April 11, 1967 H. WOLTER 3,313,132

STEERING-WHEEL LOCK PROVIDED WITH AN IGNITION SWITCH

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Fig. 1

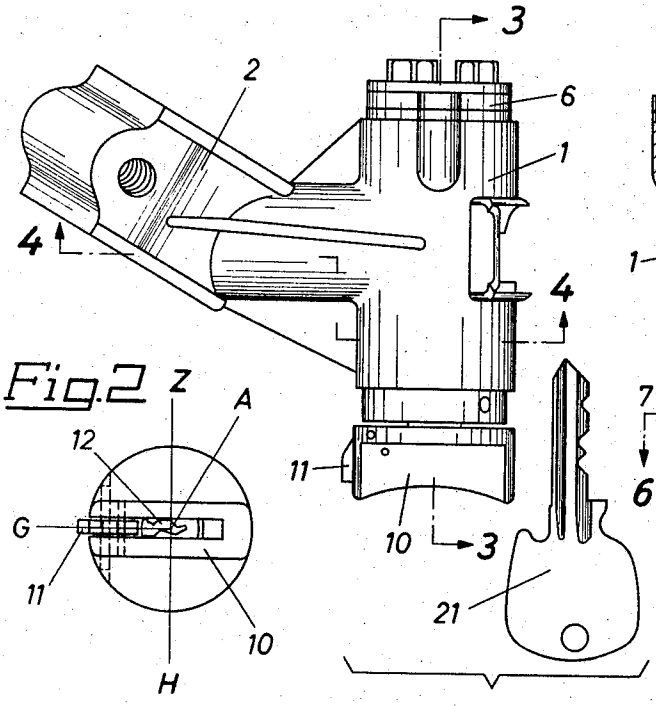


Fig. 3

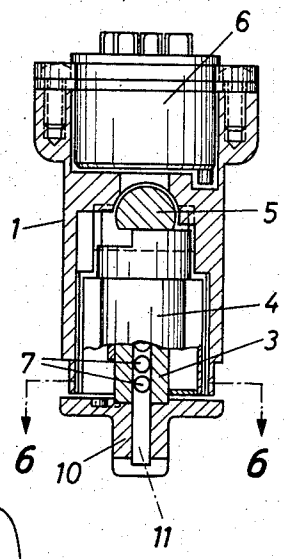


Fig. 2

Fig. 4

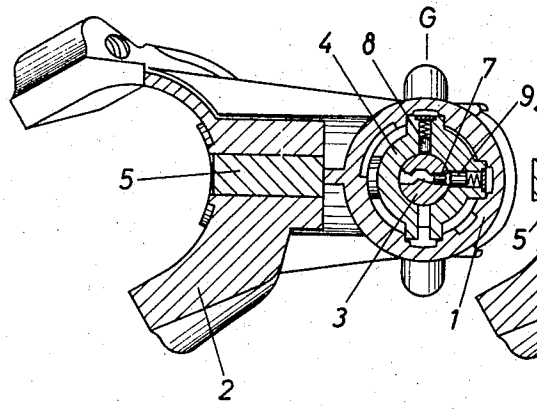
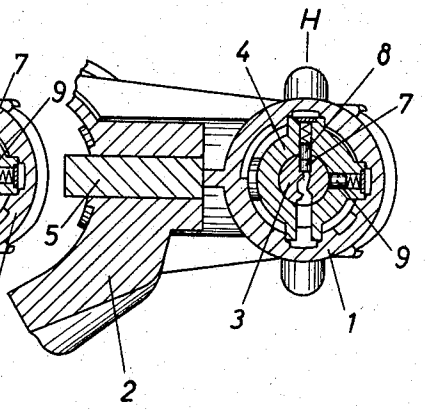


