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A191 A401 A431 A505 A508 A522**

(56) Documents Cited

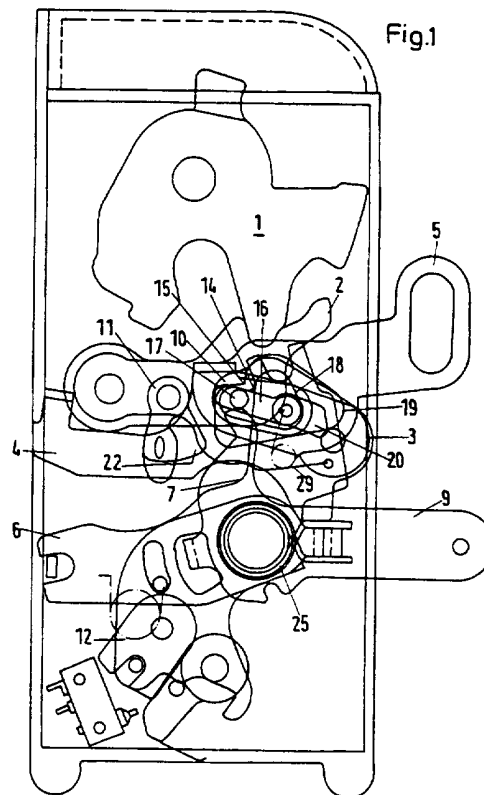
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(58) Field of Search

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INT CL⁶ B60R 25/00 , E05B 65/36**

(54) **A motor vehicle door lock with theft protection**

(57) A motor vehicle door lock has a rotary latch (1), a pawl (2) and a release lever (3) for the pawl (2), which release lever (3) comprises a release lever slot (16) extending substantially in the longitudinal direction of the release lever (3). An exterior actuating lever (5) has a driver catch (15), which is substantially aligned with one end of the release lever slot (16). Also provided are a locking central lever (7), which can be swivelled by means of an interior locking lever (6) and an exterior locking lever, (9) and on which a transmission lever (10) is mounted which has a coupling peg (17) which passes through the release lever slot (16) and which acts on the driver catch (15) of the exterior actuating lever (5), which coupling peg (17) is free from the driver catch (15) of the exterior actuating lever (5) in the "locked" operating position of the locking central lever (7) and of the transmission lever (10). Also provided is a theft protection lever (11) by means of which the movement of the transmission lever (10) and of the locking central lever (7) into the "unlocked" operating position can be blocked in the "theft-protected" operating position of the theft protection lever (11), wherein the interior locking lever (6) can be moved with inoperative travel in relation to the locking central lever (7) in the "theft-protected" operating position of the theft protection lever (11), and wherein the transmission lever (10) moves against the driver catch (15) of the exterior actuating lever (5) with spring cushioning in relation to the locking central lever (7) when the motor vehicle door lock is unlocked and when the exterior actuating lever (5) is simultaneously actuated.



