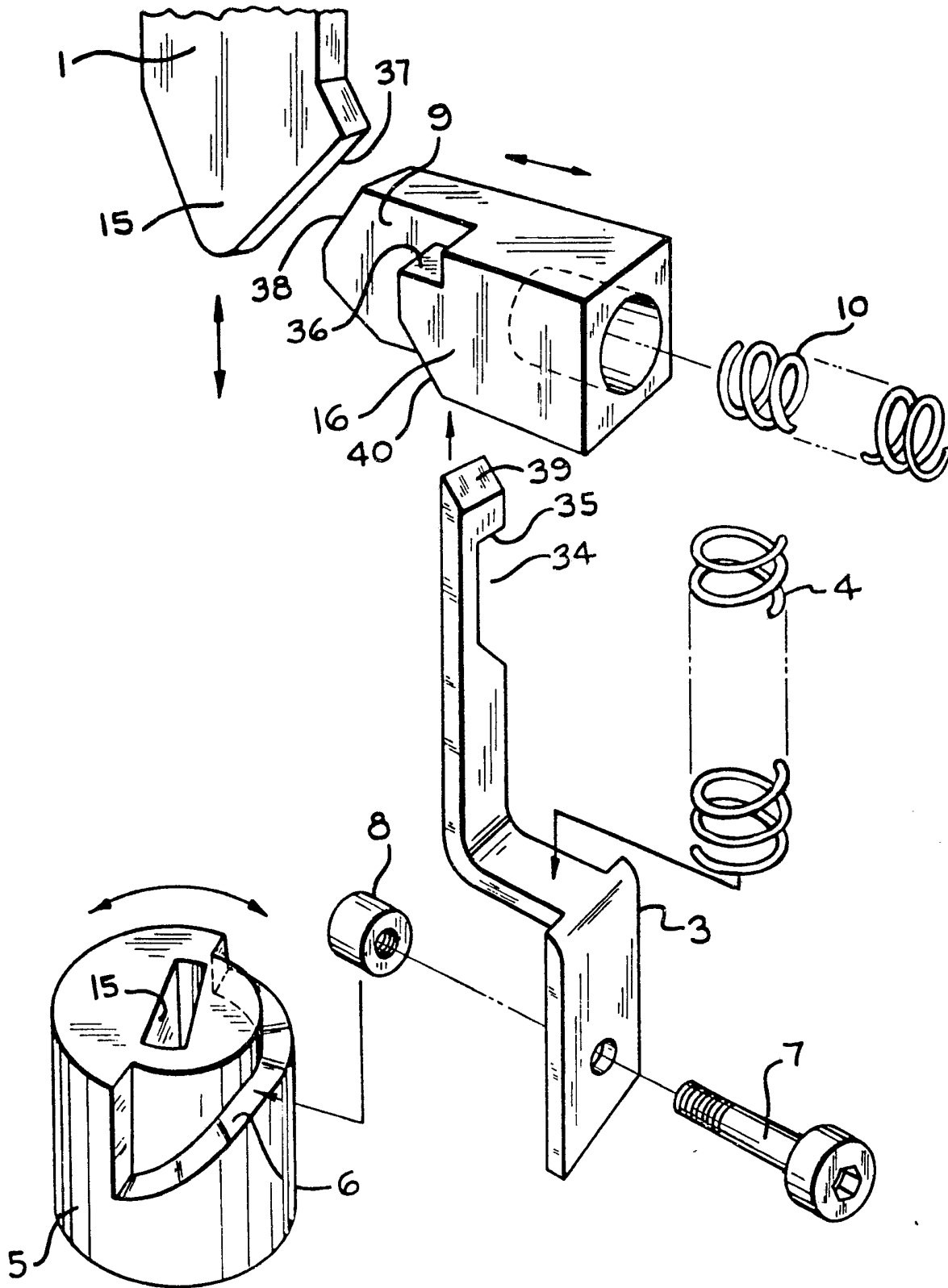






—FIG. 4





—FIG. 7

## SPECIFICATION

**An improved anti-theft device**

This invention relates to an anti-theft device of the type that locks the steering column of an associated motor vehicle when the ignition switch of the vehicle is turned to the stop position and the ignition key is removed. Anti-theft devices of the indicated type are known, being shown in Figs. 1 and 2 of the attached drawings, and in U.S. Patent No. 3,566,635. In devices of the indicated type, the ignition key, as it is turned, may successively place the switch in the positions: stop, garage, running and starting.

When the switch is in the stop position the steering column of the associated vehicle is locked when the ignition key is removed. Reinserting the key, when the switch is in the stop position, does not unlock the steering column, turning the key and the switch to the garage position being necessary to accomplish unlocking.

As indicated above, the steering column is unlocked when the key is inserted and turned to rotate the ignition switch to the garage position; it remains unlocked when the switch is turned by the key to the running and starting positions, being locked again only when the switch is turned by the key to the stop position and the key is removed from its slot.

