

The invention relates to an antitheft device mounted on a vehicle steering wheel and comprising a tubular part which extends along an inner axis and on which first hook-in means are fastened which engage from
5 inside in the rim of the steering wheel, and comprising an elongated rod-like part which is received telescopically by the tubular part and on which second hook-in means are fastened which lie opposite the first hook-in means and engage from inside in the rim of the
10 steering wheel, one of the parts having a portion projecting beyond its hook-in means and intended to strike against the interior of the vehicle if the steering wheel with the antitheft device fastened to it is turned, and comprising locking means which have a lock
15 casing mounted on the tubular part and enable the rod-like part to make a telescopic movement from a retracted position, in which the rod-like part is situated substantially inside the tubular part, to a locking position in which the rod-like part is pulled axially out of the
20 tubular part so far that the hook-in means are in contact from inside with the steering wheel rim.

An antitheft device of this kind is known (US-A-47 38 127), in which the rod-like part has shallow, curved annular grooves in which a ball engages as locking
25 member and prevents axial movement of the rod-like part when the lock is in action. This known antitheft device certainly serves its purpose, but is awkward to fit because after the antitheft device has been mounted on the steering wheel the tubular and rod-like parts, which
30 are axially slidable relative to one another, must be held fast until the lock has been operated by means of the key and the parts have been locked together.

An antitheft bar, provided with a ratchet mechanism, for attachment to the steering wheel is also
35 known (US-A-3 462 982), which however is not telescopically retractable but has an invariable length. In order to fasten the de-vice to the steering wheel one of the hooks engaging in the steering wheel rim must be

5 moved along the antitheft bar, the lock fastened to the
hook sliding along a toothed rack riveted on the
antitheft bar. Although the hook can be moved outwards
and brought into engagement with the steering wheel rim
even when the device is locked, it is not possible to
turn the hooks relative to one another or to the
antitheft bar. Consequently, the hooks cannot be
positioned between steering wheel spokes, since for that
purpose at least one of the hooks must be engaged from
10 the side in the steering wheel rim. Because of its
invariable length, this known antitheft device is very
bulky and takes up a great deal of space when detached.

15 In antitheft devices working with pedal locking
means (Fr-A-2 566 348) it is also known to mount on the
pedal a toothed rack which is provided with annular teeth
and in which a wedge-shaped locking bolt engages on
locking. If the pedal is then depressed, the spring
loaded locking lever slides along the rack and is locked
thereon with the pedal depressed, so that the pedal can
20 be freed only after the lock has been unlocked. This type
of anti-theft device is awkward to use because it lies in
the foot space of the vehicle and is difficult to reach
from the driver's seat.

25 The object of the invention is that of so
constructing an antitheft device of the type described in
detail at the outset that it is simple and convenient to
handle and to fasten to the steering wheel and takes up
little space when not mounted thereon.

30 This object is achieved by the invention through
the fact that the rod-like part has a plurality of
ratchet teeth which extend around it, adjoin one another
in the longitudinal direction and surround that portion
of the rod-like part which can be telescopically received
in the tubular part, and that each ratchet tooth has a
35 flat annular stop surface at right angles to the inner
axis and a conical support surface which widens in a
direction away from the second hook-in means and whose
diameter increases as the rod-like part is pulled

telescopically out of the tubular part, and that a ratchet pawl disposed in the lock casing is held by a spring means in contact with the ratchet tooth surfaces in order to allow mutual turning of the rod-like part and the tubular part when the rod-like part is pulled out of the tubular part, while an axial movement of the rod-like part into the interior of the tubular part is prevented by the fact that the ratchet pawl strikes against one of the vertical stop surfaces and that a key operated lock is provided in the lock casing and pulls the ratchet pawl back out of engagement with the ratchet teeth, against the action of the spring, when the key is operated to allow the rod-like part to move telescopically in both directions.

