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(54) Storage device with safety function

Bewahrungsvorrichtung mit einer Sicherheitsfunktion

Dispositif de rangement avec une fonction de sécurité

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FR-A- 2 579 181	US-A- 4 462 630
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Description

This invention relates to a so-called push-open type storage device to be installed as in the instrument panel of an automobile, and more particularly to a storage device with a safety function according to the preamble of claim 1 or 2. Such a storage device is disclosed in for example US-A-5 052 728.

Generally, conventional push-open type storage devices of this type comprise a storage cabinet operably supported in a housing which is provided on the side of the instrument panel of an automobile and constantly kept biased in the opening direction thereof by the biasing force of a spring, a cam member provided therein a cam groove which has a guide inlet, a lock part and a guide outlet, and which is rotatably disposed on the side of the housing, and a pin member adapted to move inside the cam groove of the cam member and disposed on the side of the storage cabinet, whereby the storage cabinet can be locked at its shut position inside the housing against the biasing force of the spring by causing the pin member to be engaged with the lock part of the cam groove and, by causing the storage cabinet held in the locked state to be depressed farther into the housing, the pin member can be released from the engagement with the lock part of the cam groove and the storage cabinet can be consequently moved automatically in the opening direction thereof from the opening of the housing.

A typical one of the conventional storage devices is shown in Figures 1 and 2, wherein a cam member 21 which is a one-piece shaped article of synthetic resin is rotatably fitted on a fixing shaft 27 on the side of a housing (not shown) through a torsion spring 28 and is constantly kept biased by the biasing force of the torsion spring 28 in the direction of a regulating wall 29 until it succumbs to the control of the regulating wall part 29. In the specific construction of this cam member 21, a lock part 24 and a guide outlet 25 are formed in extreme proximity to each other on one edge side of the cam member 21 defining a cam groove 22 and, meanwhile, a guide wall 26 adapted to guide a pin member P on the side of a storage cabinet (not shown) is formed as projecting from the other edge side opposite to the one edge side mentioned above.

Since the cam member 21 has been developed for the sole purpose of guiding the pin member P exclusively in the direction of the guide outlet 25 by the action of an inner edge 26a of the guide wall 26, the leading end of the guide wall 26 is formed so as to protrude from the lock part 24, namely in a state thrusting in the direction of a guide inlet 23 of the cam groove 22, and the lock part 24 serving to engage the pin member P in place is positioned inside of the leading end of the guide wall 26.

When the storage cabinet is depressed into the housing, therefore, the pin member P disposed on the rear end side of the storage cabinet collides with an outer peripheral guide surface 21a of the cam member

21 and, while rotating the cam member 21 in the direction opposite the direction in which this cam member 21 is biased by the torsion spring 28, eventually reaches the guide inlet 23 of the cam groove 22. When the pin member P collides with the outer edge of the guide wall 26, the cam member 21 is rotated to a certain extent this time in the direction in which the cam member 21 is biased by the torsion spring 28. As a result, the pin member P is guided into the cam groove 22. At this time, since the storage cabinet is retracted by the biasing force of the spring 28, the pin member P automatically engages itself with the lock part 24 positioned inside the cam groove 22 as illustrated in Figure 1 and causes the storage cabinet to be infallibly locked against the biasing force of the spring 28 in the shut position in the housing.

When the storage cabinet held in the locked state is farther depressed into the housing, the pin member P separates from the lock part 24 of the cam groove 22 as illustrated in Figure 2, collides with an inner edge 26a of the guide wall 26, and allows the cam member 21 to rotate further in the biasing direction (the unlocking direction). When the force of depressing the storage cabinet is subsequently ceased, the pin member P is automatically separated from the cam groove 22 of the cam member 21 as it is continuously guided in the direction of the guide outlet 25 of the cam groove 22. As a result, the storage cabinet is enabled by the spring biasing force to move automatically from the opening of the housing in the opening direction.

When a large inertial force generated by an automobile with the storage device, in consequence of encountering a collision or applying brakes suddenly to avoid an accident, is exerted on the storage cabinet which is locked in its shut position by the engagement of the pin member P with the lock part 24, the storage cabinet moves in the direction in which the inertial force is exerted. At this time, the pin member P synchronously separates from the lock part 24 disposed inside in the same manner as during the opening operation shown in Figure 2 and allows the cam member 21 to rotate in the unlocking direction. Thus, the possibility ensues that the storage cabinet will be moved accidentally from the opening of the housing automatically in the opening direction by the spring biasing force and consequently will do harm to the operator or occupant of the automobile.

To preclude the occurrence of such bad situation, therefore, the present inventor has already proposed a storage device furnished with a safety function in EP-A-561 113. This document was however not published before the priority date of the present application, and it consequently falls under Article 54(3), EPC.

Besides the basic construction of the conventional device described above as a prerequisite, the proposed storage device has a construction as illustrated in Figure 3(A) in which a lock part 34 and a guide outlet 35 are formed as separated by a fair interval on a first edge side defining a cam groove 32 of a cam member 31, a

stopper guide wall 36 is formed as projecting between the lock part 34 and the guide outlet 35 on the other edge side opposite to the aforementioned first edge side, and the lock part 34 discharging the function of engaging the pin member P in place is consequently allowed to be positioned farther out from the stopper guide wall 36.

In the normal use of the proposed storage device constructed as described above, therefore, when the storage cabinet is depressed into the housing, the pin member P disposed on the side of the storage cabinet collides with an outer peripheral guide surface 31a of the cam member 31 and, while simultaneously rotating the cam member 31 in a direction opposite to the direction in which the cam member 31 is biased by the torsion spring 28, eventually reaches a guide inlet 33, fastens on the lock part 34 of the cam groove 32 and enables the storage cabinet to be locked at its shut position inside the housing against the spring biasing force as illustrated in Figure 3(A) in much the same manner as in the conventional storage device. When the storage cabinet as held in the locked state is further depressed into the housing, the pin member P separates from the lock part 34 of the cam groove 32 and allows the cam member 31 to be rotated in the unlocking direction as shown in Figure 3(B). As a result, the storage cabinet is enabled to be moved automatically from the opening of the housing in the opening direction by virtue of the spring biasing force.

When the proposed storage device having the storage cabinet held in the locked state at its shut position is exposed to a large inertial force G generated when an automobile carrying the proposed storage device encounters a collision or applies brakes suddenly to avoid an accident, the result is basically that the storage cabinet moves in concert with the pin member P in the same direction as that of the inertial force G. Since the lock part 34 fulfilling the role of fastening the pin member P is positioned outside of the stopper guide wall 36 at this time, the pin member P collides with an outer edge 36a of the stopper guide wall 36 as shown in Figure 4 and is infallibly obstructed from moving in the direction of the guiding outlet 35 of the cam groove 32. As a result, the cam member 31 is no longer allowed to rotate in the unlocking direction thereof and the storage cabinet is retained at its shut position inside the housing. Owing to the safety function, the storage cabinet can be prevented from being accidentally moved automatically from the opening of the housing in the opening direction thereof by the spring biasing force. Therefore, the proposed storage device is at an advantage in promising generous simplification and miniaturization of the device as a whole because the slight modification given to the cam member 31 can easily confer a safety function on the push-open type storage device. It has been ascertained to the present inventor, however, that a further exaltation of the safety function calls for further improvements in the following points.

When the safety function is manifested, the construction of the proposed storage device described above suffices to cope with the inertial force G of normally predictable magnitude. When an inertial force G1 having an unimaginably large magnitude or an inertial force G2 in an oblique direction acts on the storage device as illustrated in Figure 5, for example, since the center of gravity of the cam member 31 exists on the leading end side owing to the overall construction of the storage device, the possibility arises that the cam member 31 will overrun in a large measure in the direction opposite to the biasing direction of the torsion spring 28 (the direction indicated by the solid arrow in Figure 5) and the pin member P will separate from the guide inlet 33 of the cam groove 32.

When the storage cabinet is locked in its shut position inside the housing, it is natural that the pin member P on the side of the storage cabinet should fasten on the lock part 34 of the cam groove 32 as already described. In this case, when the automobile carrying the storage device has some other vehicle collide therewith from behind or the automobile in the process of moving back collides with an obstacle, the resultant strong impact impels the housing and the automobile body forward and meanwhile causes the storage cabinet openably supported inside the housing to remain fast in its own position as aided by the spring biasing force. As a result, there arises the same phenomenon of separation as is encountered when the housing and the storage cabinet are moved away from each other.