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Fig.1

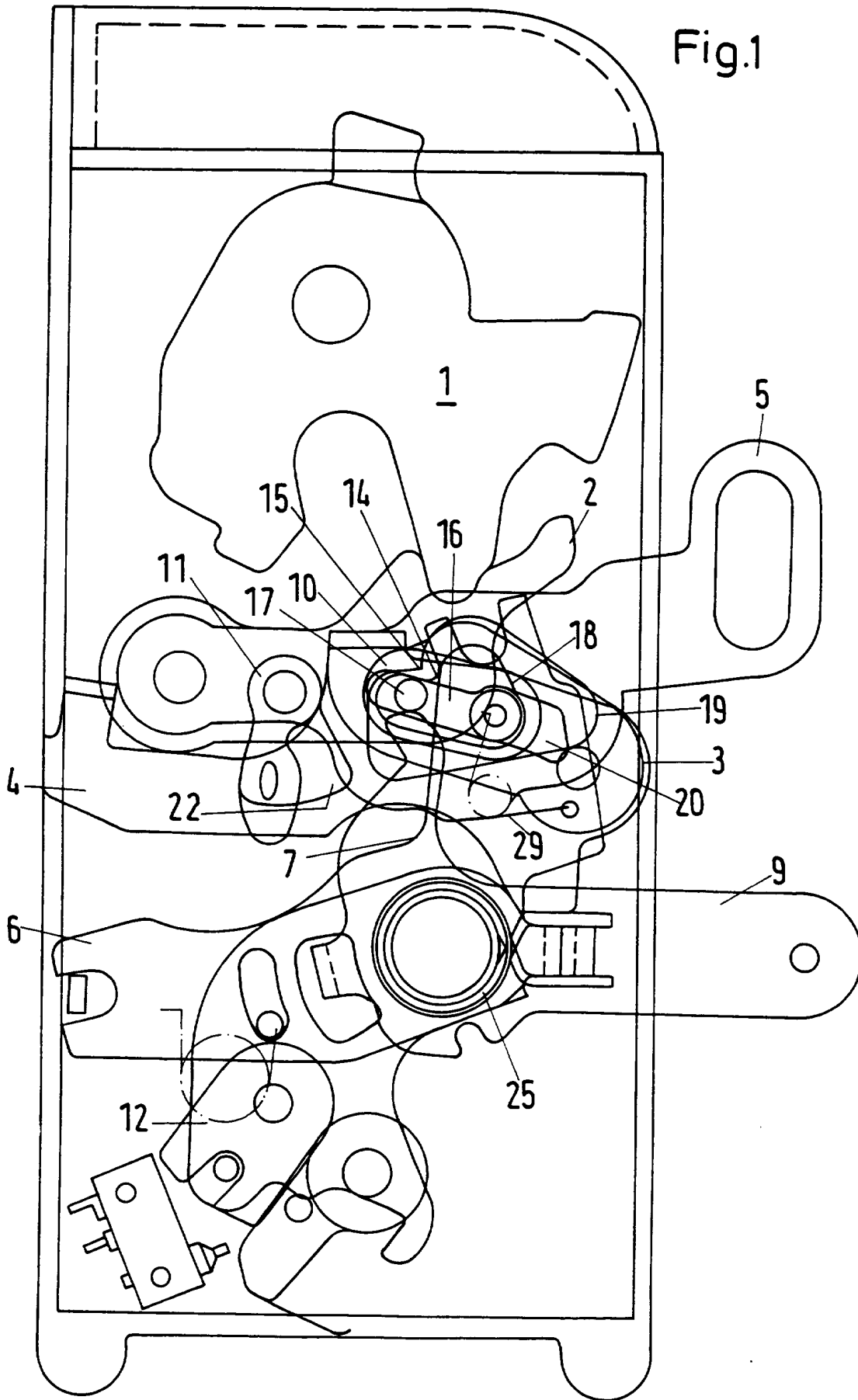