Through the construction of the locking mechanism in the form of a ratchet mechanism the two parts of the antitheft device have at all times a determined, defined position in the locked state, because the lock bolt always engages behind one of the teeth on the rod-like part of the locking device. This locked state can already be obtained when the two elongated parts of the locking device have been completely retracted one into the other and take up the smallest possible space. The two parts are then securely joined together and can be stowed away as a single part and be handled in a simple manner.

For the purpose of fastening the antitheft device according to the invention on the steering wheel, it is only necessary to take hold of the two parts joined together, one in each hand, and to pull the two parts apart over the steering wheel until the two outwardly directed hooks engage in the steering wheel rim. With the device according to the invention it is then possible, when pulling the two parts apart, to turn them simultaneously in relation to one another about their longitudinal axis and thus to bring each of the hooks of the antitheft device into its most favourable position. Separate locking is not required, because the lock was already in its locked position.

It is particularly expedient for the rod-like part to slide in a cylindrical tube which is fastened at one end to the tubular part and at the other end to a part of the lock casing containing the lock. The lock casing then has a bore which is closed at one end and which extends to an opening provided in the wall of the tube. Disposed in the bore is a bolt, one end of which can enter the opening, and the bolt has a recess of limited length, which extends in the longitudinal direction of the bolt and cooperates with a pivot when the latter is moved into the unlocking position.

In the bore which is closed at one end a spring is disposed between the bolt and the end of the bore, which spring presses the bolt against the ratchet teeth on the rod-like part when the pivot is in its locking position. By this means the clearance between the rod-like part and the lock casing is eliminated and the rod-like part makes contact with the casing diametrically opposite the opening, so that the rod-like part can engage accurately and in an effective manner when it is pulled axially out of the tubular part and the lock casing.

Each ratchet tooth expediently also has a cylindrical rest surface which extends in the longitudinal direction, is disposed next to the smaller diameter of the frustoconical surface and extends to the stop surface of an adjoining tooth. The bolt end then has at its end a flat which is not larger than the length of the rest surface, in order to form definite stop positions when the rod-like part is pulled out of the tubular part.

It is particularly advantageous for the rod-like part to be in the form of a bar having a circular cross-section and the tubular part to be in the form of a tube having a circular cross-section. In a construction of this kind the hooks can be turned in relation to one another. This facilitates attachment around the spokes connecting the steering wheel rim at horizontally opposite points, where the hooks are preferably fastened.

The bolt may be in the form of a locking pin which in its middle part has a recess provided with a pivot surface and at its free end, facing the opening, has an inclined end face cooperating with the conical surfaces of the teeth on the rod-like part. A spring brings the locking pin into engagement with the teeth of the rod-like part when the latter is situated in the passage in the lock casing.

In the lock casing a second bore may be provided, the inner end of which leads into the first bore and in which a lock cylinder provided with a pivot is disposed, the latter engaging in the recess in the locking pin and, when it is turned with the lock cylinder, pressing the locking pin against the spring when brought from its locking position into its unlocking position.

Since the second hook-in means can be turned about its longitudinal axis relative to the first hook-in means and the hooks can thus also be fastened to steering wheel spokes, the antitheft device can also be fastened on the steering wheel in the preferred position in which it extends horizontally across the steering wheel in front of the seated user, even when a steering wheel spoke is situated in a position where a hook should be attached, even if the vehicle is parked and the steering wheel is turned in such a way that the wheels have been turned to one side and, for example on a hill or the like, turned in towards the kerb. The ability to fasten the antitheft device in any position on the steering wheel also enables it to be fitted without touching or operating the horn mounted on the steering wheel.

Another advantage of the invention consists in that the locking components are completely enclosed and protected against attack with a crowbar or other criminal burglary tool.

