



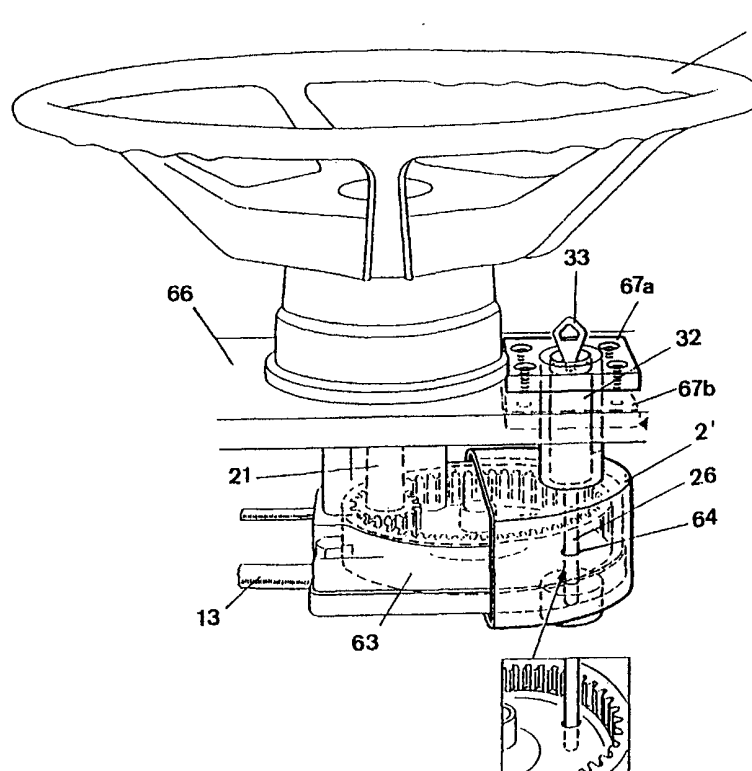
## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<p>(21) International Application Number: PCT/SE99/01419</p> <p>(22) International Filing Date: 20 August 1999 (20.08.99)</p> <p>(30) Priority Data:</p> <table border="0"> <tr> <td>9802930-9</td> <td>1 September 1998 (01.09.98)</td> <td>SE</td> </tr> <tr> <td>9900191-9</td> <td>22 January 1999 (22.01.99)</td> <td>SE</td> </tr> </table> <p>(71)(72) Applicants and Inventors: WYSTRÅHLE, Evelynn [SE/SE]; Farsta Slottsväg 7, S-134 40 Gustavsberg (SE). ÅSEN, Sten [SE/SE]; Farsta Slottsväg 7, S-134 40 Gustavsberg (SE).</p> <p>(74) Agents: BERGLUND, Stefan et al.; Bjerkéns Patentbyrå KB, Östermalmsgatan 58, S-114 50 Stockholm (SE).</p>		9802930-9	1 September 1998 (01.09.98)	SE	9900191-9	22 January 1999 (22.01.99)	SE	<p>(81) Designated States: AL, AM, AT, AT (Utility model), AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, CZ (Utility model), DE, DE (Utility model), DK, DK (Utility model), EE, EE (Utility model), ES, FI, FI (Utility model), GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (Utility model), SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</p> <p><b>Published</b></p> <p><i>With international search report.</i></p> <p><i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p> <p><i>In English translation (filed in Swedish).</i></p>
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(54) Title: A DEVICE ARRANGED TO PREVENT THEFT OF A CRAFT PROPELLED IN WATER

(57) Abstract

The present invention relates to a device arranged to prevent theft of a craft propellable in water. The craft has a steering device comprising a manoeuvrable commanding member (1), the steering motions of which are transmitted, via a motion transmission mechanism (21, 63), to a steering member located in the water. The craft is, in a non-active condition of the device, steerable by means of the steering motions of the commanding member (1). A locking member is, in an active condition of the device, arranged to lock the ability of motion of said motion transmission mechanism (21, 63), so that the craft is not steerable by means of the commanding member (1). The locking member comprises a lock cylinder (32), a locking bolt (56) by which the lock cylinder (32) is fixable in a holding member (55, 65) which is fixedly provided in the vicinity of the motion transmission mechanism, and a locking element (26) which, in an active condition of the device, is arranged to lock the ability of motion of said motion transmission mechanism (21, 63).



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5 **A device arranged to prevent theft of a craft propelled in water**

TECHNICAL FIELD OF THE INVENTION AND PRIOR ART

10 The present invention relates to a device arranged to prevent theft of a craft propellable in water, wherein the craft has a steering device comprising a manoeuvrable commanding member, the steering motions of which are transmitted, via a motion transmission mechanism, to a steering member located in  
15 the water, wherein the craft, in a non-active condition of the device, is steerable by means of the steering motions of the commanding member, and wherein a locking member, in an active condition of the device, is arranged to lock the ability of motion of said motion transmission mechanism, so that the craft  
20 is not steerable by means of the commanding member.