Fig.2

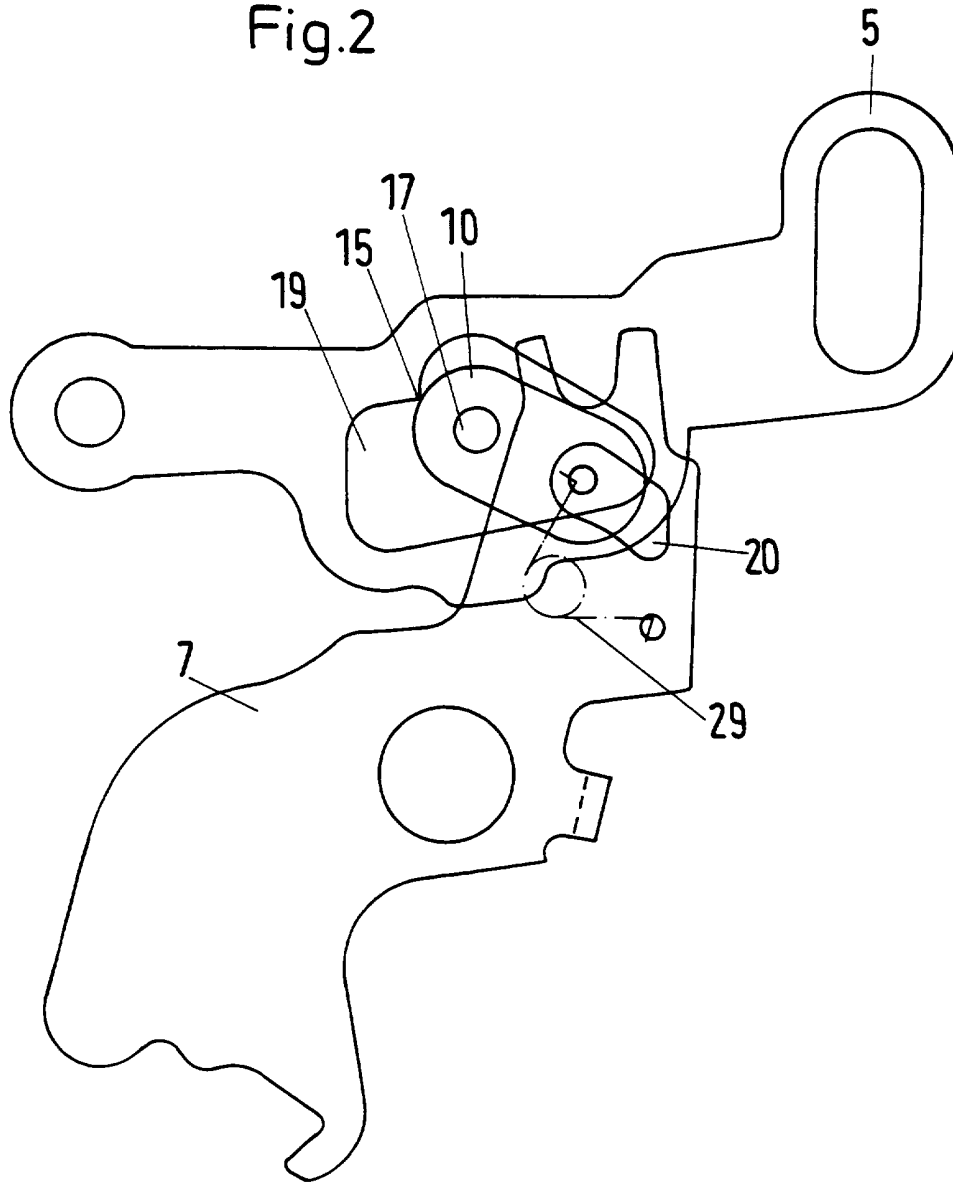


Fig.3