In a typical anti-theft device of the type exemplified by Figs. 1 and 2 of the drawings of the present application and by the previously identified U.S. patent, the locking mechanism which is actuated by a key 21 (figs. 1 and 2) comprises a latch 22 mounted for sliding longitudinal movement between a first position, shown in Fig. 2, in which it locks the steering column of the associated motor vehicle and a withdrawn position, shown in Fig. 1, in which it is ineffective to lock the steering column, a spring (not illustrated) which urges the latch 22 toward the first position, and a second latch 23 which is operable in the position shown in Fig. 1 to lock the sliding latch 22 in its second position, but inoperable in the position shown in Fig. 2 to prevent the sliding latch 22 from moving to its first position. In both of Figs. 1 and 2 the device is in the lock position. As shown in Fig. 1, the key 21 prevents a spring 24 from moving the latch 23 to the position shown in Fig. 2 which is the position the latch 23 assumes upon removal of the key 21. It will be noted that the latch 23 has released the latch 22 and that the latter has moved downwardly and to the left into its first position where it locks the steering column (not illustrated) of an associated motor vehicle. In order to return the device from the position shown in Fig. 2 to that shown in Fig. 1 it is necessary to reinsert the key 21, to rotate at least as far as the garage position, and then to rotate it back to the stop position. Rotation of the key 21 to the garage position causes rotation of a cylinder 25 having a camming surface 26; a cam follower 27 rides the cam surface 26 and raises the sliding latch 22 from the position shown in Fig. 2 to that shown in

Fig. 1 upon such rotation of the key 21. When the sliding latch 22 reaches the position shown in Fig. 1 a finger 28 of the latch 22 is urged by the spring 24 into a locking groove 29 of the sliding latch 22 so that the latter is locked in the position shown in Fig. 1 until the key 21 is again removed when the device is in the stop position. The device of Figs. 1 and 2 also includes an exterior housing 30 within which are mounted a lock cylinder 31 and a cylinder core 32 which is rigidly attached to the cylinder 25 and has therein a key slot 33.

The present invention consists in an anti-theft device comprising a latch that is mounted for sliding longitudinal movement between a first position in which it locks the steering column of an associated motor vehicle and a withdrawn position in which it is ineffective to lock the steering column, means urging the latch toward the first position, a lock cylinder mounted within an exterior housing, a cylinder core having a key slot, and within the lock cylinder body, a control cam connected to the cylinder bore, an ignition key operable, when inserted in the cylinder core and rotated to cause the cylinder bore and the cam to rotate, means associated with the cam operable to move the latch, when in the first position to the withdrawn position as the cylinder core and cam are rotated, a second latch operable in a first position to lock the sliding latch in its withdrawn position and movable to a second position in which it is not operable to lock the sliding latch, and means urging the second latch toward the first position, characterized in that the second latch comprises a slidable cam having a camming surface which extends into the key slot when the latter is rotationally aligned therewith and said latch is in the first position and a co-operating key having a recess in its rear side which receives said camming surface when the key is fully inserted in the key slot, said key also having a camming surface proximate its end, and operable when said key is removed from the key slot, in co-operation with the camming surface of said slidable cam when in the key slot, to slide the second latch to its second position.

In the accompanying drawings:—

Fig. 1 is a fragmentary sectional view showing a prior art anti-theft device in an unlocked position.

Fig. 2 is a view similar to Fig. 1, but showing the device in its locked position after removal of a key therefrom.

Fig. 3 is a fragmentary sectional view of a device according to the invention shown in its unlocked condition, with the key in the stop position.

Fig. 4 is a view similar to Fig. 3, but showing the key being withdrawn from its slot.

Fig. 5 is a view similar to Figs. 3 and 4, but showing the device in its locking position, with the key fully removed from its slot.

Fig. 6 is a view showing the position of a cam follower which is a part of the device shown in Figs. 3 to 5 at various rotational positions of a cylinder core which is a part of the device of Figs.

3 to 5 that rotates with the key.

Fig. 7 is an exploded view showing the essential elements of the device of Figs. 3 to 5.

A preferred anti-theft device according to the present invention (Fig 3) comprises an ignition key 1, a latch 2 operable, as subsequently described in more detail, a lock 3 for the latch 2 and a spring 4 which urges the latch 2 and associated elements of the apparatus away from the position shown in Fig. 3 where the latch 2 is not effective to lock the steering column of an associated vehicle toward one (shown in Fig. 5) where the latch 2 is effective so to lock.

Referring again to Fig. 3, the device also includes a cylinder 5 having a camming surface 6; the lock 3 is fastened to the latch 2 by a headed rod 7 which is threaded at the end opposite its head to receive a cam follower 8 which co-operates with the cam 6 in a manner subsequently described in more detail. The entire device is enclosed within a housing 11 which has a cover 12 and also includes a lock cylinder 13 and a cylinder core 14 which is rigidly attached to the cylinder 5 and has therein a key seat 15.

The latch 2 is locked in the position shown in Fig. 3 by a sliding lock 16 having a cam portion 9 and urged longitudinally away from the outer housing 11 by a spring 10.