Thefts of boats are a large problem. In order to prevent thefts of boats cables or chains are often used, which by means of a suitable lock lock the boat to, for example, an anchorage place  
25 in the form of a bridge. Such cables and chains are easily accessible for attacks by tools and there is no problem for a boat thief to cut off the cable or chain by a suitable tool. Usually, motor propelled boats also comprise a safety lock, which is connected to the motor boat engine. In the most cases, locks like  
30 that are neither an insurmountable obstacle for an experienced boat thief. There exist also locking devices, which prevent steering of the boat. They may comprise cables, chains or the like which, by means of a suitable lock, are provided to lock the commanding member of the boat, which member may be a  
35 steering wheel, tiller or any other form of steering member. Such superficially located locking devices are also easy to force by a

thief with a suitable tool. Consequently, there is no effective lock on the market, which prevents theft of boats.

## SUMMARY OF THE INVENTION

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The object of the present invention is to provide a device of the initially mentioned kind, which is arranged to prevent theft of a craft, which is simple and comfortable to use and which has such a position that it is protected from direct attacks by tool of various kinds. Other objects of the device are that it in a relatively simple manner will be applicable in newly produced crafts and that it will be manufactured to a low cost.

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These objects are achieved by said device initially mentioned which is characterised in that said locking member comprises a lock cylinder, a locking bolt by which the lock cylinder is fixable in a holding member provided in the vicinity of the motion transmission mechanism, and a locking element which is arranged to lock the ability of motion of said motion transmission mechanism when the lock cylinder is fixed in the holding member. A craft provided with a locked steering mechanism is not steerable and thereby it may not be stolen and driven away in a desired direction, without eliminating the locking action of said locking member to the steering mechanism. Such locking members may be designed to be very robust and they resist a very heavy violence. Preferably, such a lock cylinder comprises a front with a hardened surface and it may also comprise an internally provided hardened ball, which prevents perforation of the lock cylinder. In order to attain such a locking member to be broken up advanced tools are required and often a work taking a lot of time. Probably, this results in that the boat thief gives up.

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According to a preferred embodiment of the invention, said locking element is fixedly provided to the lock cylinder. By the fixed provision of the locking element to the lock cylinder, it engages and locks the motion transmission mechanism at the

same time as the lock cylinder is fixed in the holding member. Thereby, the locking member may obtain a very protected position, for example, behind the lock cylinder. Advantageously, said locking bolt is insertable into the holding member in a  
5 recess extending around the entire circumference of the lock cylinder. By such a recess, the lock cylinder may be inserted into and locked fixedly in the holding member in an arbitrary turning position. Furthermore, the lock cylinder is rotatably provided  
10 inside the holding member, which further makes it harder to break up the locking member since a thief thereby may not obtain a firm grip in order to break the locking member in pieces.

According to another preferred embodiment of the invention, said motion transmission mechanism may be lockable in one or a  
15 number of positions determined in advanced. In order to prevent, in an effective way, theft by towing, it is suitable that such a locking position results in tilting of a steering member, for example in the form of a rudder, at least as much as the craft endeavours to turn heavily aside during attempts of towing.  
20 Preferably, said motion transmission mechanism may be lockable in at least one position, which corresponds to a maximally steering deflection of the steering member. Thereby, the craft will endeavour to turn maximally during towing, which result in that a towing of the craft is essentially impossible to  
25 perform.

According to another preferred embodiment of the present invention, a locking element is arranged to lock a rotating motion of said motion transmission mechanism. Such a rotating motion  
30 transmission mechanism may comprise a steering axle, a steering cable wheel, a steering cable or a steering cable drum. Suitably, the steering axle or the steering cable wheel may comprise a cavity or the like in which a locking element is insertable in order to lock the rotating motion of said  
35 mechanisms in a simple and effective way. Thereby, said cavity may have such a position that the locking element is insertable

in the cavity only when the steering member has a maximally steering deflection.

5 According to another preferred embodiment of the invention, the device is arranged, in an active condition, to disconnect a first and a second portion of the motion transmission mechanism from each other. Consequently, by making the motion transmission mechanism dividable one may by a disconnection of said first and second portions prevent that the steering  
10 motions of the commanding member from being transmitted to the steering member. Thereby, the craft is not steerable by means of the commanding member, which prevents a thief from driving away with the craft in a desired direction.

15 According to another preferred embodiment of the present invention, the device is, during disconnection of said first portion from the second portion, arranged to lock automatically the ability of motion of said second portion. Consequently, by locking the second portion against, for example, rotation the steering  
20 member is also locked. Thereby, crafts having this embodiment of the device are effectively protected against both theft by driving and towing. The device may comprise a locking plate which is spring-loaded in such a way that during disconnection of the first portion of the steering axle the locking plate is displaced  
25 by the spring force toward a first position so that it locks the rotation of the second portion of the steering axle. Thereby, such a locking plate is not rotatably provided and it may comprise a grip member, which is arranged to engage the second portion of the steering axle and thereby prevent rotation of this portion.  
30 When the gripping parts of the first and second portions of the steering axle are in engagement with each other, a displacement member may be arranged to displace the locking plate against the action of the spring towards a second position where it does not lock the rotation of the second portion of the steering axle. At  
35 least one such a displacement member may be provided on the first portion of the steering axle and it displaces thus the locking

plate from a locking position of the second portion, when the first and second portions of the steering axles are brought together towards engagement.