Once this phenomenon of mutual separation occurs, a very large load is exerted to bear particularly on the lock part 34 of the cam groove 32 fulfilling the role of fastening the pin member P in place and, as a result, the lock part 34 or the neighboring part is readily broken possibly to the extent of disrupting the usability of the storage device, with the wall thickness of the lock part 34 as a contributory factor. Even if the lock part 34 escapes being broken by the impact, the load mentioned above causes the pin member P to tilt easily and consequently enables the leading end of the cam member 31 to slip upward as indicated by an imaginary line in Figure 6. As a result, the possibility ensues that the pin member P will readily separate from the lock part 34 of the cam member 31 and the storage cabinet B will move out accidentally from the opening of the housing H owing to the spring biasing force in the same manner as described above.

Moreover, US-A-5,052,728 discloses a lock device for keeping a movable body closed includes a cam lever and an inertia stopper. The cam lever serves to lock the movable body at a closed position by pushing the movable body inward to the closed position against a biasing force and to release the locked state of the movable body by further pushing the movable body inward, thereby permitting the movable body to move to an open position. The inertia stopper serves to prevent the cam lever from releasing the locked state of the

movable body when the force of inertia is generated to push the movable body inward from the locked state.

Finally, another lock device is known from FR-A-2 579 181, which is very similar to the state of the art as discussed before.

Therefore, an object of the present invention is to provide a storage device with a safety function and for use in an automobile, which is capable to effectively preclude the occurrence of such undesirable phenomena as described above, i.e. to prevent an uncontrolled rotation of the cam member opposite to its biasing direction due to a very large inertial force caused by a collision of the automobile.

According to the present invention, there is provided a storage device with a safety function and for use in an automobile, comprising a storage cabinet openably supported in a housing having an opening; a spring provided between the storage cabinet and the housing for constantly biasing the storage cabinet in an opening direction thereof; a cam member rotatably biased in one direction and disposed on the side of the housing, the cam member being provided on an outside thereof with a guide surface and on an inside thereof with a cam groove which has a guide inlet, a lock part and a guide outlet; and a pin member disposed on the side of the storage cabinet for moving along the guide surface of the cam member, entering the guide inlet of the cam groove and engaging with the lock part of the cam groove to lock the storage cabinet at a shut position thereof inside the housing against the biasing force of the spring when a first depressing force is applied to the storage cabinet; said pin member moving inside the cam groove to be released from the engagement with the lock part of the cam groove and brought to the guide outlet of the cam groove, thereby moving the storage cabinet automatically in the opening direction thereof through the opening of the housing when a second depressing force is applied for moving the locked storage cabinet further into the housing; whereby the lock part and the guide outlet of the cam groove being separated from each other on a first edge side of the cam groove and the other edge side of the cam groove opposite to the first edge side being provided integrally with a projecting stopper guide wall, said storage device being characterized in that the stopper guide wall is located at a position between the lock part and the guide outlet of the cam groove so that the lock part of the cam groove is positioned outwardly from the stopper guide wall of the cam groove; whereby the pin member is enabled to collide with an outer edge of the stopper guide wall of the cam member and prevent the storage cabinet from being thrust out of the housing when the storage device is exposed to a large inertial force; the storage device further being characterized in that either a regulating wall is provided within the housing at a position capable of limiting the amount of rotation of the cam member when the cam member happens to rotate in a direction opposite to the direction in which the cam member is biased, thus opposite the direction of releasing the pin

member via the guide outlet, or in that the cam member has a balance adjusting part for causing the center of gravity of the cam member and the axis of rotation of the cam member to coincide with each other. Moreover, a preferred embodiment of the present invention is that the cam member is thicker at the lock part other than the remaining part of the cam member.

The above and other objects, characteristic features and advantages of this invention will become more apparent when consideration is given to the following detailed description thereof with reference to the accompanying drawings, in which:

Figure 1 is an explanatory view illustrating a conventional storage device as held in a state having a pin member fastened to a lock part of a cam member;

Figure 2 is an explanatory view illustrating the same storage device as held in a state having the pin member separated from the lock part of the cam member;

Figure 3(A) is an explanatory view illustrating the storage device formerly proposed by the present inventor and held in a state having a pin member fastened to a lock part of a cam member;

Figure 3(B) an explanatory view illustrating the same storage device as held in a state having the pin member separated from the lock part of the cam member;

Figure 4 is an explanatory view illustrating the same storage device as held in a state allowing an inertial force to act thereon;

Figure 5 is an explanatory view illustrating the same storage device as held in a state involving an overrun of the cam member;

Figure 6 is an explanatory view illustrating the same storage device as held in a state keeping the cam member lifted upwardly;

Figure 7 is an exploded perspective view showing the essential part of a storage device according to the first embodiment of this invention;

Figure 8 is an enlarged perspective view showing only the relation of the cam member with a restraining wall;

Figure 9 is an explanatory view showing a state in which a regulating wall prevents the cam member from overrunning;

Figure 10 is an explanatory view showing the cam member of a storage device according to the second embodiment of this invention;

Figure 11 is an explanatory view showing from the rear side a cam member which is thicker at the lock part than at the remaining part of the cam member; Figure 12 is a cross section of the essential part of a storage device as held in a state having the pin member fastened to the lock part of the cam member according to figure 11;

Figure 13 is a cross section of the essential part of the same storage device as held in a state having

the pin member separated from the cam groove of the cam member;

Figure 14(A) is a side view showing another example of a cam member which is thicker at the lock part than at the remaining part of the cam member; and

Figure 14(B) is a side view showing still another example of a cam member which is thicker at the lock part than at the remaining part of the cam member;

Now, this invention will be described in detail here below with reference to the different embodiments thereof shown in the accompanying drawings.

Similarly to the conventional push-open type storage devices described above, the storage device constituting the first embodiment of the present invention, as a prerequisite, comprises a storage cabinet B openably supported in a housing H disposed on the side of an instrument panel (not shown) and constantly kept biased in the opening direction thereof by the biasing force of a spring which will be described specifically here below. A cam member 1 is disposed rotatably on the side of the housing H, and a pin member P is disposed on the rear end side of the storage cabinet B as illustrated in Figure 7. Thereby, the storage cabinet B can be locked at its shut position inside the housing H against the biasing force of the spring by causing the pin member P to be fastened to the cam member 1 and the storage cabinet B can be moved automatically in the opening direction thereof from an opening of the housing H by the biasing force of the spring by causing the storage cabinet B in the locked state to be farther depressed into the housing H. The pin member P is thereby released from the engagement with the cam member 1 and the cam member 1 is allowed to rotate in the unlocking direction thereof.

The cam member 1 is a one-piece shaped article of synthetic resin. As illustrated in Figures 7 to 9, it has formed therein a cam groove 2 incorporating therein a guide inlet 3, a lock part 4 and a guide outlet 5 and is set in place rotatably round a fixing shaft 7 on the side of the housing H. It has the lock part 4 and the guide outlet 5 formed as separated with a fair interval on a first edge side of the cam groove 2 and has a stopper guide wall 6 formed in the approximate shape of the inverted letter of V on the other edge side of the cam groove opposite to the first edge side mentioned above and projected between the lock part 4 and the guide outlet 5. The lock part 4, which fulfils the role of fastening the pin member P, is positioned outwardly at a fair distance from the leading end of the stopper guide wall 6.

In this respect, therefore, this storage device in the process of being normally opened, similarly to the storage device formerly proposed by the present inventor, allows the pin member P to move in the direction of the guide outlet 5 of the cam groove 2 by making use of the gap intervening between the leading end of the stopper guide wall 6 and the one edge of the cam groove 2. The

storage device, on exposure to the action of an inertial force, allows the pin member P to collide with an outer side edge 6a of the stopper guide wall 6 and prevents the pin member P from moving in the direction of the guide outlet 5 of the cam groove 2.

In Figure 7, reference numeral 10 stands for a restraining wall for limiting the position to which the cam member 1 is biased by a torsion spring 8, numeral 11 for a fastening wall adapted to fasten the end of the torsion spring 8 in cooperation with an arm 1b of the cam member 1, and numeral 12 for a constant-pressure spring for constantly keeping the storage cabinet B biased in the opening direction thereof. This constant-pressure spring 12 is enabled to function as means for biasing the storage cabinet B by winding the spring 12 round a winding shaft 13 in the contracting direction thereof, fixing the winding shaft 13 to the rear end wall of the storage cabinet B through a retaining part 14, and fixing a free end 12a of the spring 12 to the bottom surface close to the opening of the housing H by means of screws (not shown).

