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⑤④ **Closing and opening mechanism for the boot lid or rear hatchback door of a motor vehicle.**

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Description

The present invention relates to closing and opening mechanism for the boot or rear hatchback door of a motor vehicle having a locking mechanism.

More particularly, the invention relates to a closing and opening mechanism of the type known from the applicant comprising a hollow support body in which a push button carrying a cylinder lock is slidable, and a member for releasing the latch mechanism which is slidable with the push button and rotatable relative thereto, as a result of the rotation of the lock cylinder, between an inoperative position corresponding to the locked position of the lock cylinder in which the sliding of the push button does not cause the release of the latch mechanism, and an operative position corresponding to the unlocked position of the lock cylinder in which the sliding of the push button causes the release of the latch mechanism and hence the opening of the boot lid or hatchback door of the vehicle in use.

In closing and opening mechanisms of the type specified above it is known to achieve the rotation of the latch-release member from its operative position to the inoperative position in order to prevent the opening of the boot lid or hatchback door automatically by means of a servomechanism connected to the latch-release member and operated by a central electrical locking device for the motor vehicle doors.

Such an electrical device is normally controlled by the push button or control lever for locking and unlocking the driver's door of the vehicle.

Such devices, however, have the disadvantage that the return of the latch-release member to its operative position to allow the opening of the boot lid or hatchback door of the vehicle must be carried out manually by means of the key for operating the cylinder lock which is obviously inconvenient and not very practical.

In order to avoid this disadvantage, the present invention provides a closing and opening mechanism of the type specified above, characterised in that the servomechanism is also able to rotate the latch-release member from the inoperative position to the operative position when the lock cylinder is in its unlocked position, while this rotation is prevented when the lock cylinder is in its locked position, and in that the servomechanism is of the reversible type and the lock cylinder can adopt a second unlocked position to locate the latch-release member in the operative position independently of the operative state of the servomechanism.

By virtue of this characteristic, when the lock cylinder is in the unlocked position, the position adopted by the latch-release member corresponds to that of the push button for locking the driver's door of the vehicle, that is, the operative position when this push button is in the unlocked position and the inoperative position when this push button is in the locked position. Hence, in this situation the opening of the boot lid or

hatchback door may be achieved directly from inside the vehicle without the necessity for manual use of the key.

As long as the lock is in its locked position, however, the latch-release member is retained in its inoperative position, preventing the boot lid or hatchback of the vehicle being opened whatever the position of the push button of the driver's door.

Under these circumstances the boot lid or hatchback door may be opened either by rotation of the cylinder lock into its first unlocked position with the key, in which case the opening is achieved automatically through the servomechanism acting on the locking and unlocking push button for the driver's door, or by rotation of the cylinder lock into the second unlocked position, in which case the opening of the boot lid or hatchback door is effected manually independently of the operative state of the servomechanism.

The latch-release member is constituted by an annular element surrounding the support body and having a radial operating lug arranged to cooperate axially with a complementary operating part for releasing the latch mechanism, an attachment part for connection to the servomechanism and a diametrically extending pin located in angular correspondence with the said radial operating lug and rotatable and translatable rigidly with the latch-release member. The lock cylinder has two axial projections located on opposite sides of the said pin, the sides of which define abutment surfaces cooperating with this pin so that:

a) in the first unlocked position of the lock cylinder the said abutment surfaces are located angularly so as not to interfere with the pin, thus allowing the angular movement of the latch-release member between the operative and inoperative positions;

b) in the locked position of the lock cylinder the said abutment surfaces are rotated from the first unlocked position and bear against the pin so as to lock the latch-release member in the inoperative position;

c) in the second unlocked position of the lock cylinder the abutment surfaces are rotated in the opposite sense from the first unlocked position and bear against the pin retaining the latch-release member in the operative position.

The invention will now be described in detail with reference to the appended drawings, provided purely by way of non-limiting example, in which:

Figure 1 is a schematic, partially-sectioned longitudinal view of a closing and opening mechanism for the boot lid or rear hatchback of a motor vehicle according to the invention,

Figure 2 is an elevational view taken on the arrow II of Figure 1,

Figure 3 is a perspective view of part of the mechanism,

Figure 4 is a view similar to Figure 2 showing the mechanism in a first condition of operation;

Figure 5 is a cross-sectional view taken on line V—V of Figure 1 in a first position in the said first operative condition,

Figure 6 is a view similar to Figure 5 in a second position of the said first operative condition,

Figure 7 is a view similar to Figure 4 in a second operative condition of the mechanism,

Figure 8 is a view similar to Figure 5 in the said second operative condition,

Figure 9 is a view similar to Figure 4 showing the mechanism in a third operative condition and

Figure 10 is a view similar to Figure 6 in the said third operative condition.