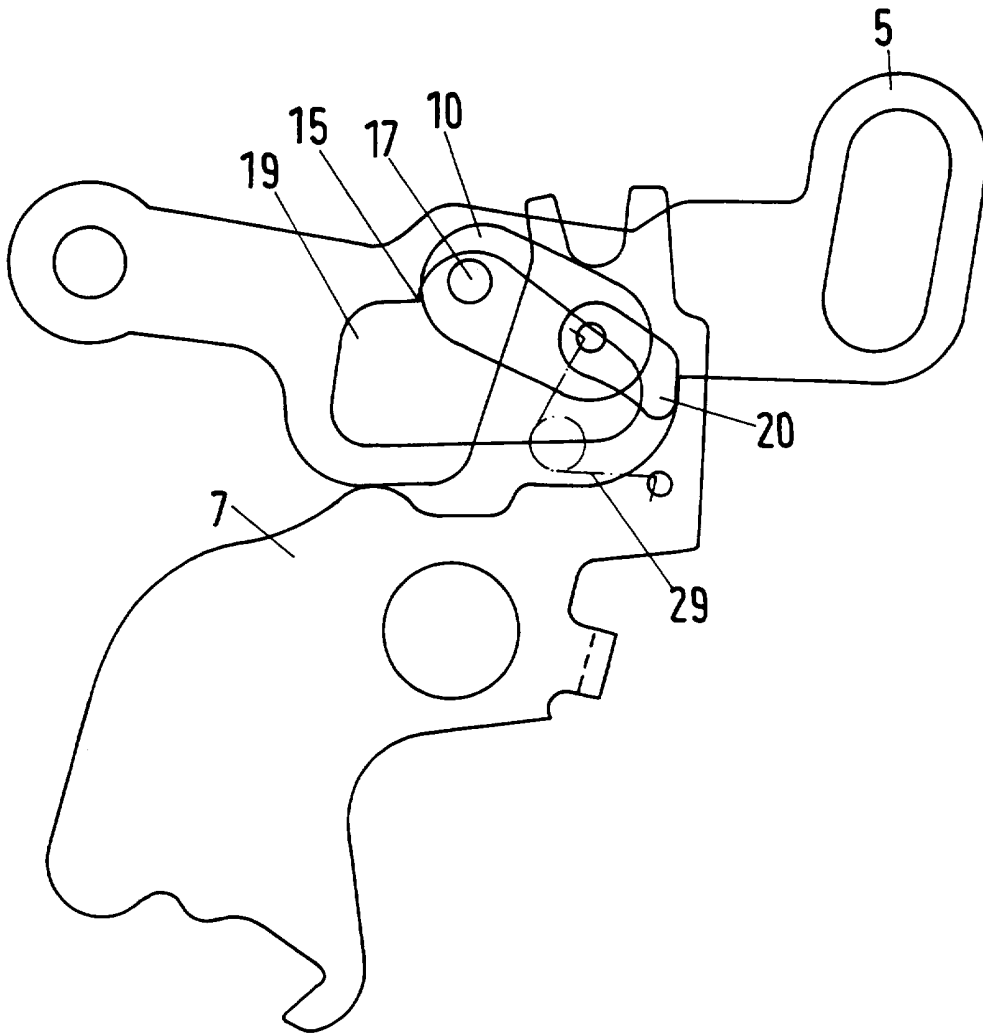
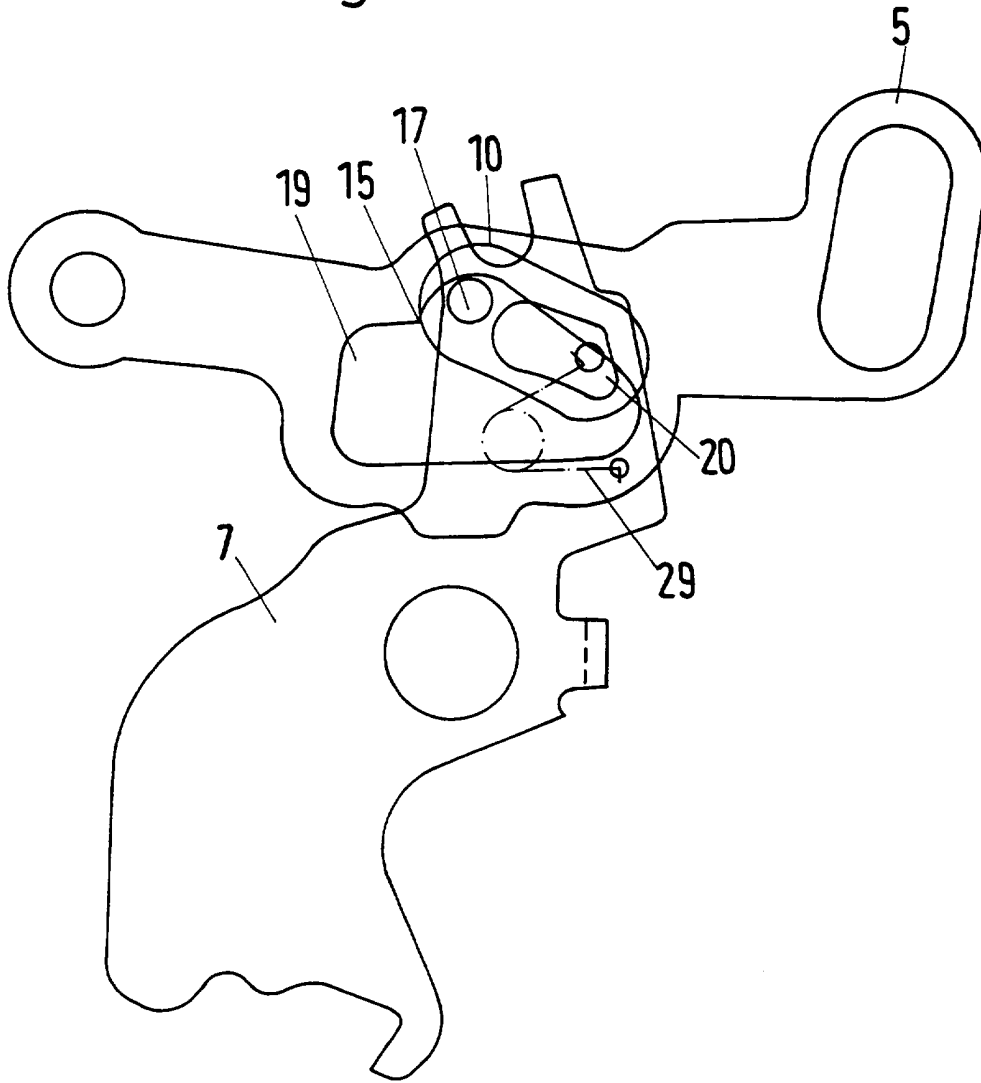