Besides the construction described above, the first embodiment further comprises, as illustrated in Figure 8, a regulating wall 15 which is adapted to limit the amount of rotation of the cam member 1 in a direction opposite to the biasing direction, namely the amount of rotation in the direction of causing the pin member P to separate from the guide inlet 3 of the cam groove 2, and is disposed on the side opposite to the restraining wall 10, which fulfils the role of limiting the position to which the cam member 1 is biased by the torsion spring 8. Owing to the presence of the regulating wall 15 at the position described above, even when an inertial force G1 of an unimaginably large magnitude or an inertial force G2 generated in an oblique direction as illustrated in Figure 9, the storage device is enabled to limit the amount of rotation of the cam member 1 in the reverse direction to the smallest possible extent and prevent the pin member P from being readily separating from the guide inlet 3 of the cam groove 2.

The first embodiment is fated to pose a problem of selection of the position at which the amount of rotation of the cam member 1 is to be limited. Since the cam member 1 must be rotated in a direction opposite to the biasing direction of the torsion spring 8 and the pin member P guided into the cam groove 2 through the guide inlet 3 for the purpose of locking the storage cabinet B at its shut position, the leading end of an outer guide surface 1a of the cam member 1 defining the guide inlet 3 is not allowed to protrude outwardly (to the lower side in the bearings of Figure 9) from the path L of motion of the pin member P.

For the sake of limiting the amount of rotation of the cam member 1 by means of the regulating wall 15, therefore, it is necessary to have the regulating wall 15 disposed on side of the housing H as illustrated in Figure 7 so that the cam member 1 will be allowed to rotate in the irreducible minimum amount in the opposite direction mentioned above and, as a result, the leading end

of the outer guide surface 1a will assume the nearest position to the path L on the inside (on the upper side in the bearings of Figure 9) of the path L along which the pin member P is smoothly guided into the guide inlet 3 of the cam groove 2.

In the normal use of the storage device of the first embodiment, therefore, when the storage cabinet B is depressed into the housing H against the biasing force of the constant-pressure spring 12, the pin member P automatically fastens on the lock part 4 of the cam groove 2 positioned outside and causes the storage cabinet B to be locked at its shut position inside the housing H against the biasing force of the constant-pressure spring 12 in the same manner as described above. When the storage cabinet B in the locked state is farther depressed into the housing H, it can move automatically in the opening direction thereof from the opening of the housing H by virtue of the biasing force of the constant-pressure spring 12 because the pin member P is allowed to separate from the cam groove 2 of the cam member 1 via the guide outlet 5.

When the inertial force G1 of unimaginably large magnitude or the inertial force G2 generated in an oblique direction acts on the storage cabinet B in the locked state at the shut position thereof, the cam member 1 in the storage device of the first embodiment rotates in a direction opposite to the direction in which the torsion spring 8 biases the storage cabinet B. Owing to the presence of the regulating wall 15, however, the cam member 1 is no longer suffered to collide against the regulating wall 15 and produce an overrun but is enabled to rotate quickly again in the biasing direction by virtue of the biasing force of the torsion spring 8 and receive infallibly the pin member P which is tending to retract by dint of the biasing force of the constant-pressure spring 12. As a result, the storage device can be expected to manifest the function of safety to a greater certainty because the otherwise possible accidental separation of the pin member P from the guide inlet 3 of the cam groove 2 of the cam member 1 can be effectively prevented.

Now, the storage device of the second embodiment according to this invention will be described below. While the storage device of the second embodiment has been developed with the same object as the first embodiment, it differs from the storage device of the first embodiment in respect that, in place of the regulating wall 15, a balance adjusting part 16 is integrally extended from the rear end of the cam member 1 as shown in Figure 10 so that the center of gravity of the cam member 1 will coincide with the fixing shaft 7 intended to serve as the center of rotation.

Incidentally, as respects the balance adjusting part 16 which plays the role of shifting the center of gravity, it is given a desired weight by suitably setting the shape, area, wall thickness, etc. as depicted in Figure 10. Optionally, the object of the provision of this balance adjusting part 16 may be attained by decreasing the

area and wall thickness of this part and providing this part with a separately shaped weight.

When the inertial force G1 of unimaginably large magnitude or the inertial force G2 produced in an oblique direction acts on the storage device of the second embodiment, therefore, the otherwise possible overrun of the cam member 1 in the reverse direction can be prevented because the center of gravity of the cam member 1 falls on the fixing shaft 7. Thus, the possibility of the cam member 1 accidentally separating from the guide inlet 3 of the cam groove 2 and the possibility of the storage cabinet B accidentally moving in the opening direction thereof from the opening of the housing H can be effectively prevented.

Now, the storage device according to figures 11 to 14, in which a constructional detail of a preferred cam member is shown, will be described below.

When an automobile carrying the storage device receives an impact in the front side thereof, the inertial force which is consequently generated simply causes the storage cabinet B to advance together with the pin member P and does not impose a very large load on the cam member 1 per se. When the automobile has some other vehicle collide therewith from behind or when the automobile in the process of driving backward collides with an obstacle, however, the housing H is made to move forward together with the automobile body, and the storage cabinet B supported in the housing H tends to remain at its existent position as aided by the biasing force of the constant-pressure spring 12. As a result, the same phenomenon of separation as is encountered when the housing H and the storage cabinet B are moved in mutually opposite directions arises to impose a very large load particularly on the cam member 1. This adverse phenomenon has motivated the development of the cam member described in figures 11-14.

By faithfully observing the principle of the cam member 1 of the first embodiment, therefore, this cam member adopts a construction such that the strength of the cam member 1 on the side of the lock part 4 thereof is positively increased by forming a part 17 of increased wall thickness on the lower surface of the lock part 4 and its immediate vicinity of the cam groove 2 of the cam member 1 throughout a fixed area as illustrated in Figure 11.

In the storage device comprising such a cam member, therefore, when the storage cabinet B is depressed into the housing H against the biasing force of the constant-pressure spring 12, the pin member P on the storage cabinet B side fastens on the lock part 4 of the cam groove 2 reinforced with the part 17 of increased wall thickness and locks the storage cabinet B at the shut position thereof inside the housing H against the biasing force as illustrated in Figure 12. When the storage cabinet B in the locked state is farther depressed into the housing H, the pin member P separated from the cam groove 2 of the cam member 1 via the guide outlet 5 as illustrated in Figure 13. As a result, the storage cabinet B is automatically moved in the opening direction

thereof from the opening of the housing H by virtue of the biasing force of the constant-pressure spring 12.

When the automobile carrying the storage device has some other vehicle collide therewith from behind or when the automobile in the process of driving backward collides with an obstruct while the storage cabinet B is in the locked state at the shut position thereof, the impact which is consequently generated induces the same phenomenon of separation as is encountered when the housing H and the storage cabinet are moved in the mutually opposite directions. Since the lock part 4 playing the role of fastening the pin member P integrally contains partly therein the part 17 of increased wall thickness, however, the possibility of the lock part 4 or the immediate vicinity thereof being broken under a large load exerted thereon is absolutely nil. Further, since the shape of the increased wall thickness of the lock part 4 ensures ample engagement of the pin member P with the lock part 4 over a fairly large width, the possibility of the pin member P being tilted by an increase in the apparent rigidity of the two components, i.e. the pin member P and the lock part 4, to the extent of releasing the leading end of the cam member 1 upwardly can be effectively prevented.

Therefore, with such a cam member the storage cabinet B can be infallibly retained at the shut position thereof inside the housing H and prevented from accidentally thrusting out of the housing H even when the automobile is exposed to a strong impact exerted not only on the front side but also on the rear side.

When the lock part 4 is to be given an increased wall thickness the part 17 having the wall thickness increased as required is formed on the lower surface side as illustrated in Figure 11. The location of this part 17 does not need to be limited to the position just mentioned. For example, the part 17 having the wall thickness increased as required may be imparted to the upper surface side of the lock part 4 of its immediate vicinity as illustrated in Figure 14(A) or the part 17 having the wall thickness increased as required may be imparted to both the upper and lower surfaces as illustrated in Figure 14(B). Naturally, the part 17 of increased wall thickness can be expected to produce the same operating effect irrespective of the relative position thereof.