Other advantages and features of the invention will emerge from the following description and from the drawings, in which a preferred embodiment of the

invention is explained more fully, and in which:

Figure 1 shows in perspective a steering wheel locking device according to the invention, fastened on a steering wheel;

5 Figure 2 is an exploded view in perspective of the steering wheel locking device shown in Figure 1;

Figure 3 is a plan view of the steering wheel locking device shown in Figure 1;

10 Figure 4 is a side view of the steering wheel locking device shown in Figure 1;

Figure 5 is a section on the line V-V, on a larger scale, of the object of Figure 4;

15 Figure 6 is a partial longitudinal section on the line VI-VI, on a larger scale, of the object of Figure 4;

Figure 7 shows part of Figure 6 with the bolt of the lock in an intermediate position;

Figure 8 shows part of the object of Figure 6, with the bolt in the unlocked position, and

20 Figure 9 is a plan view of the steering wheel locking device shown in Figure 1, fastened on the steering wheel in a different position.

In Figure 1 a steering wheel locking device according to the invention is shown in the pulled apart state in perspective. The steering wheel locking device consists essentially of an elongated tubular part 10, an elongated rod-like part 12 disposed telescopically in the tubular part 10, and a lock casing 14. A first hook-in means, namely a steering wheel rim hook 16, is disposed on the tubular part 10, and a second hook-in means, namely a steering wheel rim hook 18, is disposed on the rod-like part 12, said hooks being capable of engaging from inside in the steering wheel at points lying opposite one another. The lock casing 14 is provided with means by which the rod-like part 12 can be placed and locked relative to the tubular part 10 in any of a plurality of positions spaced axially apart. The tubular part 10 has a projecting portion 19 extending

sufficiently far beyond the first steering wheel rim hook 16 to enable it to strike against the interior of the vehicle when the steering wheel is turned and in this way to prevent complete turning of the steering wheel.

5 More precisely, the elongated tubular part 10 is an elongated tube 22 having a circular cross-section relative to an axis a. The tube 22 has a central diameter (sic) 24 of circular cross-section concentric to the axis A and is surrounded by an outer sleeve 26 forming a
10 double-walled portion 28, as shown in Figure 6. A portion 30 of the tube 22 extends in the axial direction beyond the end of the double-walled portion 28 and has two openings 32, 33 in line with one another.

 A first steering wheel rim hook 16 is rigidly
15 fastened on the outer sleeve 26 of the double-walled portion 28 of the tubular part 10 and forms a substantially U-shaped opening which extends axially in the opposite direction to the projecting portion 30 of the tubular part 10. The tube 22 and the outer sleeve 26
20 preferably consist of pieces of a standard steel tube which are welded together. The first steering wheel rim hook 16 is likewise preferably made of a standard steel tube bent into U-shape or otherwise shaped and welded to the outer sleeve 26. A wear-resistant plastics covering
25 34 is disposed over the outer sleeve 26 and the first steering wheel rim hook 16 in order to form an abrasion-proof surface on the tubular part 10. A handle 36 is provided at the end of the tubular part 10.

 The elongated rod-like part 12 consists of an
30 elongated bar 38 of circular cross-section. The outside diameter of the bar 38 is slightly smaller than the diameter of the central passage 24 in the tubular part 10, so that the bar 38 can freely move telescopically in the tubular part 10. At the end of the bar 38 is rigidly
35 fastened a substantially L-shaped portion 40, which is shown in dashed lines in the drawings and which forms the second steering wheel rim hook 18 with its opening directed oppositely to the first steering wheel rim hook

16 and engaging in the steering wheel at an opposite point. A second wear-resistant plastics covering is provided on the second steering wheel rim hook 18.

5 A plurality of catch teeth or ratchet teeth 44 spaced apart from one another in the longitudinal direction are disposed along the bar 38. Each ratchet tooth 44 has a conical support surface 46 which extends radially outwards in the axial direction away from the second steering wheel rim hook 18, and an annular stop surface 10 48 extending at right angles to the axis A. The bar 38 and the substantially L-shaped portion 40 are preferably made of case-hardened steel.