Referring initially to Figures 1 to 3, a hollow cylindrical support body is indicated 10 which is intended to be fitted to an aperture formed in the boot lid or in the rear hatchback door (not illustrated) of a motor vehicle with the interposition of an annular sealing washer 12.

An operating push button 14 is slidable axially in the body 10 and has a hollow outer end part 16 with internal axial recesses 18 housing inserts 20 of very durable material.

The push button 14 is fixed against rotation relative to the body 10 by means of keys 15 and its end part 16 constitutes the fixed member of a cylinder lock the rotatable cylinder of which is indicated 24.

The rotatable cylinder 24 is of generally conventional type and has, in known manner, tumbler plates 26 arranged to cooperate in known manner with the recesses 18.

As illustrated in greater detail in Figure 3, the rotatable cylinder 24 has two diametrically opposed axially projecting lugs 30 with radially disposed flat side faces 32, 34 at its inner end.

A radial projection 36 projecting from the inner end part of the cylinder 24 engages an internal groove 37 in the push button 14.

Between the inner end 38 of the push button 14 and the end wall of the body 10 is a helical compression spring 40 opposing the sliding of the push button 14 towards the left in Figure 1.

An annular element 42 is slidable and rotatable around the outside of the body 10. The element 42 has a radial operating lug 44 on one side arranged to cooperate frontally, in the manner which will be clarified below, with a cooperating member 46 the movement of which causes the release of the latch mechanism for the boot lid or hatchback door and hence its opening.

On its opposite side, the annular element 42 has a forking attachment 48 to which is articulated a rod 50 forming part of a reversible servomechanism, for example of the screw and nut type, operated by a central electrical locking mechanism of conventional type for the vehicle doors. This servomechanism is controlled in known manner through the push button or control lever for the locking and unlocking of the driver's door of the vehicle.

The annular element 42 is further provided with a diametrically extending pin 52 which is located in angular correspondence with the radial lug 44 and passes through slots 54 in the body 10 and

apertures 56 in the push button 14. The pin 52 is located between the axial projections 30 of the rotatable cylinder 24 and is obviously fixed to the annular element 42 for rotational and translational movement therewith. As will become clearer below, the pin 52 allows the thrust imparted to push button 14 and the rotation imparted to the rotatable cylinder 24 to be transmitted to the annular element 42. The rotation is achieved manually by means of a suitable key inserted in the keyhole 58 of the cylinder 24.

The operation of the device described above will now be described.

The rotatable cylinder 24 of the lock 22 is arranged to take up three different angular positions which will be termed the "first unlocked position", the "locked position", and the "second unlocked position" below. In these positions the keyhole 58 is disposed in the positions illustrated respectively in full outline in Figure 2 and in Figure 4, in broken outline in Figure 2 and in Figure 7, and in chain line in Figure 2 and in Figure 9.

The movement from the first unlocked position to the locked position is effected by rotation of the cylinder 24 through 90° in the clockwise sense, while the movement from the first unlocked position to the second unlocked position is effected by rotation of the cylinder 24 through about 40° in the anticlockwise sense.

It should be noted that the axially projecting lugs 30 of the cylinder 24 are aligned with each other on a diametral axis which is parallel to the longer side of the keyhole 58. Consequently the angular position of the lugs 30 varies as a result of the rotation of the cylinder 24 in exactly the same way as the angular position of the aperture 58.

In the first unlocked position the aperture 58 and the lugs 30 are thus located in the angular position illustrated in Figures 4, 5 and 6. In this position the pin 52 and hence the annular element 42 is free to effect an angular displacement of the order of 40° between the position illustrated in Figure 5 and the position illustrated in Figure 6. In the first of these positions (Figure 5) which will be termed the "operative position" below, the operating lug 44 of the annular element 42 faces the cooperating member 46 frontally, while in the second of these positions (Figure 6), which will be termed the "inoperative position" below, the lug 44 is angularly offset with respect to the member 46. The rotation of the annular element 42 is achieved automatically through the servomechanism 50 which, as stated above, is controlled by means of the central electrical locking mechanism for the vehicle doors: the condition of Figure 5 corresponds to the unlocked position of the locking and unlocking lever or push button of the driver's door, while the condition of Figure 6 corresponds to the locking position of this lever or push button. Consequently, as long as the central locking mechanism is in the locking state, the opening of the boot lid or hatchback door of the vehicle is prevented, while as long as this mechanism is in the unlocking state the opening