Fig. 5



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STEERING-WHEEL LOCK PROVIDED WITH AN IGNITION SWITCH

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Fig. 6

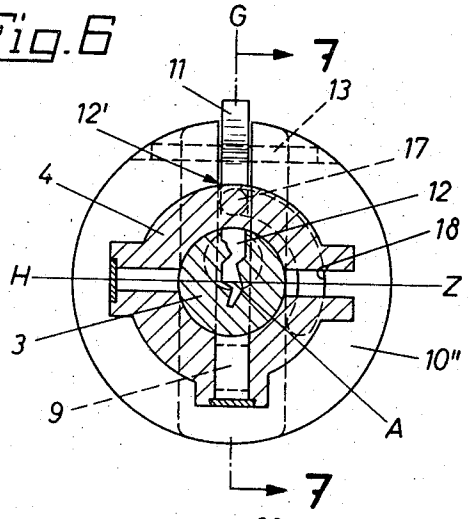


Fig. 7

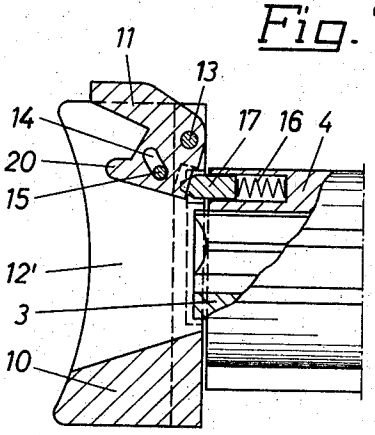


Fig. 8

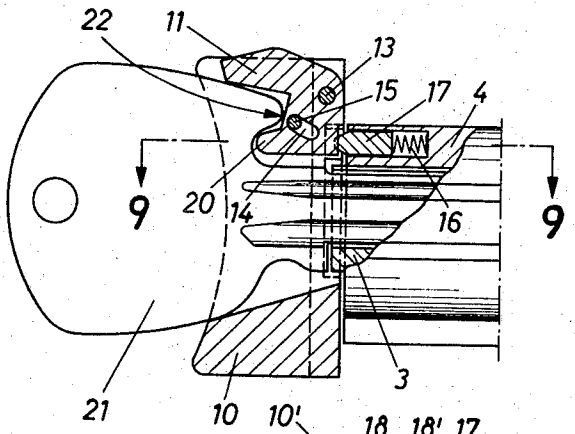
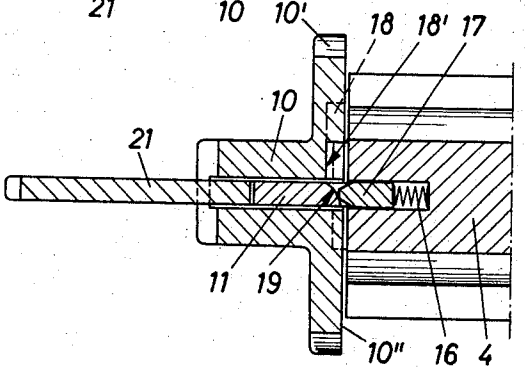


Fig. 9



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STEERING-WHEEL LOCK PROVIDED WITH AN IGNITION SWITCH

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8 Claims. (Cl. 70—252)

The present invention relates to a steering-wheel lock for vehicles for locking the operation of the steering wheel, and fitted with an ignition switch.

The present invention is based on the known expedient of intentionally locking, in a steering-wheel lock operable by a rotary cylinder the transition from a "driving" position and a "garage" or "parking" position to a "stop" position. These known locking devices depend, however, upon a key to be inserted (see German Patent No. 737,645). This arrangement is disadvantageous since the same key is usually used for the glove compartment and the luggage trunk of the vehicle, so that car owners thus do not like to leave the key with third persons.

It is one object of the present invention to provide a steering-wheel lock provided with an ignition switch which eliminates these and other drawbacks of hitherto known structures, is simple in construction and has a foolproof operation.

It is another object of the present invention to provide a steering-wheel lock provided with an ignition switch, wherein the steering-wheel lock is equipped with a rotary cylinder, and permits the conversion from the above-mentioned locking position into the "stop" position without insertion of a key; while, however, the conversion from the "stop" position into the "locking" position is possible only with the use of a key.