Fig.4



"A motor vehicle door lock"

This invention relates to a motor vehicle door lock having a rotary latch, a pawl and a release lever for the pawl, which release lever has a release lever slot extending substantially in the longitudinal direction of the release lever, having an exterior actuating lever with a driver catch, which driver catch is substantially aligned with one end of the release lever slot, having a locking central lever which can be swivelled by means of an interior locking lever and an exterior locking lever and on which a transmission lever is mounted which has a coupling peg which passes through the release lever slot and which acts on the driver catch of the exterior actuating lever, which coupling peg is free from the driver catch of the exterior actuating lever in the "locked" operating position of the locking central lever and of the transmission lever, and having a theft protection lever by means of which the movement of the transmission lever and of the locking central lever into the "unlocked" operating position can be blocked in the "theft-protected" operating position of the theft protection lever. - In general, the exterior actuating lever is connected to an exterior door handle and the interior actuating lever is connected to an interior actuating handle. The exterior locking lever can be actuated via a lock barrel. The interior locking lever is mostly connected via a control rod to an interior locking button. The construction of the release lever, of the exterior actuating lever and of the transmission lever which was cited initially results in the uncoupling of the actuating

lever system from the release lever in the "locked" operating position of the locking central lever. In this operating position of the locking central lever, the exterior actuating lever can thereby be moved with inoperative travel. Finally, 5 the theft protection lever has the effect that in the theft-protected state the motor vehicle door lock cannot be unlocked by the unauthorised application of force to the interior locking lever.

