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(54) **Device for blocking and releasing a door, particularly a door of a home appliance**

Vorrichtung zum Verriegeln und Entriegeln einer Tür, insbesondere einer Tür eines Hausgeräts

Dispositif pour verrouiller et déverrouiller une porte, notamment une porte d'un appareil domestique

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Description

[0001] The present invention relates to a button device for blocking and releasing a door, particularly a door of a home appliance. More specifically, the invention concerns a device of the above kind that can be used both for emergency opening and for cord opening function.

[0002] As it is well known, during recent years it has been paid particular attention to realization of blocking and releasing devices for door of a washing machine, or of a drying-washing machine in order to obtain always higher safety conditions.

[0003] An example of this kind of device is described in Italian Patent n° 1289804, filed by the same Applicant (application filed on December 27, 1996, and concerning a "Device for blocking and releasing a door home appliance"). In this technical picture, the Applicant has realized an innovative solution permitting conciliating door blocking function with other functionalities such as for example child safety. Patent applications DE 3426738 C2 and EP 1460163 A2 disclose examples of devices for blocking and releasing a door, which forms part of the state of the art.

[0004] It is therefore the specific object of the present invention to provide a device for blocking and releasing a door, particularly a door of a home appliance, according to independent claim 1.

[0005] Preferably, according to the invention, said device provides return elastic means, preferably springs, for said opening and blocking hook, with said strut, with said safety slide and with said opening lever.

[0006] Still preferably, said opening and blocking hook has a lengthened element, pivoted on said housing for rotation between two positions, and element for interference with home appliance door prong, and an element for interference with strut.

[0007] Still preferably, said manual opening lever, integral with said strut, is provided with a traction cord.

[0008] Always according to the invention, interaction between opening and blocking hook and strut is such that hook, forced from inside, transmits a pushing action to the strut, which, subjected to a set force, can translate and rotate freeing the dimensions of the hook so as to permit a rotation of the hook to free the door prong.

[0009] The present invention will be now described, for illustrative but not limitative purposes, according to its preferred embodiments, with particular reference to the figures of the enclosed drawings, wherein:

figure 1 is a perspective view of the protection cover of the device according to the invention;

figure 2 is a perspective view of the device according to the invention;

figure 3 shows mechanical module of the device according to the invention;

figure 4 is a perspective view of the electrical module of the device according to the invention;

figures 5a and 5b show the device according to the

invention in an open door position; figures 6a, 6b, 6c and 6d show the device according to the invention in a closed door position; figures 7a and 7b show the device according to the invention in a blocked door position; figures 8a and 8b show the device according to the invention in an emergency opening position; and figures 9a - 9c are further views of the device according to the invention with safety slide and cover not shown.

[0010] Observing now the figures of the enclosed drawings, it is shown a device according to the invention, substantially comprised of levers and return springs permitting making both the emergency opening and cord opening functions, by the same operation.

[0011] The device according to the invention, as shown in figures 1 and 2, comprises a mechanical module 1, and an electrical module 2, that could have electrical function features similar to those of the module described in the Italian Patent Application TO98A001056 published as IT 1303590, and a protection cover 3.

[0012] As already said, the device according to the invention makes the door closure and blocking function, the door opening by cord function, emergency opening (from inside the window) (child safety), as well as the safety electric release function.

[0013] Coming now to observe figure 3, it is shown the mechanical module 1, providing a fixing support 4, a blocking hook 5, a hook 5 return spring 6, an opening lever 7, with the relevant return spring 8, a strut 9, provided as well with its relevant spring 10, a safety slide 11, and its return spring 12, and the blocking slider 13.

[0014] Closure of the door (figures 5a - 5b) is obtained by entering of a door prong (not shown in these figures, but indicated by reference number 14 in figure 6b), which, intercepting hook 5, makes it rotating, permitting to strut 9 to position behind profile 5a of the hook 5 (figure 5A), maintaining it blocked. In this condition, translation movement of the safety slide 11 and of the blocking slider 13 occurred, releasing blocking pin 15 of the electric module 2 that will have now possibility of rotating.

[0015] It must be further noted that strut 9 spring is placed eccentrically with respect to the rotation center of the same strut 9, thus generating an axial motion and a rotative motion.

[0016] As to the blocking of the door, it is obtained by blocking pin 15 of the electrical module 2 which, thanks to a control sent to the electrical module 2, comes out, blocking slider 13, preventing it from translating and rotating, being engaged within profile 13a of said component.