The lock casing 14 has a passage 50 of circular cross-section and having a diameter corresponding to the 15 outside diameter of the projecting portion 30 of the tube 22, so that the lock casing 14 can be pushed telescopically over the projecting portion 30 and fastened thereon. The lock casing 14 has a first bore 52 extending at right angles to the axis A and having a closed inner end 20 53 and an open outer end 54. The first bore 52 crosses the lock passage 50 and is in line with the openings 32 and 33 in the portion 30 projecting out of the sleeve 26.

The lock casing 14 also has a second bore 56, the inner end 58 of which opens into the first bore 52, while 25 its outer end 60 is open to the outside. The locking means disposed in the interior of the lock casing 14 consist of a helical spring 62 acting in the axial direction from the closed inner end 53 of the first bore 52, a ratchet pawl or bolt 64 which is disposed in the 30 first bore 52 and extends from the helical spring 62 through the opening 33 into the central passage 24 of the cylindrical tube 22. The outer open end 54 of the first bore 52 is closed by a stopper 66.

The bolt 64 consists of a locking pin 68 having 35 an inclined end face 70, a recess 72, and a pivot surface 74 disposed in the recess 72. The locking means also include a lock cylinder 76 having a keyhole 78, a pivot 80 and a slot 82. The lock cylinder 67 is disposed in the

second bore 56, lies against the bore shoulder 84, and is secured in the bore with the aid of a fastening pin 86 inserted through a pinhole 88 into the slot 82. The pivot 80 engages in the recess 27 in the bolts (sic) 64 and
5 cooperates with the pivot surface 74 in a manner to be described further on. As stated above, the elongated tube 22 and the outer sleeve 26 of the tubular part 10 consist of pieces of tubing of ordinary steel. In the preferred embodiment of the invention the lock casing 14 is made
10 of steel and is cast around the projecting portion 30 of the tube 22 by an injection moulding process in order to form an integral construction therewith. The first bore 52 is machined out or otherwise produced after the lock casing 14 has been formed on the projecting portion 30 of
15 the tube 22, the first bore 52 and the openings 32 and 33 being produced simultaneously in order to ensure their accurate alignment.

The closed construction of the lock casing 14 which is disposed over the end of the tubular part 10
20 protects the enclosed parts of the lock against tampering, because the interior of the lock is accessible only from the open end of the passage opening 50. Such access is blocked by the rod-like part 12.

The lock casing 14 projects radially beyond the
25 tubular part 10 in a direction opposite to that of the steering wheel rim hook, as shown in Figure 1, so that it will not strike against the steering wheel spokes or come into contact with the horn mounted on the steering wheel. The keyhole 78 has its opening in the direction of the
30 seated driver and is consequently easily accessible.

To go into greater detail, the lock casing 14 has a flat rear side 90 facing the steering wheel, as can be seen in Figure 4. The lock cylinder 76 is accommodated in a projecting portion 92 of the lock casing 14, this
35 portion extending at right angles to the axis A away from the rear side 90 and the first steering wheel rim hook 16. No part of the steering wheel locking device between the steering wheel rim hooks 16 and 18 extends into the

interior of the steering wheel rim R. As can be seen in Figure 9, space is thus left in front of the steering wheel spokes 94, the hub 96 and the horn 98 to bring the steering wheel locking device into position and to enable the user to place his fingers around and behind the locking device, as is necessary for its handling.