It is still another object of the present invention to provide a steering-wheel lock provided with an ignition switch, wherein the rotary cylinder is connected at its end face with a rotary handle, a key being rotatably mounted in the handle. The key enters them into engagement with a spring-biased locking pin guided in the housing of the cylinder lock in the "garage" position. Upon operation, the locking pin is released from a groove which bridges the angle between the "garage" position, over the "driving" position, to the "ignition" position, the groove being provided on a disc disposed on the rotary handle.

This arrangement results in the novel and advantageous operation whereby the steering-wheel lock can be brought into the "garage" position, and the key can be removed, without locking the steering shaft. It is then possible for the garage operators to move about the car by switching the ignition switch into "ignition" and "driving" position by making use of the rotary handle. Furthermore, after this movement of the vehicle, it is furthermore possible for the garage operators to secure the vehicle in the "stop" position, whereby by rotation of the handle upon operation of the key, the steering shaft being locked in the "stop" position. The rotation of the cylinder lock to the opening position is thereafter possible only by using the key. This operation brings about an increased security of the vehicle protection; simultaneously, however, a locking, releasable only intentionally, is achieved for the switching rotation directed towards the "stop" position of the lock, so that an inadvertent or helpless conversion from the "garage" position into the "stop" position is avoided.

It is yet another object of the present invention to provide a steering-wheel lock provided with an ignition switch, wherein the key is equipped with a nose, against which a stop provided on the lock key abuts, when the latter is inserted into the lock, and, thereby switches the locking pin out of the groove. Due to this arrangement, a rotation of the cylinder lock is possible without additional actuation of the key if the lock key is inserted. Thereby suitably a lock-key operated retaining latch is provided for a bolt assuming its state of locking readiness.

With a view to obtaining a transition of the locking pin from the groove limiting the closing rotation, in accordance with the present invention, the face of the key engaging the locking pin, is inclined in the direction of the groove.

In order to make possible the withdrawal of the lock key in the "garage" position of the lock, without locking the rotary cylinder, in accordance with the present invention, two rows of counter-pins, set-off for 90° relative to each other in the housing of the safety lock, are coordinated to the rotary cylinder equipped with a row of tumbler pins, the row of the counter-pins associated with the "garage" position being merely yielding and not locking.

With these and other objects in view which will become apparent in the following detailed description, the present invention will be clearly understood in connection with the accompanying drawings, in which

FIGURE 1 is a side elevation of the steering-wheel lock according to the present invention, the key for the safety lock being withdrawn;

FIG. 2 is an end view of the rotating handle of the lock, indicating the various angular positions of the handle during the respective locking rotations;

FIG. 3 is a section along the lines 3—3 of FIG. 1;

FIG. 4 is a section along the lines 4—4 of FIG. 1, disclosing the rotary cylinder in the "garage" position;

FIG. 5 is a section similar to that of FIG. 4, but in the "stop" position, that is, with rotary cylinder in "locking" positions;

FIG. 6 is a section on an enlarged scale along the lines 6—6 of FIG. 3, the rotary handle being shown in the "garage" position;

FIG. 7 is a section along the lines 7—7 of FIG. 6, the lock-key being removed, and the knob protruding, respectively;

FIG. 8 is a section similar to that of FIG. 7, but with the key inserted and the knob actuated thereby; and

FIG. 9 is a section along the lines 9—9 of FIG. 8.

Referring now to the drawings, the steering-wheel lock according to the present invention comprises substantially a housing body 1, having shackles 2 for attachment to the steering shaft, the housing body 1 receiving a locking bolt 5 operable by a rotary cylinder 3 of a cylinder safety-lock 4. The bolt 5 can resiliently engage a recess provided at an approximate location of the steering shaft (not illustrated), so as to lock the steering mechanism and wheel of the vehicle. The rotary cylinder 3 also acts upon a starter switch 6 of conventional structure, the switch positions of which are retained by springs and in which, upon turning beyond the position for the ignition for the ignition current, the starter is being energized. In a conventional manner, this overturning (from the ignition position to the starting position) is performed against the effect of a return spring.