of the boot lid or hatchback door is allowed. Indeed, in the first case the annular element 42 and hence the radial lug 44 are held in the inoperative position of Figure 6 by the servomechanism 50 whereby any sliding of the push button 14 against the action of the spring 40 and simultaneous axial advance of the element 42 do not allow the cooperating member 46 to be operated. In the second case the annular element 42 and the lug 44 are held in the operative position of Figure 5 by the servocontrol 50 whereby the thrust on the push button 14 against the action of the spring 40 and the simultaneous advance of the annular element 42 by means of the pin 52 cause the lug 44 to bear against the cooperating member 46 and consequently displace the latter and allow opening of the boot lid or hatchback door.

In other words when the lock 22 is in the first unlocked position, the servomechanism 50 allows the annular element 42 to be positioned automatically both in the inoperative position in which the operation of the cooperating member 46 is prevented (Figure 6) and in the operative position in which this operation is on the contrary allowed (Figure 5).

In the locked position of the lock 22 illustrated in Figures 7 and 8, the lugs 30 are rotated through 90° in the clockwise sense relative to the first unlocked position, such that the pin 52 is locked in the position illustrated in Figure 8 between the side face 32 of one of the lugs 30 and the side surface 34 of the other lug 30. This position corresponds to the inoperative position of the annular element 42 in that the radial lug 44 is angularly offset relative to the cooperating member 46. Consequently, as long as the lock 22 is in the locked position, the opening of the boot lid or hatchback door of the vehicle is prevented and cannot be allowed by the servomechanism 50, whatever the position of the push button or lever for locking and unlocking the driver's door.

As soon as the cylinder 24 is rotated in an anti-clockwise sense into the second unlocked position illustrated in Figure 9, the axial lugs 30 of this cylinder 24 retain the pin 52 and hence the annular element 42 in the operative position corresponding to alignment of the radial lug 44 and the cooperating member 46. Indeed, in this position the pin 52 bears against the side face 32 of one of the lugs 30 and against the side face 34 of the other projection 30 and the opening of the boot lid or hatchback door of the vehicle can be achieved by pushing on the push button 14 whatever the state of the servomechanism 50.

Claims

1. Closing and opening mechanism for the boot lid or the rear hatchback door of a motor vehicle having a locking mechanism, of the type comprising a hollow support body (10) in which a push button (14) carrying a cylinder lock (22) is slidable, and a member (42, 44) for releasing the latch mechanism which is slidable with the push button

(14) and rotatable relative thereto, as a result of the rotation of the cylinder (22) of the lock, between an inoperative position corresponding to the locked position of the lock cylinder (22) in which the sliding of the push button (14) does not cause the release of the latch mechanism, and an operative position corresponding to the unlocked position of the lock cylinder (22) in which the sliding of the push button (14) causes the release of the latch mechanism and hence, in use, the opening of the boot lid or hatchback, and in which the rotation of the latch-release member (42, 44) from the operative position to the inoperative position can also be achieved automatically by means of a servomechanism (50) connected to the latch-release member (42, 44) and operated by a central electrical locking mechanism for the motor vehicle doors, characterised in that the servomechanism (50) is also able to rotate the latch-release member (42, 44) from the inoperative position to the operative position when the lock cylinder (24) is in its unlocked position while this rotation is prevented when the lock cylinder (24) is in its locked position, and in that the servomechanism (50) is of the reversible type and the lock cylinder (24) can adopt a second unlocked position for locating the latch-release member (42, 44) in the operative position independently of the operative state of the servomechanism (50).

2. Mechanism according to Claim 1, characterised in that the latch release member is constituted by an annular element (42) surrounding the support body (10) and having a radial operating lug (44) arranged to cooperate axially with a complementary cooperating part (46) for releasing the latch mechanism, an attachment part (48) for connection to the servomechanism (50) and a diametrically-extending pin (52) located in angular correspondence with the said radial operating lug (44) and rotatable and translatable rigidly with the latch-release member (42); the lock cylinder (24) having two axially-extending projections (30) located on opposite sides of the said pin (52) the sides of which define abutment surfaces (32, 34) cooperating with this pin (52) so that:

a) in the first unlocked position of the lock cylinder (24) the said abutment surfaces (32, 34) are located angularly so as not to interfere with the pin (52), thus allowing the angular movement of the latch-release member (42) between the operative and inoperative position;

b) in the closing position of the locking cylinder (24) the said abutment surfaces (32, 34) are rotated from the first opening position and bear against the pin (52) so as to lock the latch-release member (42, 44) in the inoperative position;

c) in the second unlocked position of the lock cylinder (24) the abutment surfaces (32, 34) are rotated in the opposite sense from the first unlocked position and bear against the pin (52) retaining the latch-release member (42, 44) in the operative position.