The operation of the locking means 20 is illustrated in Figures 6 to 8. As can be seen in Figure 6, the helical spring 62 normally presses the bolt 64 out of the first bore 52 and into engagement with an annular stop surface 48 of a ratchet tooth 44 onto (sic) the rod-like part 12. The latter is thereby prevented from being pushed axially into the interior of the tubular part 10. A movement of the rod-like part 12 axially out of the tubular part 10, as indicated by the arrow shown in Figure 7, causes the conical support surface 46 of a ratchet tooth 44 to press against the inclined end face 70 of the bolt 64, so that the bolt 64 is pressed, against the action of the helical spring 62, into the interior of the first bore 52 and brought out of engagement with the ratchet tooth 44. The helical spring 62 then pushes the bolt 64 outwards again, so that it comes into engagement with the next ratchet tooth 44 and to hold (sic) the rod-like part 12 loosely in a next position at a distance therefrom, relative to the tubular part 10, as illustrated in Figure 6. When the pivot 80 is turned with the lock cylinder 76, as shown in Figure 8, the pivot 80 is caused to press against the pivot surface 74, as a result of which the bolt 64 is pulled back into the interior of the first bore 52 and out of engagement with the ratchet tooth 44. The locking means then remain in their positions shown in Figure 8 and allow the rod-like part 12 to make a free axial movement into the tubular part 10 until they are locked by the use of the key. The antitheft device is mounted on a steering wheel by first pushing the first steering wheel rim hook 16 over the steering wheel rim, as illustrated in Figure 1. The rod-like part 12 is then pulled axially out of the

tubular part 10 and through the lock casing 14 until the second steering wheel rim hook 18 lies fast against the steering wheel rim hook (18) fast (sic) against the steering wheel at a point opposite the point where the first steering wheel rim hook 16 engages.

As shown in Figure 6, the locking means hold the rod-like part 12, and therefore the two hooks 16 and 18 fixed in any of the positions axially distant from one another which are defined by the space between the ratchet teeth 44, while the rod-like part 12 need not be held by hand as it is pushed forwards and backwards.

The multiplicity of ratchet teeth 44 permits numerous axial positions of the extended rod-like part, so that the steering wheel locking device is adjustable over a wide range and can be adapted to most sizes of steering wheels. Above all, however, the locking means holds the rod-like part and the second steering wheel rim hook 18 securely fixed in their positions, in which they are pulled out of the tubular part 10 and mounted on the steering wheel rim, as illustrated in Figure 1. In this arrangement the locking device is self-locking in its mounted position and does not have to be locked by hand in the locking position.

The antitheft device is unlocked by unlocking the lock cylinder 76 and then allows the second steering wheel rim hook 18 to be pulled back axially in the direction of the first steering wheel rim hook 16 in order to free the steering wheel rim. The rod-like part 12 can advantageously be fully pushed into the tubular part 10 as far as the L-shaped part 40, so that the steering wheel locking device is completely retracted for storage. The storage of the steering wheel locking device in its locked position enables the locking means 20 to hold the rod-like part 12 fast and to prevent it from slipping uncontrolledly out of the tubular part while the locking device is stored in the boot or under the seat of the vehicle. At the same time the steering wheel locking device is prepared for fastening, as described above,

without a key having to be used for that purpose.

Other features and advantages of the invention result from the above-described construction. The grouping of the locking components in the interior of the lock casing 14 and the fastening of the latter at one end of the tubular part 10 protects these parts against the attentions of a would-be thief. The joining of the lock casing 14 to the tubular part 10 eliminates any external points where a burglary tool could be applied. The arrangement of the bolt and appertaining components inside the lock casing 14 also protects the user's fingers against jamming. The double-walled tube construction, moreover, cannot easily be sawn into and destroyed.