5 According to another preferred embodiment of the invention, a protective housing is arranged to enclose completely, or at least partly, the device. Such a protective housing protects thereby the included parts of the device. Thereby, the device may not be  
10 attacked before the housing is completely or partly deformed, which may require a lot of time. In order to make it further harder for a thief, such a protective housing may wholly or at least partly be manufactured in a hardened material. The protective housing may also comprise at least two separate protective  
15 layers having different material properties. Such combined layers of different materials make breaking up also by means of advanced tools, such as electrically driven cross-cutting machines and gas driven cutting apparatus, difficult.

#### BRIEF DESCRIPTION OF THE DRAWINGS

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In the following, preferred embodiments of the invention are described as examples with reference to the attached drawings, in which:

- 25 Fig 1 shows a commanding member with a protective housing enclosing a device according to the present invention,
- Fig 2 shows a cap of the protective housing in Fig 1,
- Fig 3 shows a protection for a control cable,
- 30 Fig 4-7 shows a first embodiment of a device according to the present invention,
- Fig 8 shows a second embodiment of a device according to the present invention,
- Fig 9 shows a cross-section view of the locking mechanism  
35 shown in Fig 8.

## DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS OF THE INVENTION

5 Fig 1 shows a commanding member 1 in form of a steering wheel, the motions of which are arranged to be transmitted, via a motion transmission mechanism, to a steering member located in the water for steering a craft, e g, a boat. A protective housing 2 is provided to enclose and protect a device arranged to act on  
10 the transmission mechanism so that the craft, in an active condition of the device, is not steerable by means of the commanding member 1. Preferable embodiments of the device are described in more detail below. The protective housing 2 is arranged to be fixed in the craft, e g, to an instrument panel by means of screws. By such a protective housing 2, it is essentially  
15 harder for a thief to attack and eliminate the locking or disconnecting action of the device to the steering mechanism of the craft. In order to further prevent the accessibility to the device for a thief, the original mounting nut of the steering wheel  
20 1 or alternatively a tiller has been replaced by a special nut 3, which at a certain tightening torque breaks at the waist and leave only a metal piece which is very difficult to grip. In order to make it harder for a thief to remove the steering wheel 1 or the tiller and thereby force the protective housing 2, a protective sleeve 4 is provided around the nut 3. The protective sleeve 4 has at its bottom edge a plane washer which at the underside has projecting pins 4a which get down into corresponding holes in the steering wheel 1 or the tiller. Thereby, the sleeve 4 is prevented from being turned around, which may result in  
25 loosening of the nut 3. Thereby, the nut 3 and the protective sleeve 4 protect also against theft of exclusive steering wheels 1. Said motion transmission mechanism may comprise a steering gear and a steering cable. In order to prevent a thief from connecting such a steering cable to a portable steering gear, the  
30 original locking screw may be replaced by a special screw 5 and be provided with a special nut, the construction of which



corresponds to the above described nut 3. In order to make the possibility further harder for a thief to attain the steering cable, the screw 5 is provided with a protective sleeve 6. Furthermore, an end piece 7, provided above the steering gear, may also be  
5 fixed by special screws and safety nuts 8, according to the above. Finally, the opening of the end piece 7 for the steering cable is provided with a ridge 9 extending in a groove in a cover of the steering cable. Thereby, it is further harder to remove the steering cable. Fig 2 shows a cap 10 for the protective housing  
10 2. The cap 10 is mounted fixedly at the top of the protective housing 2 by means of screws 11. The protective housing 10 comprises countersunk holes 12 so that the screws 11 are difficult to attain by a tool. The screws 11 also may comprise heads missing grooves in a mounted condition.

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Fig 3 shows the other end of a steering cable 13 which is fastened to a steering arm 14 arranged to control e g, a rudder. In order to prevent a thief from screwing off the end of the steering cable 13 from the steering arm 14 for in such a way,  
20 during a theft, evading the locked steering mechanism and being able to steer the boat, the steering arm 14 is provided with a hardened first flat bar 15 the ends of which are folded 90° over the side portions of the steering arm 14. Thereby, the flat bar 15 is kept non-turnably fixed to the steering arm 14. On the flat bar  
25 15, there is a protective sleeve 16 in which a special nut 17 according to the type described above is provided. In the case, the steering cable is pivotally connected to the steering arm 14 by means of a bolt 18 extending through the steering arm 14, the flat bar 15 may be completed with a second flat bar 19 at the  
30 underside of the steering arm 14. Thereby, the second flat bar 19 is suited between the downwards folded sides of the first flat bar 15 and it becomes by that also non-turnable. On the second flat bar 19, there is a protective sleeve 20 directed downwards, which protects the through bolt 18. In this case, a special nut of  
35 the above-described type, which breaks by tightening, may also replace the nut 17. The bolt 18 and the nut 17 are countersunk in

protective sleeves 16, 20 in order to make a disconnection of the steering cable 13 from the steering arm 14 further harder.