Particularly in the construction in which the part 17 of wall thickness increased as required is imparted exclusively to the lower surface side as illustrated in Figure 11, the depth of the pin member P reaching the vicinity of the root thereof is allowed to contact the part 17 of increased wall thickness on the lock part 4 side. Owing to this state of ample contact, the construction is at an advantage in effectively precluding the pin member P from tilting and preventing the leading end of the cam member 1 from slipping upward with enhanced certainty.

This invention makes full use of the advantages of the present inventor's formerly proposed storage device and, at the same time, makes up for the defects thereof

by the provision of a very simple construction as described above. The storage device of this invention, therefore, can be expected to produce a reliable safety function to cope with the impact exerted on the front side of the automobile.

Claims

1. Storage device with a safety function and for use in an automobile, comprising:

a storage cabinet (B) openably supported in a housing (H) having an opening;

a spring (12) provided between the storage cabinet (B) and the housing (H) for constantly biasing the storage cabinet (B) in an opening direction thereof;

a cam member (1) rotatably biased in one direction and disposed on the side of the housing (H), the cam member (1) being provided on an outside thereof with a guide surface (1a) and on an inside thereof with a cam groove (2) which has a guide inlet (3), a lock part (4) and a guide outlet (5); and

a pin member (P) disposed on the side of the storage cabinet (B) for moving along the guide surface (1a) of the cam member (1), entering the guide inlet (3) of the cam groove (2) and engaging with the lock part (4) of the cam groove (2) to lock the storage cabinet (B) at a shut position thereof inside the housing (H) against the biasing force of the spring (12) when a first depressing force is applied to the storage cabinet (B); said pin member (P) moving inside the cam groove (2) to be released from the engagement with the lock part (4) of the cam groove (2) and brought to the guide outlet (5) of the cam groove (2), thereby moving the storage cabinet (B) automatically in the opening direction thereof through the opening of the housing (H) when a second depressing force is applied for moving the locked storage cabinet (B) further into the housing (H);

whereby the lock part (4) and the guide outlet (5) of the cam groove (2) being separated from each other on a first edge side of the cam groove (2) and the other edge side of the cam groove (2) opposite to the first edge side being provided integrally with a projecting stopper guide wall (6), said storage device being characterized in that the stopper guide wall (6) is located at a position between the lock part (4) and the guide outlet (5) of the cam groove (2) so that the lock part (4) of the cam groove (2) is positioned outwardly from the stopper guide wall (6) of the cam groove (2); and

in that the pin member (P) is enabled to collide with an outer side edge (6a) of the stopper guide wall (6) of the cam member (1) and prevent

the storage cabinet (B) from being thrust out of the housing (H) when the storage device is exposed to a large inertial force; and

in that a regulating wall (15) is provided within the housing (H) at a position capable of limiting the amount of rotation of the cam member (1) when the cam member (1) happens to rotate in a direction opposite to the direction in which the cam member (1) is biased, thus opposite the direction of releasing the pin member (P) via the guide outlet (5).

2. Storage device with a safety function and for use in an automobile, comprising:

a storage cabinet (B) openably supported in a housing (H) having an opening;

a spring (12) provided between the storage cabinet (B) and the housing (H) for constantly biasing the storage cabinet (B) in an opening direction thereof;

a cam member (1) rotatably biased in one direction and disposed on the side of the housing (H), the cam member (1) being provided on an outside thereof with a guide surface (1a) and on an inside thereof with a cam groove (2) which has a guide inlet (3), a lock part (4) and a guide outlet (5); and

a pin member (P) disposed on the side of the storage cabinet (B) for moving along the guide surface (1a) of the cam member (1), entering the guide inlet (3) of the cam groove (2) and engaging with the lock part (4) of the cam groove (2) to lock the storage cabinet (B) at a shut position thereof inside the housing (H) against the biasing force of the spring (12) when a first depressing force is applied to the storage cabinet (B); said pin member (P) moving inside the cam groove (2) to be released from the engagement with the lock part (4) of the cam groove (2) and brought to the guide outlet (5) of the cam groove (2), thereby moving the storage cabinet (B) automatically in the opening direction thereof through the opening of the housing (H) when a second depressing force is applied for moving the locked storage cabinet (B) further into the housing (H);

whereby the lock part (4) and the guide outlet (5) of the cam groove (2) being separated from each other on a first edge side of the cam groove (2) and the other edge side of the cam groove (2) opposite to the first edge side being provided integrally with a projecting stopper guide wall (6), said storage device being characterized in that the stopper guide wall (6) is located at a position between the lock part (4) and the guide outlet (5) of the cam groove (2) so that the lock part (4) of the cam groove (2) is positioned outwardly from the stopper

guide wall (6) of the cam groove (2); and

in that the pin member (P) is enabled to collide with an outer side edge (6a) of the stopper guide wall (6) of the cam member (1) and prevent the storage cabinet (B) from being thrust out of the housing (H) when the storage device is exposed to a large inertial force; and

in that the cam member (1) has a balance adjusting part (16) for causing the center of gravity of the cam member (1) and the axis (7) of rotation of the cam member (1) to coincide with each other.

3. Storage device according to claim 1 or 2, characterized in that the cam member (1) is thicker at the lock part (4) than at the remaining part of the cam member (1).

Patentansprüche

1. Aufbewahrungsvorrichtung mit einer Sicherheitsfunktion und zur Verwendung in einem Kraftfahrzeug, umfassend:

ein Aufbewahrungsgehäuse (B), das offenbar in einem Gehäuse (H), das eine Öffnung aufweist, abgestützt ist;

eine Feder (12), die zwischen dem Aufbewahrungsgehäuse (B) und dem Gehäuse (H) zur konstanten Vorspannung des Aufbewahrungsgehäuses (B) in einer Öffnungsrichtung davon vorgesehen ist;

ein Nockenelement (1), das in einer Richtung drehbar vorgespannt und auf der Seite des Gehäuses (H) angeordnet ist, wobei das Nockenelement (1) an einer Außenseite davon mit einer Führungsfläche (1a) und an einer Innenseite davon mit einer Nockenausnehmung (2), welche einen Führungseinlaß (3), ein Verschlußteil (4) und einen Führungsauslaß (5) aufweist, versehen ist; und

ein Bolzenelement (P), das auf der Seite des Aufbewahrungsgehäuses (B) zur Bewegung längs der Führungsfläche (1a) des Nockenelementes (1) angeordnet ist, welches in den Führungseinlaß (3) der Nockenausnehmung (2) eintritt und mit dem Verschlußteil (4) der Nockenausnehmung (2) in Eingriff kommt, um das Aufbewahrungsgehäuse (B) in einer Schließposition davon in dem Gehäuse (H) gegen die Vorspannungskraft der Feder (12) zu schließen, wenn eine erste Druckkraft auf das Aufbewahrungsgehäuse (B) ausgeübt wird;

wobei sich das Bolzenelement (P) in der Nockenausnehmung (2) bewegt, um aus dem Eingriff mit dem Verschlußteil (4) der Nockenausnehmung (2) freigegeben und zu dem Führungsauslaß (5) der Nockenausnehmung (2) verbracht zu werden, wobei sich das Aufbewahrungsgehäuse (B)

automatisch in die Öffnungsrichtung davon durch die Öffnung des Gehäuses (H) bewegt, wenn eine zweite Druckkraft zum Bewegen des geschlossenen Aufbewahrungsgehäuses (B) weiter in das Gehäuse (H) ausgeübt wird; wobei das verschlußteil (4) und der Führungsauslaß (5) der

Nockenausnehmung (2) voneinander an einer ersten Kantenfläche der Nockenausnehmung (2) getrennt sind und die andere, der ersten Kantenfläche gegenüberliegende Kantenfläche der Nockenausnehmung (2) integral mit einer vorstehenden Halteführungswand (6) versehen ist, wobei die Aufbewahrungsvorrichtung dadurch gekennzeichnet ist,

daß die Halteführungswand (6) in einer Position zwischen dem Verschlußteil (4) und dem Führungsauslaß (5) der Nockenausnehmung (2) angeordnet ist, derart, daß das verschlußteil (4) der Nockenausnehmung (2) von der Halteführungswand (6) der Nockenausnehmung (2) nach außen positioniert ist; und

daß das Bolzenelement (P) imstande ist, mit einer äußeren Kantenfläche (6a) der Halteführungswand (6) des Nockenelementes (1) zu kollidieren und das Aufbewahrungsgehäuse (B) von einem Herausstoßen aus dem Gehäuse (H) abhält, wenn auf die Aufbewahrungsvorrichtung eine große Trägheitskraft ausgeübt wird; und

daß eine Einstellwand (15) in dem Gehäuse (H) in einer Position, die eine Begrenzung des Drehmaßes des Nockenelementes (1) ermöglicht, wenn sich das Nockenelement (1) beim Drehen in einer Richtung befindet, welche zu der Richtung, in der das Nockenelement (1) vorgespannt ist, entgegengesetzt, daher zu der Richtung einer Freigabe des Bolzenelementes (P) über den Führungsauslaß (5) entgegengesetzt ist.