[0017] Opening of door (figures 6a - 6d) is instead caused by movement of the opening lever 7, by a cord 16 coupled with the same lever 7. Displacement of lever 7 drags slider that, by pin 18 drags backward strut 9, thus making it rotating about pin 19, freeing hook 5 from strut 9, interfering with a portion of the left part 13, and blocking

slider slides along a slot with a roto-translatory motion. Said pin 19 is provided both above and under the strut 9, and slides at the bottom along a slot 20 realized on support 4 and shown in figure 2.

[0018] As to the emergency opening of the window (figures 7a - 7c), by a pushing action from inside (child safety function), it is ensured by pushing action that hook 5 transmits to strut 9, which, if subjected to a set force, can translate and rotate thanks to the displacement created by contact of strut 9 profile 9a with fixed cam 4a of support, not being anymore within the hook 5 dimension, so as to permit to make such a rotation to free door prong (figures 9a - 9c).

[0019] Device according to the invention can be interfaced with a floating door prong 14, permitting compensating variations of the same along axis X, maintaining the same contact point with hook 5 (figure 6c).

[0020] Furthermore, window of a washing machine is maintained blocked during the washing phase.

[0021] The present invention has been described for illustrative but not limitative purposes, according to its preferred embodiments, but it is to be understood that modifications and/or changes can be introduced by those skilled in the art without departing from the relevant scope as defined in the enclosed claims.

Claims

1. Device for blocking and releasing a door, particularly a door of a home appliance provided with a prong (14), said device (1) comprises an housing (4), provided with a cover (3), an electrical module (2) and a mechanical module (1), said device being **characterized in that** said housing (4) comprised a fixed cam (4a), **in that** said electrical module (2) provides an activation and blocking pin (15), said mechanical module (1) provides a blocking slider (13), interacting with said activation and blocking pin (15) of said electrical module (2), so that, when said activation and blocking pin (15) comes out by a control sent to the electrical module (2), it prevents said blocking slider (13) from translating and rotating, **in that** said device (1) further comprises a strut (9) having a profile (9a) capable to interact with said fixed cam (4a) so as to permit to make such a rotation to free said door prong (14), said strut (9) being movable along a horizontal direction, and connected with said blocking slider (13), a safety slider (11), parallel with respect to said strut (9), that, in case said prong (14) misses or in case of tampering, tends to go back to the position, making eventually entering back said blocking pin (15), so as to switch off the home appliance, a rotating opening and blocking hook (5), interacting, with said strut (9), and with said prong (14) of the

door, and

an opening lever (7) for manual activation of the opening, by activating said opening lever (7), said slider (13) being dragged, causing said slider (13) to drags backward said strut (9), freeing said hook (5) from said strut (9),

the interaction between said opening and said blocking hook (5) and strut (9) is such that when said door of the home appliance is forced from inside, said hook (5) transmits a pushing action to the strut (9), which, subjected to a set force, can translate and rotate by the displacement created by the contact of said strut (9) profile (9a) with said fixed cam (4a) of said housing, freeing the dimensions of the hook (5) so as to permit a rotation of the hook (5) to free the door prong (14).

2. Device for blocking and releasing a door according to claim 1, **characterized in that** it provides return elastic means, preferably springs, for said opening and blocking hook (5), with said strut (9), with said safety slide and with said opening lever.
3. Device for blocking and releasing a door according to one of preceding claims, **characterized in that** said opening and blocking hook (5) has a lengthened element, pivoted on said housing (4) for rotation between two positions, and element for interference with home appliance door prong (14), and an element for interference with strut (9).
4. Device for blocking and releasing a door according to one of preceding claims, **characterized in that** said manual opening lever, integral with said strut (9), is provided with a traction cord (16).

Patentansprüche

1. Vorrichtung zum Verriegeln und Entriegeln einer Tür, insbesondere einer mit einem Gabelstück (14) versehenen Tür eines Haushaltsgeräts, wobei die Vorrichtung (1) aufweist:
 - ein mit einer Abdeckung (3) versehenes Gehäuse (4),
 - ein elektrisches Modul (2) und ein mechanisches Modul (1),
 - wobei die Vorrichtung **dadurch gekennzeichnet ist, dass**
 - das Gehäuse (4) einen stationären Nocken (4a) aufweist,
 - das elektrische Modul (2) einen Aktivierungs- und Verriegelungsstift (15) aufweist,
 - das mechanische Modul (1) einen Verriegelungsschieber (13) aufweist, der mit dem Aktivierungs- und Verriegelungsstift (15) des elektrischen Moduls (2) zusammenwirkt, derart,