Figs 4-7 show a first embodiment of the device. In this device a  
5 first portion 43 of the motion transmission mechanism is disconnectable from a second portion 44 which is fixedly connected to the steering axle 21. The first portion 43 comprises a shaft end 45 to which a commanding member 1 is screwably fixed. The shaft end 45 is fixedly connected to a sleeve 46,  
10 which extends downwards over the upper end of the steering axle 21, which is shown with dashed lines. The sleeve 46 comprises at a lower portion a recess 47. The second portion 44 comprises a second sleeve 48 with a grip shoulder 49. The second sleeve 48 is fixedly provided to the steering axle 21. Said  
15 first portion 43 and second portion 44 may be displaced axially in relation to each other between a disengaged position, see Figs 6, 7 and a connected position, see Figs 4, 5, when the recess 47 of the first portion 43 engages the grip shoulder 49 of the second portion 44. The device comprises also a third sleeve 50, which is  
20 kept fixed axially by means of groove rings 51 in relation to the shaft end 45. The sleeve 50 comprises a projecting portion 52 with a first and a second hole 53, 54. Externally of the projecting portion 52 of the sleeve 50, a support 55 is provided, which is fixedly mounted inside the protective housing 2, e g, to its  
25 bottom. The support 55 is arranged to receive a lock cylinder 32, which is lockable by means of a key 33. The lock cylinder 32 is provided with a locking bolt 56, which is insertable and lockable in a recess in the support 55. Thereby, the lock cylinder 32 may be retained fixedly in the support 55. The lock cylinder 32  
30 comprises at its front end a lock element 26, which is insertable in one of the holes 53, 54. The device comprises also a locking plate 57, which is loaded by a spring 58. The locking plate 57 is non-rotatably provided and it comprises an upwards folded portion 59, which is arranged to co-operate with a chamfered  
35 portion 60 of the sleeve 48 in order to lock the rotation of the second portion 44. The locking plate 57 may be displaced out of

engagement with the second sleeve 48 by pegs 61, which are provided on a slide plate 62.

5 After use of a boat having a device according to Fig 4-7, the lock cylinder 32 is released from its fixed position in the support 55, by means of the key 33. Thereby, the locking bolt 56 gets out of engagement with the recess in the support 55. At the same time, the locking element 26, which is provided in front of the lock cylinder 32, is displaced out of engagement with the upper hole 10 53 in the sleeve 50. Thereafter, the driver of the boat turns the commanding member 1 to a determined turning position, preferably with a maximally steering deflection, whereafter the commanding member 1 with the first portion 43 is displaced upwards. Thereafter, in a pulled-up position of the commanding member 1, the lock cylinder 32 is once again provided in the support 15 55 and the locking element 26 is inserted into the lower hole 54 in the sleeve 50. Thereafter, the key 33 is turned in the lock cylinder 32 so that the bolt 56 engages the recess in the support 55, wherein the lock cylinder 32 is fixed in the support 20 55 and the locking element is fixed in the hole 54 in the sleeve 50. Thereby, the first portion 43 also has been displaced from engagement with the second portion 44 and the motion of the commanding member 1 may thereby not be transmitted to the second portion 44. At the same time as this disconnecting motion, the spring 58 may displace the pegs 61 upward through 25 holes in the second sleeve 48. Thereby, the locking plate 57 is also displaced upwards in relation to the sleeve 48 and the upwards folded portion 59 of the locking plate 57 thereby engages the chamfered portion 60 of the sleeve 48. Thereby, the sleeve 48 is prevented from rotating. Consequently, the second 30 portion 44 is automatically locked during said disconnection. This disconnected position is shown in Figs 6 and 7. Thereby, by the present device both a disconnection of the steering axle 21 from the commanding member 1 and a locking of the steering 35 axle 21 in a fixed position are obtained.

When the boat will be used again, the key 33 is turned in the lock cylinder 32 so that the bolt 56 gets out of engagement with the recess in the support 55. Thereafter, the lock cylinder 32 is displaced from its position in the support 55, bringing the locking element 26 out of the hole 54. Then, the commanding member 1 with the sleeve 46 is led downwards and is turned until the recess 47 of the sleeve 46 gets into engagement with the grip shoulder 49 of the sleeve 48. At the same time, the sleeve 46 displaces the pegs 61 against the action of the spring 58 downward during its motion directed downwards. The pegs 61, which are fixedly provided on the sliding plate 62, displace at the same time the locking plate 57, provided under the sliding plate 62, downwards. Thereby, the upwards directed portion 59 of the locking plate 57 gets out of engagement with the chamfered portion 60 of the second sleeve 48. Consequently, the locking plate 57 gets automatically out of engagement with the second sleeve 48 when the first portion 43 and the second portion 44 are connected together. This connected condition is shown in Fig 4 and 5.