2. Aufbewahrungsvorrichtung mit einer Sicherheitsfunktion und zur Verwendung in einem Kraftfahrzeug, umfassend:

ein Aufbewahrungsgehäuse (B), das offenbar in einem Gehäuse (H), das eine Öffnung aufweist, abgestützt ist;

eine Feder (12), die zwischen dem Aufbewahrungsgehäuse (B) und dem Gehäuse (H) zur konstanten Vorspannung des Aufbewahrungsgehäuses (B) in einer Öffnungsrichtung davon vorgesehen ist;

ein Nockenelement (1), das in einer Richtung drehbar vorgespannt und auf der Seite des Gehäuses (H) angeordnet ist, wobei das Nockenelement (1) an einer Außenseite davon mit einer Führungsfläche (1a) und an einer Innenseite davon mit einer Nockenausnehmung (2), welche einen Führungseinlaß (3), ein Verschlußteil (4) und einen Führungsauslaß (5) aufweist, versehen ist; und

ein Bolzenelement (P), das auf der Seite des Aufbewahrungsgehäuses (B) zur Bewegung längs der Führungsfläche (1a) des Nockenelementes (1) angeordnet ist, welches in den Führungseinlaß (3) der Nockenausnehmung (2) eintritt und mit dem Verschlußteil (4) der Nockenausnehmung (2) in Eingriff kommt, um das Aufbewahrungsgehäuse (B) in einer Schließposition davon in dem Gehäuse (H) gegen die Vorspannungskraft der Feder (12) zu schließen, wenn eine erste Druckkraft auf das Aufbewahrungsgehäuse (B) ausgeübt wird;

wobei sich das Bolzenelement (P) in der Nockenausnehmung (2) bewegt, um aus dem Eingriff mit dem Verschlußteil (4) der Nockenausnehmung (2) freigegeben und zu dem Führungsauslaß (5) der Nockenausnehmung (2) verbracht zu werden, wobei sich das Aufbewahrungsgehäuse (B) automatisch in die Öffnungsrichtung davon durch die Öffnung des Gehäuses (H) bewegt, wenn eine zweite Druckkraft zum Bewegen des geschlossenen Aufbewahrungsgehäuses (B) weiter in das Gehäuse (H) ausgeübt wird;

wobei das Verschlußteil (4) und der Führungsauslaß (5) der Nockenausnehmung (2) voneinander an einer ersten Kantenfläche der Nockenausnehmung (2) getrennt sind und die andere, der ersten Kantenfläche gegenüberliegende Kantenfläche der Nockenausnehmung (2) integral mit einer vorstehenden Halteführungswand (6) versehen ist, wobei die Aufbewahrungsvorrichtung dadurch gekennzeichnet ist,

daß die Halteführungswand (6) in einer Position zwischen dem Verschlußteil (4) und dem Führungsauslaß (5) der Nockenausnehmung (2) angeordnet ist, derart, daß das Verschlußteil (4) der Nockenausnehmung (2) von der Halteführungswand (6) der Nockenausnehmung (2) nach außen positioniert ist; und

daß das Bolzenelement (P) imstande ist, mit einer äußeren Kantenfläche (6a) der Halteführungswand (6) des Nockenelementes (1) zu kollidieren und das Aufbewahrungsgehäuse (B) von einem Herausstoßen aus dem Gehäuse (H) abhält, wenn auf die Aufbewahrungsvorrichtung eine große Trägheitskraft ausgeübt wird; und

daß das Nockenelement (1) ein Ausgleichseinstellteil (16) aufweist, um ein Zusammenfallen des Schwerkraftsmittelpunktes des Nockenelementes (1) und der Drehachse (7) des Nockenelementes (1) miteinander herbeizuführen.

3. Aufbewahrungsvorrichtung nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß das Nockenelement (1) an dem Verschlußteil (4) dicker ist als an dem übrigen Teil des Nockenelementes (1).

Revendications

1. Dispositif de stockage à fonction de sécurité et utilisable dans une automobile, comprenant :

un coffret de stockage (B) supporté de façon ouvrable dans un caisson (H) ayant une ouverture ;

un ressort (12) prévu entre le coffret de stockage (B) et le caisson (H) de façon à solliciter constamment le coffret de stockage (B) dans sa direction d'ouverture ;

une came (1) rappelée de façon tournante dans une première direction et disposée sur le côté du caisson (H), la came (1) présentant sur son côté extérieur une surface de guidage (1a) et, sur son côté intérieur, une rainure de came (2) qui comporte une entrée de guidage (3), une partie de verrouillage (4) et une sortie de guidage (5) ; et

une broche (P) disposée sur le côté du coffret de stockage (B) de façon à se déplacer le long de la surface de guidage (1a) de la came (1), à pénétrer dans l'entrée de guidage (3) de la rainure de came (2) et à venir en prise avec la partie de verrouillage (4) de la rainure de came (2) afin de bloquer le coffret de stockage (B) à sa position fermée à l'intérieur du caisson (H) contre la force de sollicitation du ressort (12) lorsqu'on applique une première force d'enfoncement au coffret de stockage (B) ; ladite broche (P) se déplaçant à l'intérieur de la rainure de came (2) de façon à être libérée de la prise avec la partie de verrouillage (4) de la rainure de came (2) et à venir à la sortie de guidage (5) de la rainure de came (2), afin de déplacer le coffret de stockage (B) automatiquement dans sa direction d'ouverture, à travers l'ouverture du caisson (H), lorsqu'on applique une deuxième force d'enfoncement pour déplacer le coffret de stockage verrouillé (B) plus loin dans le caisson (H) ;

la partie de verrouillage (4) et la sortie de guidage (5) de la rainure de came (2) étant séparées l'une de l'autre sur un premier bord latéral de la rainure de came (2), et une paroi de guidage de butée en saillie (6) étant prévue solidairement sur l'autre bord latéral de la rainure de came (2) en face du premier bord latéral ; ledit dispositif de stockage étant caractérisé en ce que :

la paroi de guidage de butée (6) est située à une position entre la partie de verrouillage (4) et la sortie de guidage (5) de la rainure de came (2), de sorte que la partie de verrouillage (4) de la rainure de came (2) est située vers l'extérieur par rapport à la paroi de guidage de butée (6) de la rainure de came (2) ;

la broche (P) est prévue pour rencontrer un

bord latéral extérieur (6a) de la paroi de guidage de butée (6) de la came (1) et empêcher l'éjection du coffret de stockage (B) hors du caisson (H) lorsque le dispositif de stockage est exposé à une grande force d'inertie ; et

une paroi de régulation (15) est prévue à l'intérieur du caisson (H) à une position permettant de limiter la quantité de rotation de la came (1) lorsque la came (1) effectue une rotation dans une direction opposée à la direction dans laquelle la came (1) est sollicitée, et donc opposée à la direction de libération de la broche (P) via la sortie de guidage (5).