3. Mechanism according to Claim 2, characterised in that the angle between the locked position and the first unlocked position of the lock cylinder

(24) is of the order of 90° and the angle between the second unlocked position and the first unlocked position of the lock cylinder (24) is of the order of 40°.

Patentansprüche

1. Schließ- und Öffnungsmechanismus für Kofferraumdeckel oder Hecktüren von Kraftfahrzeugen mit einem Verriegelungsmechanismus, der einen hohlen Trägerkörper (10) aufweist, in dem ein Druckknopf (14), der ein Zylinderschloß (22) trägt, gleitbar angeordnet ist, und ein Verriegelungs-Auslöseglied (42, 44) zum Auslösen des Verriegelungsmechanismus, das mit dem Druckknopf (14) gleitbar und aufgrund einer Drehbewegung des Schloßzylinders (22) relative zu ihm drehbar ist zwischen einer der Verriegelungsposition des Schloßzylinders (22) entsprechenden Ruheposition, in der das Verschieben des Druckknopfes (14) kein Auslösen des Verriegelungsmechanismus bewirkt, und einer Arbeitsposition, die der unverriegelten Stellung des Schloßzylinders (22) entspricht, in der das Verschieben des Druckknopfes (14) das Auslösen des Verriegelungsmechanismus und damit das Öffnen des Kofferraumdeckels oder der Hecktür bewirkt, wobei das Drehen des genannten Verriegelungs-Auslöseglieds (42, 44) aus der Arbeitsposition in die Ruheposition auch automatisch mit Hilfe eines Servomechanismus (50) erfolgen kann, der mit dem Verriegelungs-Auslöseglied (42, 44) verbunden und durch einen zentralen elektrischen Verriegelungsmechanismus für die Kraftfahrzeugtüren betätigbar ist, dadurch gekennzeichnet, daß der Servomechanismus (50) ferner das Verriegelungs-Auslöseglied (42, 44) aus der Ruheposition in die Arbeitsposition drehen kann, wenn der Schloßzylinder (24) sich in seiner unverriegelten Position befindet, während eine solche Drehung verhindert ist, wenn der Schloßzylinder (24) sich in seiner Schließposition befindet, und daß der Servomechanismus (50) ein reversibler Mechanismus ist und der Schloßzylinder (24) eine zweite unverriegelte Position einnehmen kann, um das Verriegelungs-Auslöseglied (42, 44) unabhängig von dem Betriebszustand des Servomechanismus (50) in die Arbeitsposition zu führen.

2. Mechanismus nach Anspruch 1, dadurch gekennzeichnet, daß das Verriegelungs-Auslöseglied von folgenden Teilen gebildet ist: einem ringförmigen Element (42), das den Trägerkörper (10) umgibt und einen radialen Betätigungsansatz (44) besitzt, der derart angeordnet ist, daß er axial mit einem komplementären Teil (46) zusammenwirkt, um den Verriegelungsmechanismus auszulösen; einem Befestigungsteil (48) für die Verbindung mit dem Servomechanismus (50) und einem diametral verlaufenden Stift (52), dessen Winkelstellung derjenigen des radialen Betätigungsansatzes (44) entspricht und der mit dem Verriegelungs-Auslöseglied (42) starr drehbar und längsverschiebbar ist, wobei der Schloßzylinder (24) zwei axial verlaufende Vorsprünge

(30) aufweist, die auf entgegengesetzten Seiten des Stiftes (52) angeordnet sind und deren Seiten Anschlagflächen (32, 34) bilden, die mit diesem Stift (52) derart zusammenwirken, daß

a) in der ersten unverriegelten Position des Schloßzylinders (24) die Anschlagflächen (32, 34) eine solche Winkelposition haben, daß sie mit dem Stift (52) nicht kollidieren, so daß sie eine Winkelbewegung des Verriegelungs-Auslöseglieds (42) zwischen der Arbeitsposition und der Ruheposition ermöglichen,

b) in der Schließposition des Schloßzylinders (24) die Anschlagflächen (32, 34) aus der ersten Öffnungsposition herausgedreht sind und am dem Stift (52) anschlagen, so daß sie das Verriegelungs-Auslöseglied (42, 44) in der Ruheposition sperren,

c) in der zweiten unverriegelten Position des Schloßzylinders (24) die Anschlagflächen (32, 34) in der entgegengesetzten Richtung aus der ersten unverriegelten Position gedreht werden gegen den Stift (52) anschlagen, und dadurch das Verriegelungs-Auslöseglied (42, 44) in der Arbeitsposition halten.