Figs 8 and 9 show a second embodiment of the device. In this case, the device is arranged to lock the motion of a steering cable wheel 63. The motion of the commanding member 1 is in this case transmitted, via a steering axle 21, to the steering cable wheel 63, which during rotation drives a steering cable 13. In order to prevent the motion of the steering cable wheel 63, a hole 64 is provided in the steering cable wheel 63 and its house. In this case, a protective housing 2' is also provided and encloses essentially the half of the steering cable wheel 63. Alternatively, the protective housing 2' may be performed so that it encloses essentially the whole device. The protective housing 2' comprises also a hole corresponding to the hole 64 in the steering cable wheel 63. In order to lock the motion of the steering cable wheel 63, a lock cylinder 32 is provided, the locking function of which is controlled by a key 32. The lock cylinder 32 comprises a locking bolt 56 and a locking element 26

provided at a front end. A sleeve 65, which is made in one piece with the protective housing 2', is fastened to the instrument panel 66 of the boat. Such an attachment is made by two plates 67 a, b provided on either side of the instrument panel 66.

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In order to lock the motion of the steering cable wheel 63 after use of the boat, the lock cylinder 32 is led into the sleeve 65, whereafter the commanding member 1 is turned to an end position wherein the hole 64 in the house of the steering cable wheel 63 is located exactly under the sleeve 65. The locking element 26, which is fixedly provided to the front portion of the lock cylinder 32, is then led through the hole 64 and the corresponding holes in the protective housing 2'. Thereafter, the key 33 is turned wherein the bolt 56 is displaced outwards into a recess 68 in the sleeve 65. Preferably, such a recess 68 may extend around the entire circumference of the lock cylinder 32. Thereby, the lock cylinder 32 may be locked fixedly in an arbitrary turning position in the sleeve 65. A sleeve element 69 having a closure 70 is provided at the lower hole of the protective housing 2' in order to protect the projecting end of the locking element 26.

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When the boat will be used again, the key 33 is turned in the lock cylinder 32 so that the bolt 56 is disengaged from the recess 68 in the sleeve 65. Thereafter, the lock cylinder 32 is drawn out with the locking element 26, wherein the steering cable wheel 63 is disengaged. The steering motion of the commanding member 1 may again be transmitted via the steering cable wheel 63 for steering of a steering member located in the water, e g a rudder.

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The present invention is not in any way restricted to the above-described embodiments, but may be varied freely within the scope of the claims.

## Claims

1. A device arranged to prevent theft of a craft propellable in water, wherein the craft has a steering device comprising a manoeuvrable commanding member (1), the steering motions of which are transmitted, via a motion transmission mechanism (21, 63), to a steering member located in the water, wherein the craft, in a non-active condition of the device, is steerable by means of the steering motions of the commanding member (1), and wherein a locking member, in an active condition of the device, is arranged to lock the ability of motion of said motion transmission mechanism (21, 63), characterised in that said locking member comprises a lock cylinder (32), a locking bolt (56) by which the lock cylinder (32) is fixable in a holding member (55, 65) which is fixedly provided in the vicinity of the motion transmission mechanism (21, 63), and a locking element (26) which is arranged to lock the ability of motion of said motion transmission mechanism (21, 63) when the lock cylinder (32) is fixed in the holding member (55, 65).
2. A device according to claim 1, characterised in that said locking element (26) is fixedly provided to the lock cylinder (32).
3. A device according to claim 1 or 2, characterised in that said locking bolt (56) is fixable in said holding member (65) in a recess (68) extending around the entire circumference of the lock cylinder (32).
4. A device according to any one of the preceding claims, characterised in that said motion transmission mechanism (21, 63) is lockable in one or a number of positions determined in advance.
5. A device according to claim 4, characterised in that said motion transmission mechanism (21, 63) is lockable in at least

one position which corresponds to a maximally steering deflection of the steering member.

5 6. A device according to any one of the preceding claims, characterised in that said locking element (26) is arranged to lock a rotating motion of said motion transmission mechanism (21, 63).

10 7. A device according to claim 6, characterised in that said motion transmission mechanism comprises a steering axle (21).

15 8. A device according to claim 6, characterised in that said motion transmission mechanism comprises a steering cable wheel (63).

20 9. A device according to any one of the preceding claims, characterised in that the device is arranged, in an active condition, to disconnect a first (43) and a second (44) portion of the motion transmission mechanism (21) from each other.

25 10. A device according to claim 9, characterised in that during disconnection of said first position (43) from the second portion (44), said device (2) is arranged to lock automatically the rotation of said second portion (44).

30 11. A device according to claim 10, characterised in that the device comprises a locking plate (57) which is spring-loaded in such a way that during disconnection a first portion (43) the locking plate (57) is displaced by the spring force towards a first position so that it locks the rotation of the second portion (44).

35 12. A device according to claim 10, characterised in that when the first (43) and second (44) portions are in engagement with each other, a displacement member (61) is arranged to displace the locking plate (57) against the action of the spring (58)

towards a second position where it does not lock the rotation of the second portion (44).

5 13. A device according to any one of the preceding claims, characterised in that a protective housing (2, 2') is arranged to, at least partly, enclose the device.

10 14. A device according to claim 13, characterised in that said protective housing (2, 2') comprises at least two separate protective layers having different material properties.