2. Dispositif de stockage à fonction de sécurité et utilisable dans une automobile, comprenant :

un coffret de stockage (B) supporté de façon ouvrable dans un caisson (H) ayant une ouverture ;

un ressort (12) prévu entre le coffret de stockage (B) et le caisson (H) de façon à solliciter constamment le coffret de stockage (B) dans sa direction d'ouverture ;

une came (1) rappelée de façon tournante dans une première direction et disposée sur le côté du caisson (H), la came (1) présentant sur son côté extérieur une surface de guidage (1a) et, sur son côté intérieur, une rainure de came (2) qui comporte une entrée de guidage (3), une partie de verrouillage (4) et une sortie de guidage (5) ; et

une broche (P) disposée sur le côté du coffret de stockage (B) de façon à se déplacer le long de la surface de guidage (1a) de la came (1), à pénétrer dans l'entrée de guidage (3) de la rainure de came (2) et à venir en prise avec la partie de verrouillage (4) de la rainure de came (2) afin de bloquer le coffret de stockage (B) à sa position de fermeture à l'intérieur du caisson (H) contre la force de sollicitation du ressort (12) lorsqu'on applique une première force d'enfoncement au coffret de stockage (B) ; ladite broche (P) se déplaçant à l'intérieur de la rainure de came (2) de façon à être libérée de la prise avec la partie de verrouillage (4) de la rainure de came (2) et à venir à la sortie de guidage (5) de la rainure de came (2), de sorte que le coffret de stockage (B) se déplace automatiquement dans sa direction d'ouverture, à travers l'ouverture du caisson (H), lorsqu'on applique une deuxième force d'enfoncement pour déplacer le coffret de stockage verrouillé (B) plus loin dans le caisson (H) ;

la partie de verrouillage (4) et la sortie de guidage (5) de la rainure de came (2) étant séparées l'une de l'autre sur un premier bord latéral de la rainure de came (2), et une paroi de guidage de

butée en saillie (6) étant prévue solidairement sur l'autre bord latéral de la rainure de came (2) en face du premier bord latéral ; ledit dispositif de stockage étant caractérisé en ce que :

la paroi de guidage de butée (6) est située à une position entre la partie de verrouillage (4) et la sortie de guidage (5) de la rainure de came (2), de sorte que la partie de verrouillage (4) de la rainure de came (2) est située vers l'extérieur par rapport à la paroi de guidage de butée (6) de la rainure de came (2) ;

la broche (P) est prévue pour rencontrer un bord latéral extérieur (6a) de la paroi de guidage de butée (6) de la came (1) et empêcher l'éjection du coffret de stockage (B) hors du caisson (H) lorsque le dispositif de stockage est exposé à une grande force d'inertie ; et en ce que la came (1) comprend une partie d'équilibrage (16) pour faire coïncider le centre de gravité de la came (1) et l'axe de rotation (7) de la came (1) l'un avec l'autre.

3. Dispositif de stockage suivant la revendication 1 ou 2, caractérisé en ce que la came (1) est plus épaisse à l'endroit de la partie de verrouillage (4) que dans les autres parties de la came (1).

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FIG.1

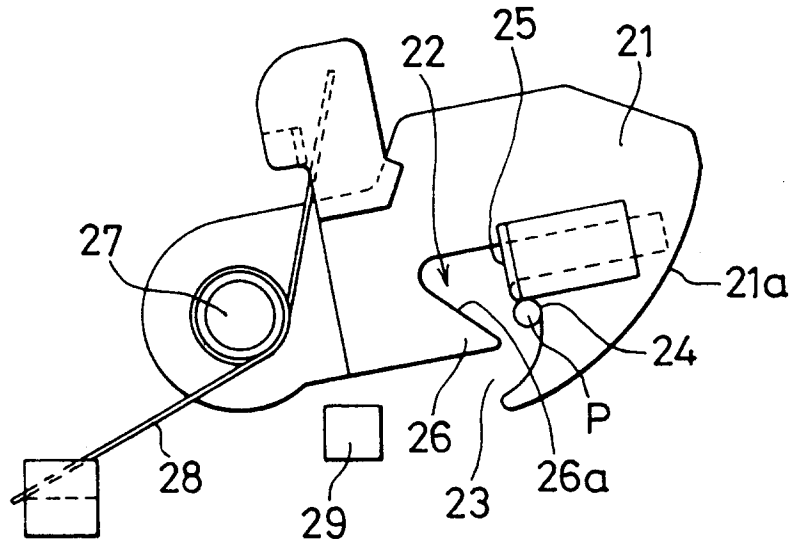


FIG.2

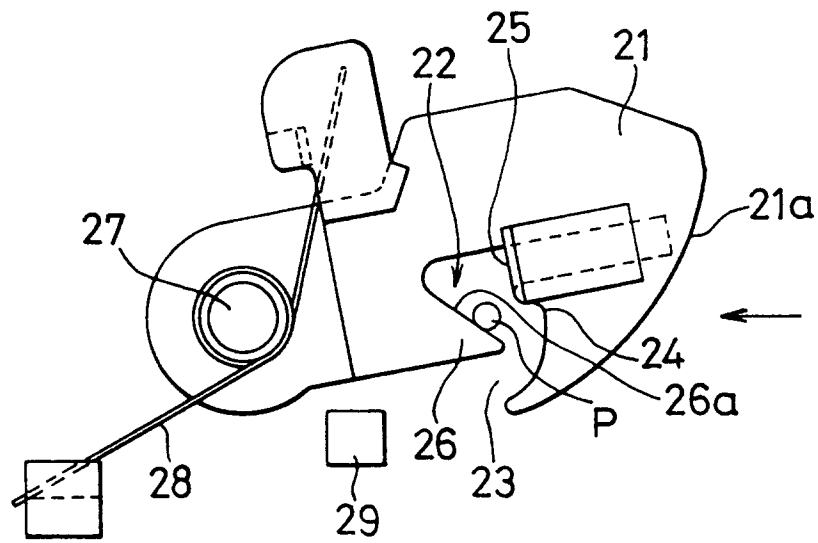


FIG. 3(A)

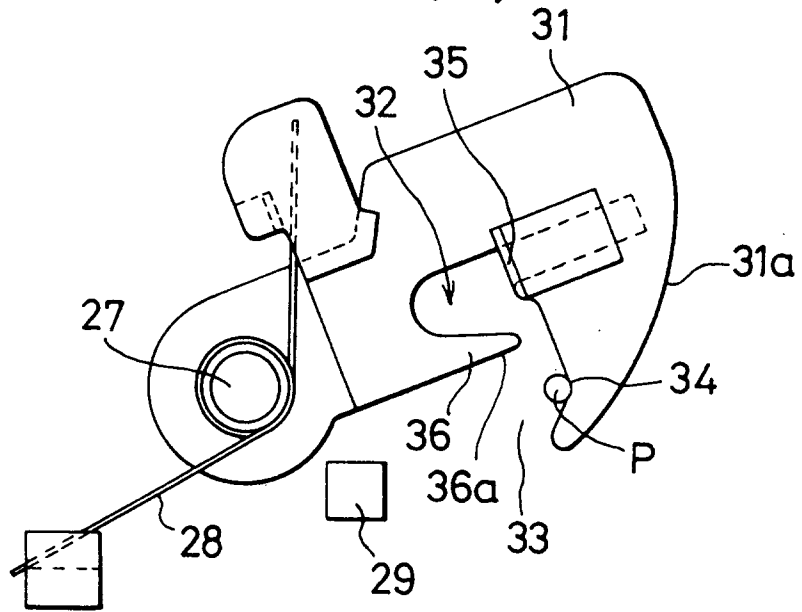


FIG. 3(B)