3. Mechanismus nach Anspruch 2, dadurch gekennzeichnet, daß der Winkel zwischen der Verriegelungsposition und der ersten unverriegelten Position des Schloßzylinders (24) in der Größenordnung von 90° liegt und der Winkel zwischen der zweiten unverriegelten Position und der ersten unverriegelten Position des Schloßzylinders (24) in der Größenordnung von 40° liegt.

Revendications

1. Dispositif pour ouvrir et fermer le capot de coffre à bagages ou la porte de hayon arrière d'un véhicule automobile muni d'un mécanisme de verrouillage, du type comprenant un corps de support creux (10) dans lequel peut coulisser un bouton poussoir (14) portant une serrure cylindrique (22), et un élément (42, 44) pour libérer le mécanisme de blocage qui peut coulisser avec le bouton poussoir (14) et qui est rotatif par rapport à ce dernier, par suite de la rotation du cylindre (22) de la serrure, entre une position non opérationnelle correspondant à la position verrouillée du cylindre de serrure (22), à laquelle le coulisement du bouton poussoir (14) n'engendre pas la libération du mécanisme de blocage, et une position opérationnelle correspondant à la position déverrouillée du cylindre de serrure (22), à laquelle le coulisement du bouton poussoir (14) engendre la libération du mécanisme de blocage et par suite, en utilisation, l'ouverture du capot de coffre à bagages ou du hayon arrière, et selon lequel la rotation de l'élément de déblocage (42, 44) de la position opérationnelle à la position non opérationnelle peut également être réalisée automatiquement au moyen d'un servomécanisme (50) relié à l'élément de déblocage (42, 44) et actionné par un mécanisme central de verrouillage électrique des portes du véhicule automobile, caractérisé en ce que le servomécanisme (50) est également capable de faire tourner l'élément

de déblocage (42, 44) de la position non opérationnelle à la position opérationnelle lorsque le cylindre de serrure (24) est à sa position déverrouillée, tandis que cette rotation est empêchée lorsque le cylindre de serrure (24) est à sa position verrouillée, et en ce que le servomécanisme (50) est du type réversible, et le cylindre de serrure (24) peut adopter une deuxième position déverrouillée pour positionner l'élément de déblocage (42, 44) à la position opérationnelle indépendamment de l'état de fonctionnement du servomécanisme (50)

2. Dispositif selon la revendication 1, caractérisé en ce que l'élément de déblocage est constitué par un élément annulaire (42) entourant le corps de support (10) et présentant une patte (44) agissant radialement, disposée de manière à coopérer axialement avec une pièce coopérante complémentaire (46) afin de libérer le mécanisme de blocage, une pièce accessoire (48) pour le raccordement au servomécanisme (50), et une axe (52) s'étendant diamétralement, situé en correspondance angulaire avec ladite patte agissant radialement (44), et rigidement rotatif et déplaçable avec l'élément de déblocage (42); le cylindre de serrure (24) étant muni de deux saillies s'étendant axialement (30) situées sur des côtés opposés dudit axe (52), dont les côtés définissent des surfaces de butée

(32, 34) coopérant avec cet axe (52), de telle sorte que:

a) à la première position déverrouillée du cylindre de serrure (24), lesdites surfaces de butée (32, 34) sont disposées angulairement de manière à ne pas interférer avec l'axe (52), autorisant ainsi le déplacement angulaire de l'élément de déverrouillage (42) entre la position opérationnelle et la position non opérationnelle;

b) à la position de fermeture du cylindre de serrure (24), lesdites surfaces de butée (32, 34) sont tournées par rapport à la première position d'ouverture, et viennent porter contre l'axe (52) de manière à verrouiller l'élément de déblocage (42, 44) à la position non opérationnelle;

c) à la deuxième position déverrouillée du cylindre de serrure (24), les surfaces de butée (32, 34) sont tournées dans le sens opposé par rapport à la première position déverrouillée, et viennent porter contre l'axe (52) de manière à retenir l'élément de déblocage (42, 44) à la position opérationnelle.

3. Dispositif selon la revendication 2, caractérisé en ce que l'angle entre la position verrouillée et la première position déverrouillée du cylindre de serrure (24) est de l'ordre de 90°, et l'angle entre la deuxième position déverrouillée et la première position déverrouillée du cylindre de serrure (24) est de l'ordre de 40°.

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