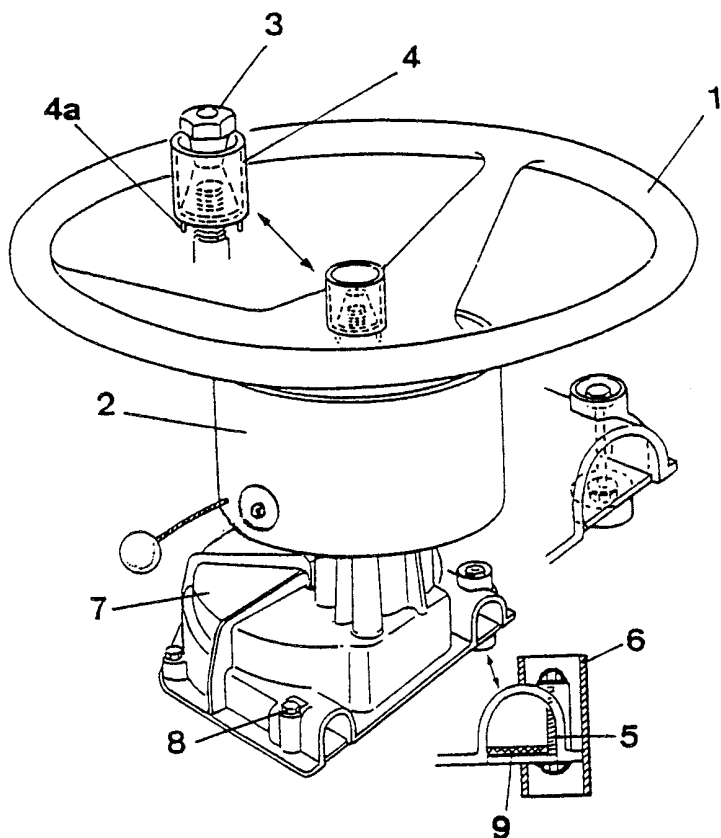


Fig 1

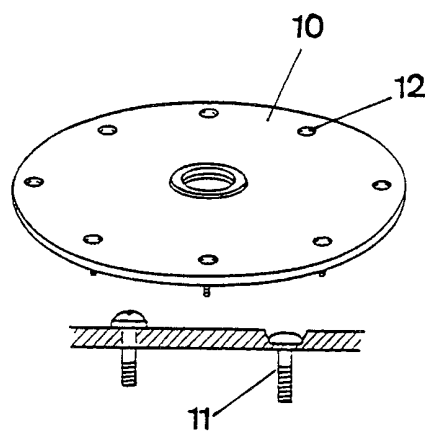


Fig 2

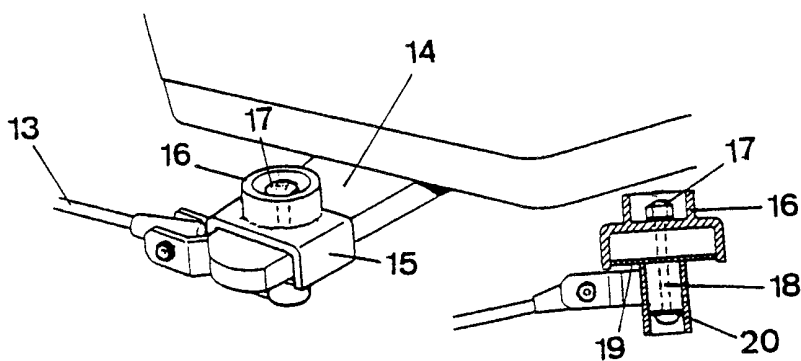


Fig 3

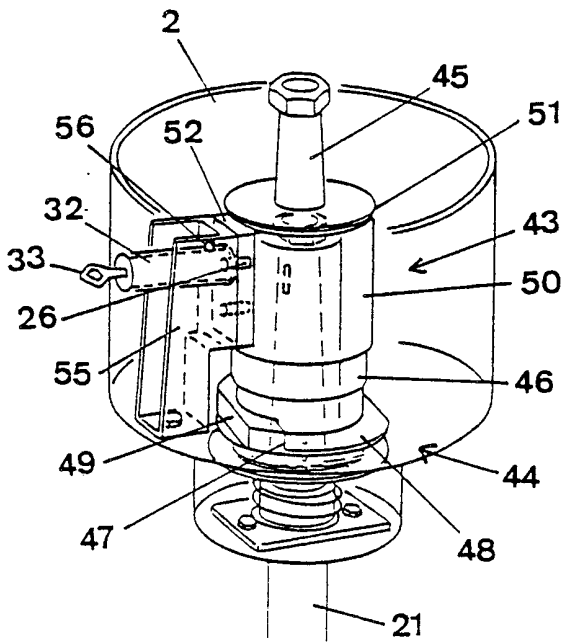


Fig 4

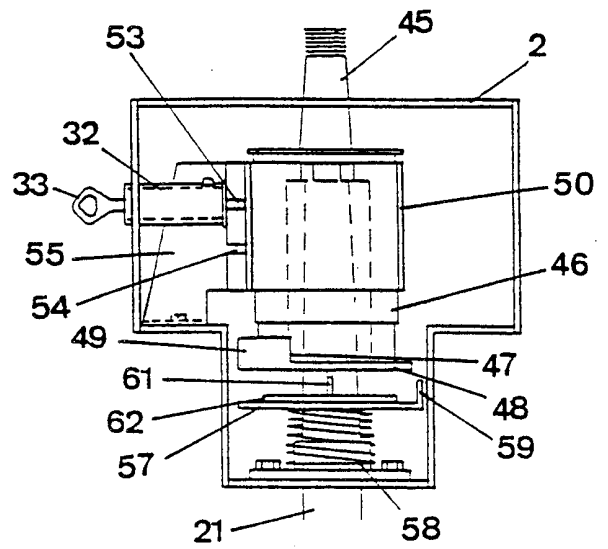


Fig 5

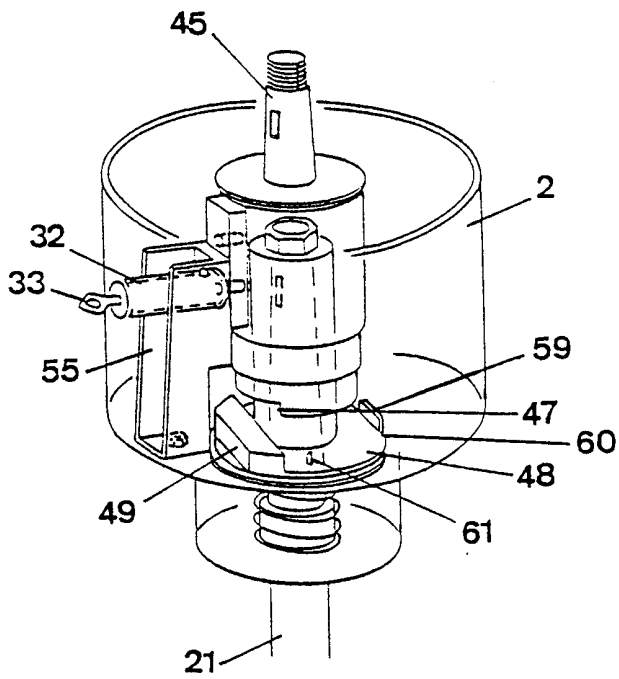


Fig 6

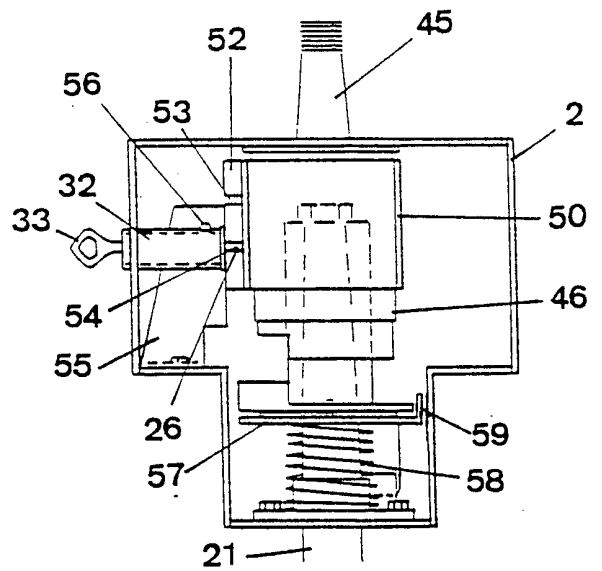


Fig 7

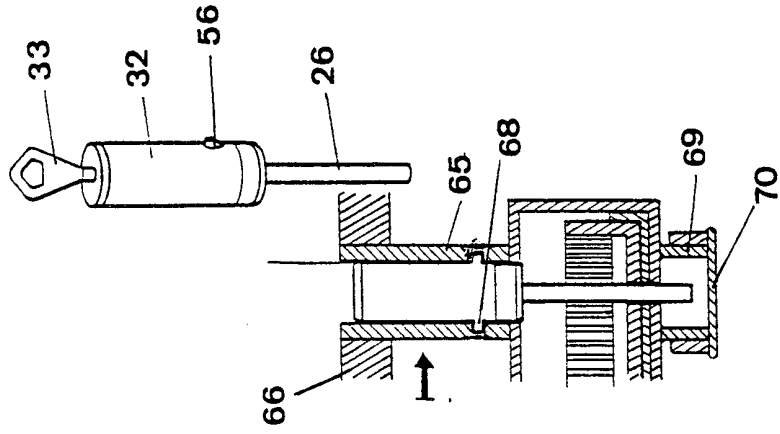
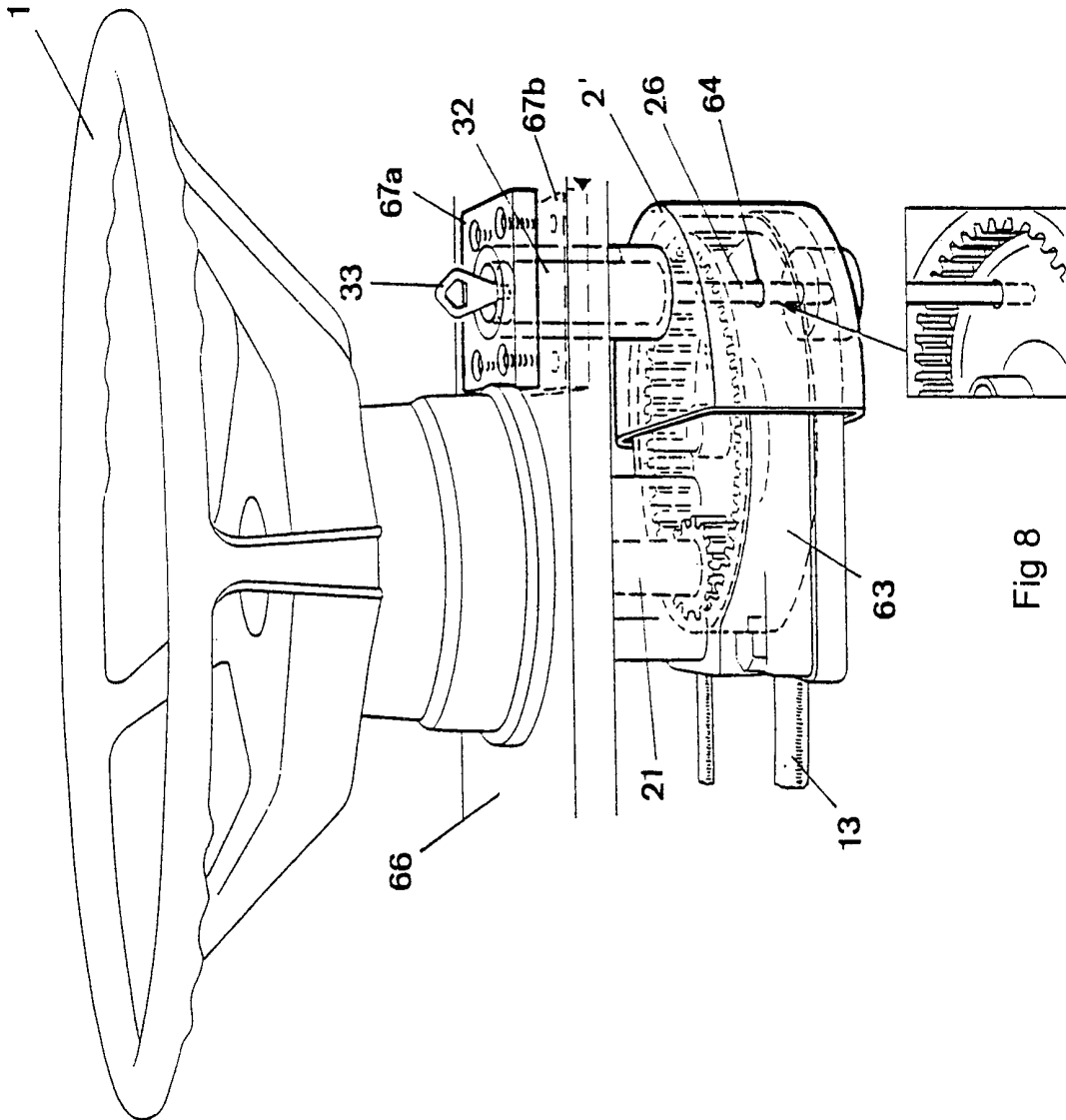


Fig 9

Fig 8

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 99/01419

## A. CLASSIFICATION OF SUBJECT MATTER

IPC7: E05B 73/00, B60R 25/02, B63M 25/52

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: E05B, B60R, B63M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 3747556 A (K.J. KJELLBERG), 24 July 1973 (24.07.73) --	1-14
Y	US 1367200 A (J.A. MURPHEY), 1 February 1921 (01.02.21) --	1-14
Y	US 3871199 A (K.L. PERLDAL), 18 March 1975 (18.03.75), column 1, line 53 - line 54 --	4
Y	DE 3906458 A1 (WEBER, W.), 6 Sept 1990 (06.09.90) --	9

 Further documents are listed in the continuation of Box C. See patent family annex.

\* Special categories of cited documents:

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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"&amp;" document member of the same patent family

Date of the actual completion of the international search

6 December 1999

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## INTERNATIONAL SEARCH REPORT

 International application No.  
 PCT/SE 99/01419

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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Y	DE 4236701 C1 (VALEO DEUTSCHLAND GMBH & CO.), 7 April 1994 (07.04.94) --	10-12
Y	WO 9219474 A1 (CARACIK, P.R.R.), 12 November 1992 (12.11.92) --	13
Y	US 4859541 A (H. MAXEINER ET AL), 22 August 1989 (22.08.89) --	14
A	US 4811580 A (J.J. JANG), 14 March 1989 (14.03.89) -- -----	

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Information on patent family members

02/11/99

International application No.

PCT/SE 99/01419

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