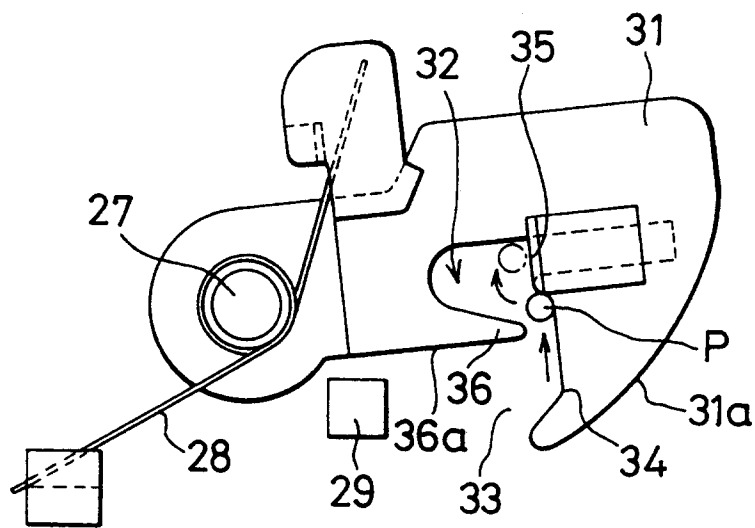


FIG. 4

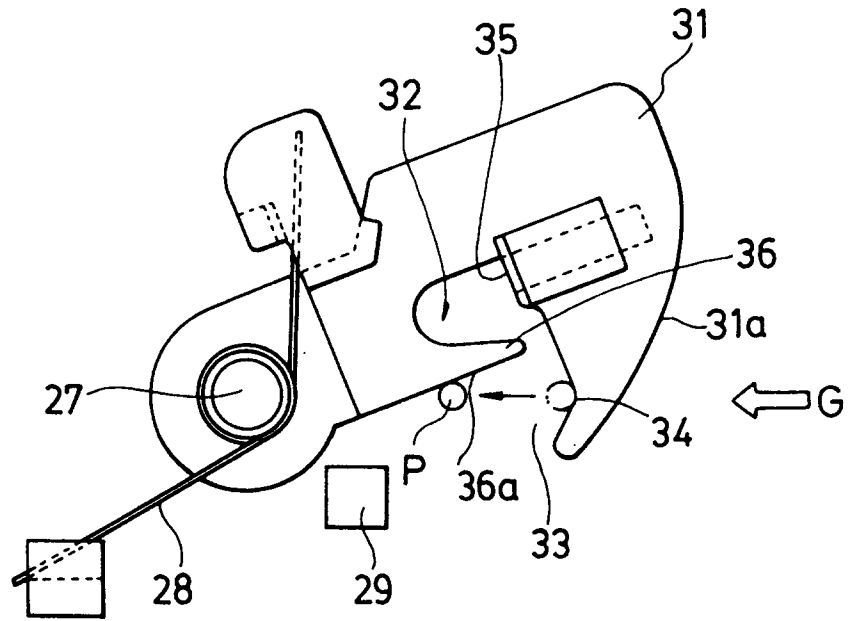


FIG. 5

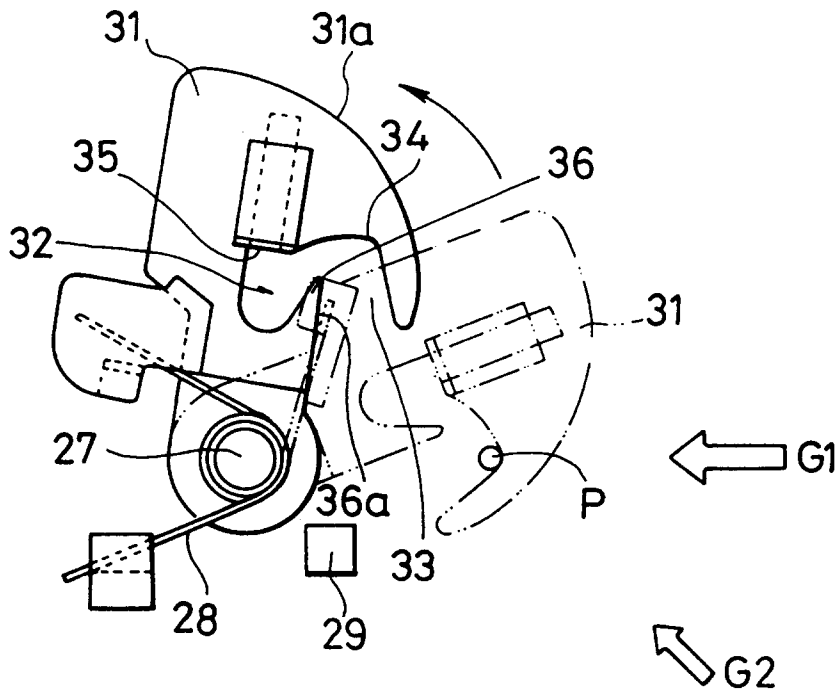


FIG. 7

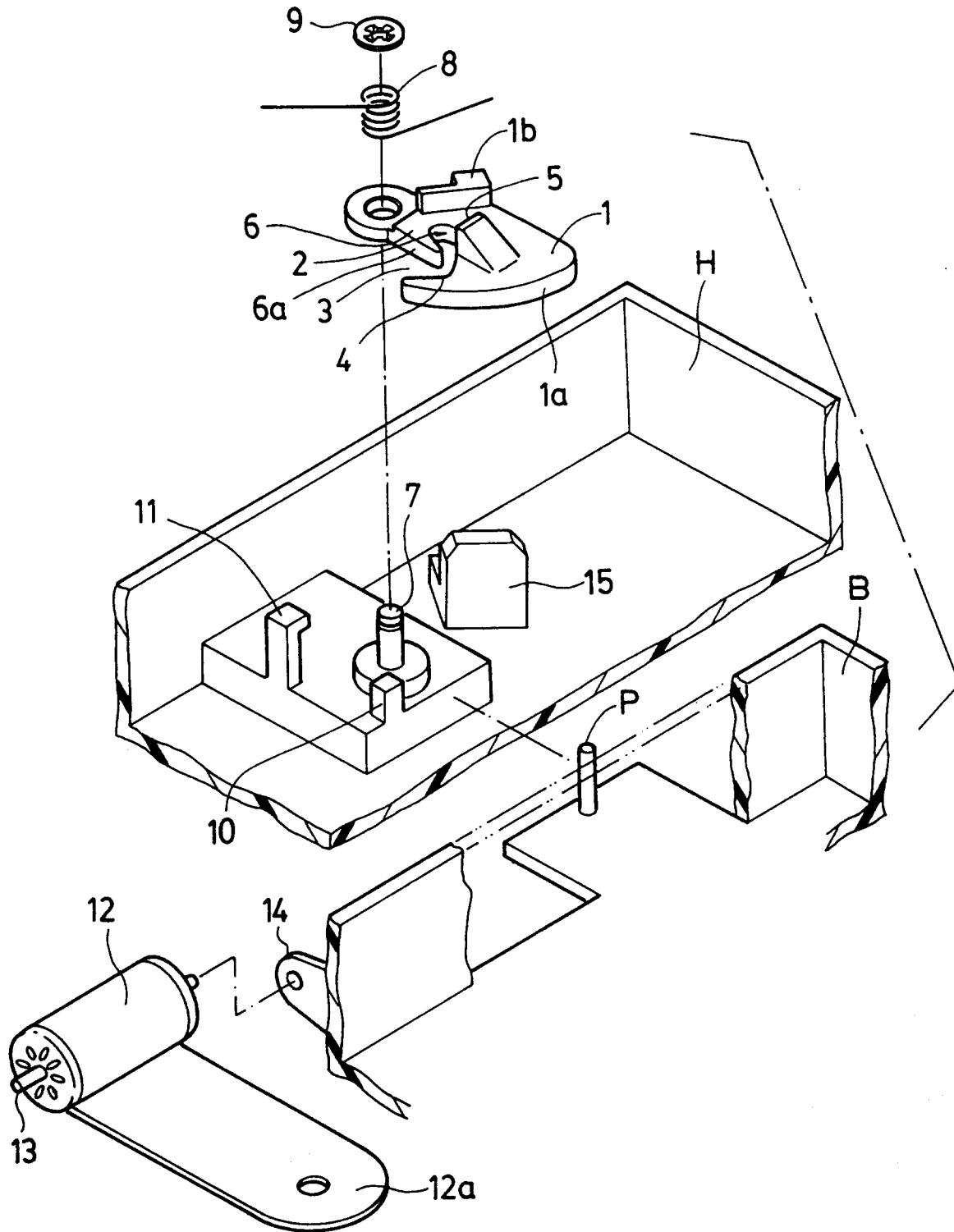


FIG.9

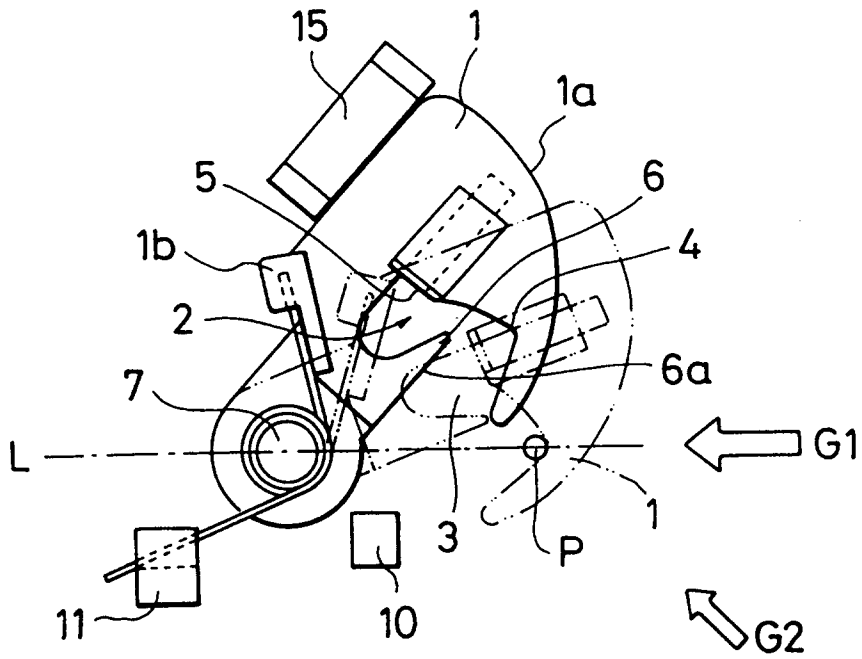


FIG.10