Patent Claims

1. Antitheft device mounted on a vehicle steering wheel and comprising a tubular part (10) which extends along an inner axis (A) and on which first hook-in means
5 (16) are fastened which engage from inside in the rim (R) of the steering wheel, and comprising an elongated rod-like part (12) which is received telescopically by the tubular part (10) and on which second hook-in means (18) are fastened which lie opposite the first hook-in means
10 (16) and engage from inside in the rim (R) of the steering wheel, one of the parts (10, 12) having a portion (19) projecting beyond its hook-in means (16, 18) and intended to strike against the interior of the vehicle if the steering wheel with the antitheft device fastened to
15 it is turned, and comprising locking means which have a lock casing (14) mounted on the tubular part (10) and enable the rod-like part (12) to make a telescopic movement from a retracted position, in which the rod-like part (12) is situated substantially inside the tubular part (10), to a locking position in which the rod-like part (12) is pulled axially out of the tubular part (10) so far that the hook-in means (16, 18) are in contact from inside with the steering wheel rim (R), characterised in that the rod-like part (12) has a
20 plurality of ratchet teeth (44) which extend around it, adjoin one another in the longitudinal direction and surround that portion of the rod-like part (12) which can be telescopically received in the tubular part (10), and that each ratchet tooth (44) has a flat annular stop surface (48) at right angles to the inner axis (A) and a conical support surface (46) which widens in a direction away from the second hook-in means (18) and whose diameter increases when the rod-like part (12) is pulled telescopically out of the tubular part (10), and that a
25 ratchet pawl (64) disposed in the lock casing (14) is held by a spring means (62) in contact with the ratchet tooth surfaces (46, 48) in order to allow mutual turning

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of the rod-like part (12) and the tubular part (10) when the rod-like part (12) is pulled out of the tubular part (10), while an axial movement of the rod-like part (12) into the interior of the tubular part (10) is prevented by the fact that the ratchet pawl (64) strikes against one of the vertical stop surfaces (48), and that a key operated lock (76) is provided in the lock casing (14) and pulls the ratchet pawl (64) back out of engagement with the ratchet teeth (44), against the action of the spring, when the key is operated to allow the rod-like part (12) to move telescopically in both directions.

2. Device according to Claim 1, characterised in that the rod-like part (12) slides in a cylindrical tube (22) which is fastened at one end to the tubular part (10) and at the other end to a part of the lock casing (14) containing the lock (76), and that the lock casing (14) has a bore (52) which is closed at one end and which extends to an opening (33) provided in the wall of the tube (22), and that in the bore (52) a bolt (64) is disposed, of which one end (70) can enter the opening (33), and that the bolt (64) has a recess (72) of limited length, which extends in the longitudinal direction of the bolt and cooperates with a pivot (80) when the latter is moved into the unlocking position, and that in the bore (52) closed at one end a spring is disposed between the bolt (64) and the end of the bore (52), which spring presses the bolt (68) against the ratchet teeth (44) on the rod-like part (12) when the pivot (80) is in its locking position, so that the clearance between the rod-like part (12) and the lock casing (14) is eliminated and the rod-like part (12) makes contact with the casing (14) diametrically opposite the opening (33), so that the rod-like part (12) can engage accurately and in an effective manner when it is pulled axially out of the tubular part (10) and the lock casing (14).

3. Device according to Claim 1 or 2, characterised in that each ratchet tooth (44) also has a cylindrical rest surface which extends in the longitudinal direction,



is disposed next to the smaller diameter of the frustoconical surface (46) and extends to the stop surface (48) of an adjoining tooth, and that the bolt end has at its end a flat which is not larger than the length of the rest surface, in order to form definite stop positions when the rod-like part (12) is pulled out of the tubular part (10).

4. Device according to Claim 1, characterised in that the rod-like part (12) is in the form of a bar having a circular cross-section, and that the tubular part (10) is in the form of a tube having a circular cross-section.

5. Device according to one of Claims 1 to 4, characterised in that the bolt (64) is in the form of a locking pin (68) which in its middle part has a recess (72) provided with a pivot surface (74) and at its free end, facing the opening (33), has an inclined end face (70) cooperating with the conical surfaces (46) of the teeth (44) on the rod-like part (12).

6. Device according to one of Claims 1 to 5, characterised in that in the lock casing (14) a second bore (56) is provided, the inner end (58) of which leads into the first bore (52) and in which a lock cylinder (76) provided with a pivot (80) is disposed, the latter engaging in the recess (72) in the locking pin (68) and, when it is turned with the lock cylinder, pressing the locking pin against the spring (62) when brought from its locking position into its unlocking position.