A motor vehicle door lock of the construction cited 10 initially is known as internal prior art from German Patent Application P 44 33 994.1-31. In the motor vehicle door lock which is known in this respect, theft protection is effected as what is termed free-travel theft protection, in that the transmission lever is displaceably mounted on the locking 15 central lever and is acted upon by spring force towards the "unlocked" operating position. In the "theft-protected" operating position of the theft protection lever, a blocking cam is swung into the path of movement of the transmission lever so that the "unlocked" operating position of the 20 transmission lever is blocked. In other words, the free travel of the theft protection is effected between the transmission lever and the locking central lever. In a further development of the said internal prior art, the free travel of the theft protection is no longer effected between 25 the transmission lever and the locking central lever, but is effected between the interior locking lever and the locking central lever. In this further development, a displaceable mounting of the transmission lever on the locking central

lever for the purpose of theft protection is no longer
necessary. This further development has been proven in
principle. It has been recognised, however, that the motor
vehicle door lock which has been further developed in this
5 respect does not function in the optimum manner under all
operating conditions. In particular, if an attempt is made to
unlock the motor vehicle door lock from the "locked" or
"theft-protected" operating position when the exterior
actuating lever is simultaneously actuated, the coupling peg
10 of the transmission lever moves laterally against the driver
catch of the exterior actuating lever and thus prevents the
locking central lever from being swivelled completely into the
"unlocked" operating position.

A basic object of the present invention is therefore
15 to further develop a motor vehicle door lock of the
construction cited initially so that the free-travel theft
protection function is not effected between the coupling lever
and the locking central lever, and so that the motor vehicle
door lock nevertheless functions reliably under all operating
20 conditions.

According to the present invention, there is provided
a motor vehicle door lock having a rotary latch, a pawl and a
release lever for the pawl, which release lever comprises a
release lever slot extending substantially in the longitudinal
25 direction of the release lever, having an exterior actuating
lever with a driver catch, which driver catch is substantially
aligned with one end of the release lever slot, having a
locking central lever, which can be swivelled by means of an

interior locking lever and an exterior locking lever, and on
which a transmission lever is mounted which has a coupling peg
which passes through the release lever slot and which acts on
the driver catch of the exterior actuating lever, which
5 coupling peg is free from the driver catch of the exterior
actuating lever in the "locked" operating position of the
locking central lever and of the transmission lever, and
having a theft protection lever by means of which the movement
of the transmission lever and of the locking central lever
10 into the "unlocked" operating position can be blocked in the
"theft-protected" operating position of the theft protection
lever, wherein the interior locking lever can be moved with
inoperative travel in relation to the locking central lever in
the "theft-protected" operating position of the theft
15 protection lever, and wherein the transmission lever moves
against the driver catch of the exterior actuating lever with
spring cushioning in relation to the locking central lever
when the motor vehicle door lock is unlocked and when the
exterior actuating lever is simultaneously actuated.

20 Because the transmission lever is of spring-cushioned
construction in relation to the locking central lever, the
locking central lever can also be swivelled completely into
the "unlocked" operating position when the exterior actuating
lever is actuated. In this respect it should be understood
25 that the transmission lever is biased towards the "unlocked"
operating position. If the exterior actuating lever is
released again when the motor vehicle door lock is unlocked in
this respect, the transmission lever then snaps into its

normal operating position again, and the release lever is released in the usual manner via the driver catch on a repeated actuation of the exterior actuating lever.

5 In one preferred form of construction, the transmission lever is displaceably mounted in a slot of the locking central lever which is substantially parallel to the release lever slot, and is acted upon by force in the direction of the driver catch of the exterior actuating lever by means of a biasing spring. In this connection,
10 "substantially parallel" means that an angle of less than 45° is provided between the release lever slot and the slot.