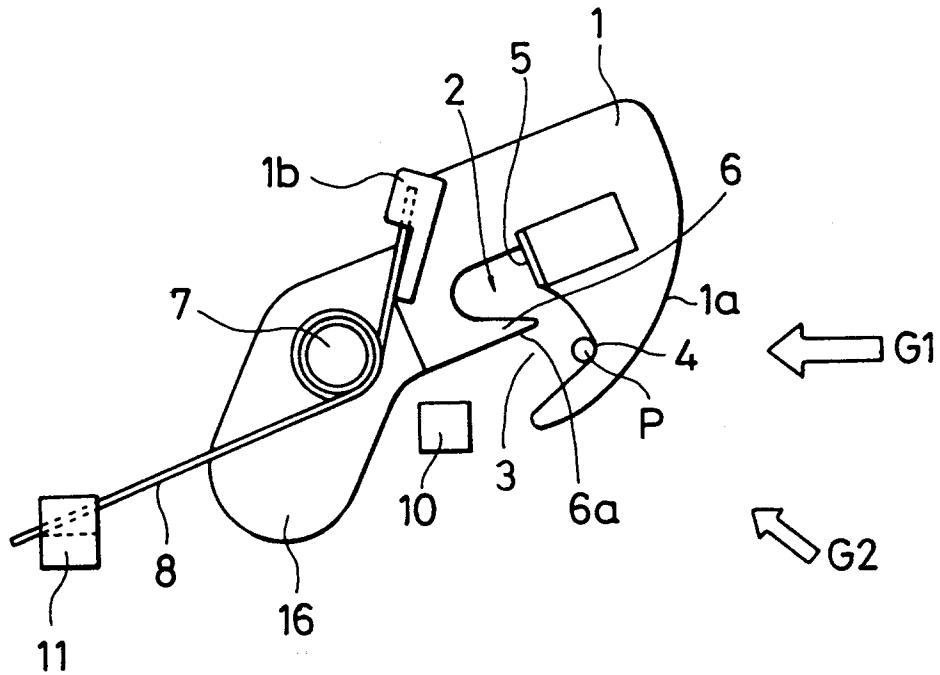


FIG.11

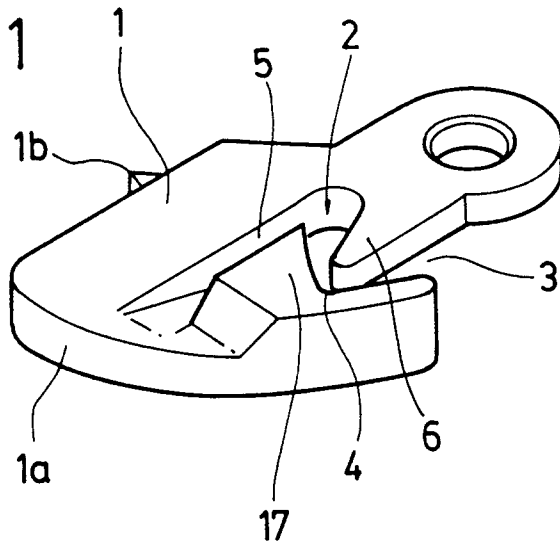


FIG.12

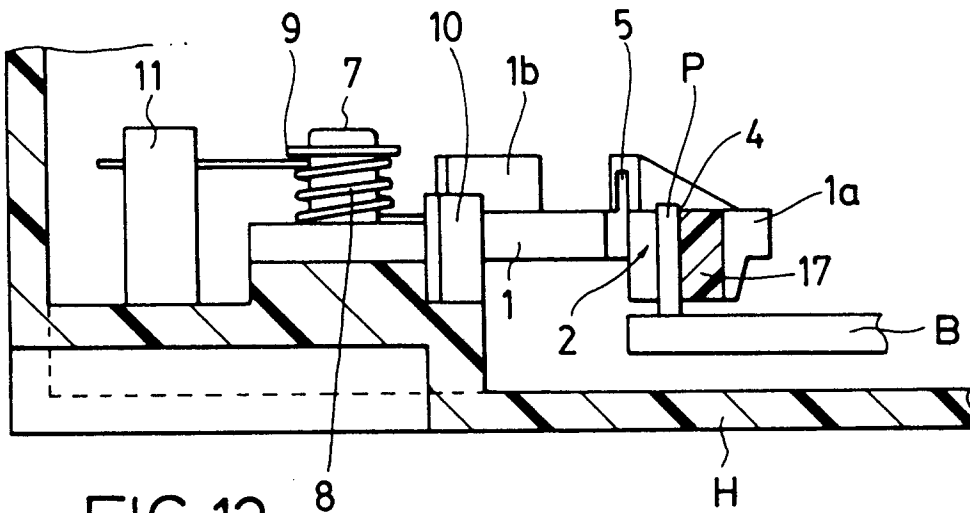


FIG.13

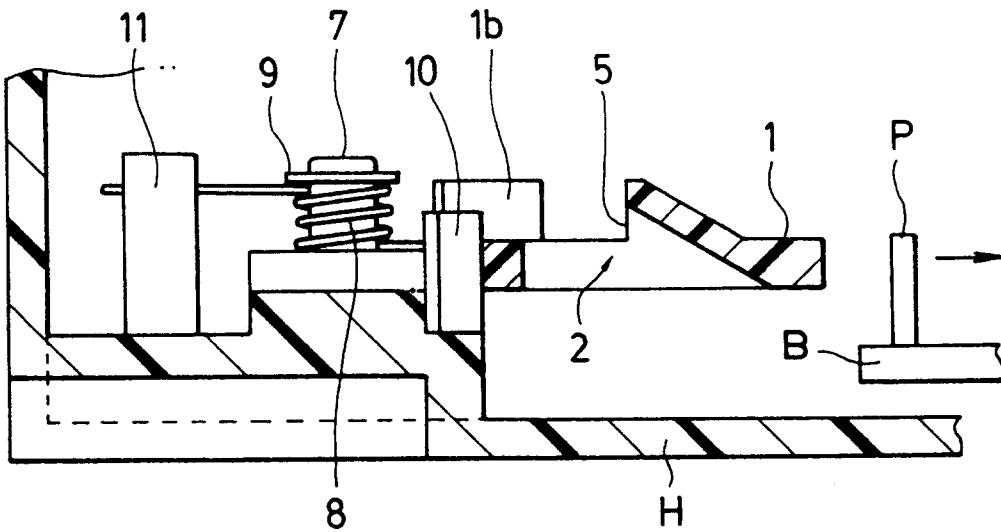


FIG.14(A)

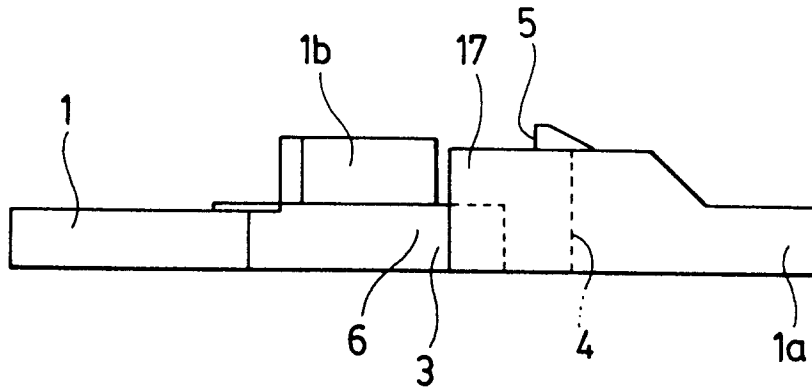


FIG.14(B)