The steering-wheel lock has a plurality of locking positions, in particular at least one "stop" position (identified in the drawing by H), in which the steering mechanism is locked; a "garage" position G, in which steering is possible, but the electrical circuits are switched off; a "driving" or "ignition" position Z, in which the motor is operative; and finally, a "start" position (identified by A), in which the engine starter is operated (see FIGS. 2 and 6). A lock-key 21 serving the purpose of operating the safety lock is removable in the "stop" position H as well as in

the "garage" position G. To this end, the rotary cylinder 3 is equipped with a row of tumbler pins 7 (FIG. 3), while the housing 4 of the cylinder lock has two rows of counter-pins 8 and 9 set off for an angle of 90° relative to each other. From these two rows of counter-pins, the pins of the row 9, coordinated to the "garage" position G are merely yielding and thus do not lock the rotation of the rotary cylinder 3.

The rotary cylinder 3 is connected at its end face with a turning handle 10, in which a knob is pivotally mounted (FIGS. 7 and 8). Suitably, the knob 11 is inserted in a radial extension of the key slot 12, is held by a cross pin 13 and its rotational movement is limited by a stop pin 15 projecting into an arcuate slot 14 of the knob 11 (FIG. 7).

A locking pin 17 biased by a corresponding spring 16 is disposed in the cylinder-lock housing 4, diametrically opposite the position of pins 9. As indicated in FIG. 9, an arcuate groove 18, bridging the angle from the "garage" position G over the "driving" position Z to the "start" position A (FIG. 6), is formed in a disc 10' provided on the turning handle 10, the groove 18 having a corresponding radius. The locking pin 17 enters the groove 18 and limits the angle of rotation between the respective positions. In the "garage" position, the pin 17 engages a corresponding lifting surface 19, provided on the knob 11 (FIG. 9). The lefting surface 19 is wedge-shaped and extends from the groove bottom 18' to the outermost face 10'' of the disc 10', upon actuating the knob 11 (FIG. 9), while in the non-operative position of the knob 11, the wall 12' of the key slot 12 forms an abutment (FIG. 6).

The knob 11 is furthermore equipped with a nose portion 20, against which abuts an abutment portion 22 of the key 21 in the inserted position of the latter. By this arrangement, the knob 11 is turned, and consequently, the locking pin 17 is pushed out of the groove 18, so that the locking pin 17, favored by the head formation thereof, still brings about a locking effect, however, can pass over easily on to the face 10'' of the turning-handle disc 10', upon rotation of the handle 10 and the turning cylinder 3, respectively, in corresponding direction (FIG. 9).

The function of the steering-wheel lock and its operation is performed in the following manner:

In the safely switched-off vehicle, the steering-wheel lock and its rotary cylinder 3, respectively, is in the "stop" position H, corresponding to FIG. 5. The bolt 5 is, thereby, in advanced position and the rotary cylinder 3 is locked against rotation by the row of pins 8. From this secured or locked position, the steering-wheel lock can be operated only by means of a fitting key 21. Upon insertion of the key 21, the tumbler pins 8 are pushed back. Due to the subsequent rotation of the rotary cylinder 3, the bolt 5 is withdrawn in conventional manner (the interconnecting structure is only schematically indicated in FIGS. 3–5). After a quarter turn of the rotary cylinder 3, the locking pin 17 enters the groove 18. The rotary cylinder 3 can now be turned further to the "start" position A, whereby the bolt 5 remains in the disengaged position, shown in FIG. 4.

The "driving" position Z is latched by the spring-controlled starter switch 6; the electric circuit being completed, the vehicle can be operated.

If the vehicle should be parked in a parking lot or a garage, where the final placement is carried out by the garage operators, the driver of the vehicle shifts the steering-wheel lock, according to the present invention, merely to the "garage" position (FIGS. 4 and 6) and withdraws the key which he can retain.

Owing to the abutment of the locking pin 17, as set forth above, this "garage" position G cannot be turned to the "stop" position H without special measures. However, the rotary cylinder 3 can be moved from the "garage" position, without making use of the key 21, to either the "driving" position Z or the "start" position A, and back again, if necessary, so that the motor can be freely started and the vehicle can be operated.