In one particularly simple form of construction of a motor vehicle door lock according to the invention, the free-travel theft protection is arranged so that the interior
15 locking lever is non-positively connected to the locking central lever by means of a theft protection spring. In this respect it is advantageous if the spring constants of the biasing spring and of the theft protection spring are designed so that in the "locked" and "theft-protected"
20 operating position of the motor vehicle door lock and when the interior locking lever is actuated the transmission lever remains in the inoperative position which is set with the biasing spring. In addition, an interior actuating lever with a driver catch can be provided, wherein the driver catch
25 of the interior actuating lever is substantially aligned with the driver catch of the exterior actuating lever. In this form of construction the transmission lever moves in a corresponding manner against the driver catch of the interior

actuating lever, with spring-cushioning in relation to the locking central lever, when the motor vehicle door lock is unlocked and when the interior actuating lever is actuated simultaneously.

5 A motor vehicle door lock according to the invention can be equipped with a central locking drive, wherein the locking central lever and/or the theft protection lever can be swivelled between their operating positions by means of the central locking drive.

10 The invention is described in more detail below with reference to the drawings, which merely illustrate an example of an embodiment, and where:

15 Figure 1 is a general view of a motor vehicle door lock according to the invention in the "unlocked" operating position;

 Figure 2 is a partial view of Figure 1, in the "locked" operating position;

 Figure 3 corresponds to Figure 2 with the exterior actuating lever actuated; and

20 Figure 4 corresponds to Figure 3 with the locking central lever swivelled into the "unlocked" position.

 It can firstly be seen from Figure 1 that the motor vehicle door lock is constructed in the usual manner with a rotary latch 1, a pawl 2, a release lever 3 for the pawl, and
25 with an actuating lever system 4, 5 acting on the release lever 3. A locking lever system is provided, and comprises a locking central lever 7 as well as an interior locking lever 6 and an exterior locking lever 9. The locking central lever 7

can be swivelled by means of the interior locking lever 6 and the exterior locking lever 9. In detail, the actuating lever system 4, 5 comprises an interior actuating lever 4 and an exterior actuating lever 5, wherein the interior actuating lever 4 and the exterior actuating lever 5 each have a recess 18, 19 with a driver catch 14, 15. The release lever 3 has a release lever slot 16 extending substantially in the longitudinal direction of the release lever 3. The driver catches 14, 15 and one end of the release lever slot 16 are substantially aligned with each other. A transmission lever 10 with a coupling peg 17 is mounted on the locking central lever 7. The coupling peg 17 passes through the recesses 18, 19 and through the release lever slot 16. In the "locked" operating position of the locking central lever 7 and of the transmission lever 10, the coupling peg 17 is free from the driver catches 14, 15 of the exterior actuating lever 5 and of the interior actuating lever 4. By means of this construction, the actuating lever system 4, 5 can be moved with inoperative travel in the "locked" operating position of the locking central lever 7.

In addition, a theft protection lever 11 is provided, by means of which the movement of the transmission lever 10 and of the locking central lever 7 into the "unlocked" operating position can be blocked in the "theft-protected" operating position. In detail, the theft protection lever 11 comprises a blocking cam 22 for this purpose, which can be swung into the path of movement of the coupling peg 17 in the "unlocked" operating position of the transmission lever 10.

In the "theft-protected" operating position of the theft protection lever 11, the interior locking lever 6 can be moved with inoperative travel in relation to the locking central lever 7. In detail, the interior locking lever 6 is non-positively connected to the locking central lever 7 for this purpose by means of a theft protection spring 25. In the embodiment illustrated, a central locking drive with a power take-off element 12 is provided, by means of which the locking central lever 7 and/or the theft protection lever 11 can be swivelled between their operating positions.

When the motor vehicle door lock is unlocked and when the exterior actuating lever 5 is simultaneously actuated, the transmission lever 10 moves against the driver catch 15 of the exterior actuating lever 5 with spring-cushioning in relation to the locking central lever 7. This situation is correspondingly applicable when the motor vehicle door lock is unlocked and the interior actuating lever 4 is simultaneously actuated. In detail, the transmission lever 10 is displaceably mounted in a slot 20 of the locking central lever 7 which is substantially parallel to the release lever slot 16, and is acted upon by force in the direction of the driver catch 15 of the exterior actuating lever 5 by means of a biasing spring 29.