The cylinder core 14 has a peripheral recess 17 which receives the cam 9 of the lock 16 without causing the former to be moved toward the housing 11 when the key 1 and the cylinder core 14 are rotated as subsequently discussed in more detail. The key 1 has a recess 18 in its back so that the cam 9 is not urged by the key 1 toward the housing 11 when the key and the cylinder core 14 are in the rotational position shown in Figs. 3 to 5 and a cam at an end 19 which drives the cam 9 of the lock 16 toward the housing 11 as the key is removed from the key slot 15 of the cylinder core 14, thereby disengaging the locks 3 and 16. The device is shown in Fig. 4 with the cam at the end 15 of the key 1 about to engage the cam 9 of the lock 16; in this view, the latch 2 is in its withdrawn position, out of locking engagement with the steering column of an associated vehicle (not illustrated). In Fig. 5, the key 1 is shown withdrawn from the key slot 15, and with the latch 2 moved by the spring 4 to its locking position.

The operation of the device according to the invention, as shown in Figs. 3 to 5, will be more readily understood by reference to Fig. 7 where the lock 3 is shown below the sliding lock 16; this corresponds with its position as shown in Fig. 5 after the key 1 has been withdrawn from the key slot 15. It will be noted that the lock 3 has an opening 34 with an upper surface 35 capable of locking engagement against a surface 36 of the sliding lock 16.

When the key 1 is moved into the key slot 15 of the cylinder core 14 (not shown in Fig. 7), a camming surface 37 thereof bears against a camming surface 38 of the cam 9, moving the sliding lock 16 to the right in Fig. 1. This motion is only incidental, performing no function except that

of enabling insertion of the key 1. When the key 1 has been inserted an appropriate distance into the slot 15 of the cylinder core 14, rotation thereof from the stop position to the garage position

causes rotation of the cylinder core 14 (not shown in Fig. 7), and, with it, of the cylinder 5. Rotation of the cylinder 5 causes the cam follower 8, which, when the device is assembled, is resting on the cam surface 6, to move upwardly, carrying with it the lock 3 and causing a camming surface 39 thereof to engage a camming surface 40 of the sliding lock 16, moving the latter to the right in Fig. 7 and holding it there until the surface 35 of the lock 3 clears the surface 36 of the sliding lock 16, whereupon the spring 10 moves the sliding lock 16 to the left in Fig. 7, thereby supporting the lock 3 and the attached latch 2 (not shown in Fig. 7) in the position where the latter is out of locking engagement with the steering column of an associated vehicle.

The relationship between the position of the cam follower 8 and the rotational position of the key 1 and the cylinder core 14 are shown in Fig. 6. When the key is removed from its key slot 17 the cam follower 8 drops to the position designated 41, and the latch 2 moves to the locked position. As the key is reinserted in its slot 15 the position of the cam follower 8 does not change, but as the key is rotated, after insertion, the cam follower rises as indicated by a line 42 to the height indicated by a line 43. As indicated by the dashed circles numbered 44, 45 and 46 the cam follower 8 remains at the height indicated by the line 43 with subsequent rotation of the key in either direction, remaining at that height until the key is first rotated so that the cylinder core is in the stop position and then removed from the key slot 15. Upon removal of the key from the slot 15 the cam follower 8 drops to the position designated 41.

In Figs. 3 to 5 the device of the present invention is shown with the key slot 15 aligned with the cam 9 so that the latter extends therethrough. With rotation of the key from the position shown in the recess 17 (Fig. 3) in the cylinder core 14 becomes important because it receives the cam 9 in the other rotational positions without causing the sliding lock 16 to move to the right in Fig. 7 to break the locking engagement between the surfaces 35 and 36.

## 115 CLAIMS

1. An anti-theft device comprising a latch that is mounted for sliding longitudinal movement between a first position in which it locks the steering column of an associated motor vehicle and a withdrawn position in which it is ineffective to lock the steering column, means urging the latch toward the first position, a lock cylinder mounted within an exterior housing, a cylinder core having a key slot, and within the lock cylinder body, a control cam connected to the cylinder bore, an ignition key operable, when inserted in the cylinder core and rotated to cause the cylinder bore and the cam to rotate, means associated with the cam operable to move the latch, when in the



- first position, to the withdrawn position as the cylinder core and cam are rotated, a second latch operable in a first position to lock the sliding latch in its withdrawn position and moveable to a
- 5 second position in which it is not operable to lock the sliding latch, and means urging the second latch toward the first position, characterized in that the second latch comprises a slidable cam having a camming surface which extends into the
- 10 key slot when the latter is rotationally aligned therewith and said latch is in the first position and
- 15 a co-operating key having a recess in its rear side which receives said camming surface when the key is fully inserted in the key slot, said key also having a camming surface proximate its end, and operable when the said key is removed from the key slot, in co-operation with the camming surface of said slidable cam when in the key slot, to slide the second latch to its second position.
- 20 2. An anti-theft device substantially as described with reference to, and as illustrated in Figs. 3 to 7 of the accompanying drawings.