If the vehicle, however, for instance after reaching the final parking place is to be secured, the knob 11 is pushed inwardly while in the "garage" position (FIG 6). The lifting surface 19 pushes the locking pin 17 out of the groove 18 and out of engagement with its abutment, respectively, so that the turning handle 10 can be rotated in the direction toward the "stop" position H. Once this position has been set, the pins 8 enter the tumbler bores and lock the rotary cylinder 3 against any further rotation.

If the locking from the "driving" position Z into the "stop" position H is accomplished by means of the key 21, it is of advantage to hold the bolt 5 in the "stop" position by appropriate locking means (not illustrated) which depends upon the operation of the key, until the key has been withdrawn from the safety lock.

While I have disclosed one embodiment of the present invention with certain useful variants thereof, it is to be understood that this embodiment is given by example only and not in a limiting sense, the scope of the present invention being determined by the objects and the claims.

I claim:

1. A key-operated steering-wheel lock comprising:
- a housing body adapted to be attached to the steering mechanism of a vehicle,
- a housing disposed in said housing body,
- a rotary cylinder, rotatably disposed in said housing body and settable to any one of at least three operating positions,
- locking means operated by said rotary cylinder for projection from said housing body and adapted for locking the steering mechanism in one of said operating positions,
- a handle connected with said rotary cylinder for manually setting the latter to any one of said operating positions,
- said handle defining an arcuate groove disposed in a plane substantially perpendicular to the rotary axis of said handle,
- said housing defining a recess,
- a locking pin guided in said recess of said housing and spring-biased toward said groove, thereby locking said rotary cylinder in a predetermined one of said operating positions, and
- a knob pivotally mounted in said handle and abutting said locking pin, while protruding from said handle, and permitting in its pushed-in position the turning of said rotary cylinder from said predetermined to said one of said operating positions.

2. The steering-wheel lock, as set forth in claim 1, wherein
- said rotary cylinder has an axially disposed key slot, and includes
- a key complementary to said key slot and turning said rotary cylinder through said respective operating positions upon operating said key.

3. The steering-wheel lock, as set forth in claim 1, wherein
- said handle includes a disc defining said groove therein,
- said operating positions include a "driving" position, a "garage" position, and a "stop" position,
- said groove extends between at least said "garage" and said "driving" positions,
- said one of said operating positions constitutes said "stop" position, while said predetermined operating position constitutes said "garage" position.
- said locking pin is moved out of said groove upon pushing said knob towards said handle, whereby said handle can simultaneously be moved from said "garage" to said "stop" position, but is prevented from being returned to said "garage" position.

4. The steering-wheel lock, as set forth in claim 3, which includes

an electric starter switch operatively connected to said rotary cylinder, and wherein

said operating positions also include a "start" position, in which said starter switch is operated.

5. The steering-wheel lock, as set forth in claim 4, wherein

said rotary cylinder and said handle are operable from said "garage" position in one direction to turn to said "stop" position, and

in the opposite direction to turn to said "driving" and said "start" positions, respectively.

6. The steering-wheel lock, as set forth in claim 2, wherein

said key includes an abutment portion,

said knob has a nose portion engageable by said abutment portion of said key when the latter is inserted into said rotary cylinder,

so that upon insertion of said key, said locking pin is pushed out of said groove.

7. The steering-wheel lock, as set forth in claim 1, wherein

said knob has at its end opposite said locking pin an

engaging face inclined in the direction of the groove, and abutting said locking pin.

8. The steering-wheel lock, as set forth in claim 1, which includes

a row of tumbler pins reciprocable in bores of said rotary cylinder,

two rows of counter-pins set off at an angle of 90 degrees relative to each other and reciprocable in bores of said housing, and operably connected with said tumbler pins of said rotary cylinder, and

one of said rows of counter-pins being associated with said predetermined position is yielding upon engaging with said tumbler pins and unlocking said rotary cylinder.

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