It can be seen from a comparative examination of Figures 2 and 3 that in the "locked" operating position of the motor vehicle door lock the exterior actuating lever 5 can be moved with inoperative travel, since the driver catch 15 is moved past the coupling peg 17 by a movement of the exterior

actuating lever 5. In contrast, in the operating position shown in Figure 1, the effect of actuating the exterior actuating lever 5 is that the driver catch 15 entrains the coupling peg 17 and thus releases the release lever 3. It can further be seen from a comparative examination of Figures 3 and 4 that the locking central lever 7 can also be swivelled into the "unlocked" operating position when the exterior actuating lever 5 is actuated. This is ensured in that the transmission lever 10 is spring-cushioned in relation to the locking central lever 7 in the course of the swivelling of the locking central lever 7. The lateral movement of the coupling peg 17 against the driver catch 15 is thus cushioned by the biasing spring 29. After the exterior actuating lever 5 is released, the operating position shown in Figure 1 is reached again.

CLAIMS

1. A motor vehicle door lock having a rotary latch, a pawl and a release lever for the pawl, which release lever comprises a release lever slot extending substantially in the longitudinal direction of the release lever,

5 having an exterior actuating lever with a driver catch, which driver catch is substantially aligned with one end of the release lever slot,

having a locking central lever, which can be swivelled by means of an interior locking lever and an exterior locking lever, and on which a transmission lever is mounted which has a coupling peg which passes through the release lever slot and which acts on the driver catch of the exterior actuating lever, which coupling peg is free from the driver catch of the exterior actuating lever in the "locked" operating position of the locking central lever and of the transmission lever, and

15 having a theft protection lever by means of which the movement of the transmission lever and of the locking central lever into the "unlocked" operating position can be blocked in the "theft-protected" operating position of the theft protection lever,

20 wherein the interior locking lever can be moved with inoperative travel in relation to the locking central lever in the "theft-protected" operating position of the theft protection lever, and

25 wherein the transmission lever moves against the driver catch of the exterior actuating lever with spring

cushioning in relation to the locking central lever when the motor vehicle door lock is unlocked and when the exterior actuating lever is simultaneously actuated.

2. A motor vehicle door lock according to claim 1, wherein the transmission lever is displaceably mounted in a slot of the locking central lever which is substantially parallel to the release lever slot, and is acted upon by force in the direction of the driver catch of the exterior actuating lever by means of a biasing spring.

3. A motor vehicle door lock according to claim 1 or 2, wherein the interior locking lever is non-positively connected to the locking central lever by means of a theft protection spring.

4. A motor vehicle door lock according to any one of claims 1 to 3, wherein the spring constants of the biasing spring and of the theft protection spring are designed so that in the "locked" and "theft-protected" operating position of the motor vehicle door lock and when the interior locking lever is actuated the transmission lever remains in the inoperative position which is set with the biasing spring.

5. A motor vehicle door lock according to any one of claims 1 to 4, wherein an interior actuating lever with a driver catch is provided, and wherein the driver catch of the interior actuating lever is substantially aligned with the driver catch of the exterior actuating lever.

6. A motor vehicle door lock according to any one of claims 1 to 5, wherein the locking central lever and/or the theft protection lever can be swivelled between their

operating positions by means of a central locking drive.



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Claims searched: All

Examiner: A Angele
Date of search: 2 July 1996

**Patents Act 1977
Search Report under Section 17**

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): E2A(AMXG, AMXF, AARN)

Int Cl (Ed.6): B60R-025/00; E05B-065/36

Other:

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	GB 2285476 A ROCKWELL BODY & CHASSIS	
A	GB 2284636 A MITSUI KINZOKU KKK	
A	DE 4433994 C1 KIERKERT AG	
	See whole document in each case.	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.