dass, wenn der Aktivierungs- und Verriegelungsstift (15) durch ein dem elektrischen Modul (2) zugesandtes Steuerungssignal ausgefahren worden ist, eine Translations- und Rotationsbewegung des Verriegelungsschiebers (13) verhindert ist, wobei die Vorrichtung (1) außerdem aufweist:

eine Strebe (9) mit einem Profil (9a), das mit dem stationären Nocken (4a) zusammenwirken kann, um eine Durchführung einer Drehung zu erlauben, derart, dass das Türgabelstück (14) freigegeben wird, wobei die Strebe (9) entlang einer horizontalen Richtung bewegbar ist und mit dem Verriegelungsschieber (13) verbunden ist, einen Sicherheitsschieber (11), der parallel zu der Strebe (9) angeordnet ist und der bestrebt ist, im Fall eines Versagens des Gabelstücks (14) oder im Fall eines unbefugten Hantierens in die Position zurückzugehen, um dadurch den Verriegelungsstift (15) gegebenenfalls wieder einfahren zu lassen, so dass sich das Haushaltsgerät abschaltet,

einen Öffnungs- und Verriegelungsdrehhaken (5), der mit der Strebe (9) und dem Gabelstück (14) der Tür zusammenwirkt, und einen Öffnungshebel (7) zum manuell betätigbaren Öffnen, wobei durch Betätigen des Öffnungshebels (7) der Schieber (13) gezogen wird, wodurch der Schieber (13) die Strebe (9) nach hinten zieht, was den Haken (5) von der Strebe (9) löst, wobei das Zusammenwirken zwischen dem Öffnungs- und Verriegelungshaken (5) und der Strebe (9) derart ist, dass, wenn von innen auf die Tür des Haushaltsgeräts gedrückt wird, der Haken (5) eine Druckwirkung auf die Strebe (9) überträgt, die unter Einwirkung einer vorgegebenen Kraft sich verschieben und durch die Bewegung, die durch den Kontakt des Profils (9a) der Strebe (9) mit dem stationären Nocken (4a) des Gehäuses erzeugt wird, drehen kann, wodurch sie sich von dem Haken (5) soweit löst, um eine Drehung des Hakens (5) zu erlauben, um eine Freigabe des Türgabelstücks (14) zu erzielen.

2. Vorrichtung zum Verriegeln und Entriegeln einer Tür nach Anspruch 1, **dadurch gekennzeichnet, dass** die Vorrichtung elastische Rückstelleinrichtungen, vorzugsweise Federn, aufweist, für den Öffnungs- und Verriegelungshaken (5), mit der Strebe (9), mit dem Sicherheitsschieber und mit dem Öffnungshebel.

3. Vorrichtung zum Verriegeln und Entriegeln einer Tür nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** der Öffnungs- und Verriegelungshaken (5) aufweist:

ein längliches Element, das drehbar an dem Gehäuse (4) gelagert ist und zwischen zwei Positionen drehbar ist,
ein Element zum Eingriff mit dem Türgabelstück (14) des Haushaltsgeräts und
ein Element zum Eingriff mit der Strebe (9).

4. Vorrichtung zum Verriegeln und Entriegeln einer Tür nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** der mit der Strebe (9) integrale, manuell betätigbare Öffnungshebel mit einer Zugschnur (16) versehen ist.

20 Revendications

1. Dispositif pour bloquer et libérer une porte, en particulier une porte d'un appareil électroménager munie d'une dent (14), ledit dispositif (1) comprenant :

un boîtier (4), muni d'un capot (3),
un module électrique (2), et
un module mécanique (1),
ledit dispositif étant **caractérisé** :

en ce que ledit boîtier (4) comprend une came fixe (4a),

en ce que ledit module électrique (2) présente une broche d'activation et de blocage (15), ledit module mécanique (1) présentant un élément coulissant de blocage (13), interagissant avec ladite broche d'activation et de blocage (15) dudit module électrique (2), de telle sorte que, lorsque ladite broche d'activation et de blocage (15) sort sous l'effet d'une commande envoyée au module électrique (2), elle empêche ledit élément coulissant de blocage (13) d'effectuer une translation et de tourner,

en ce que ledit dispositif (1) comprend de plus :

une entretoise (9) ayant un profil (9a) susceptible d'interagir avec ladite came fixe (4a), de façon à permettre la réalisation d'une rotation telle qu'elle libère ladite dent de porte (14), ladite entretoise (9) étant mobile le long d'une direction horizontale, et reliée audit élément coulissant de blocage (13), un élément coulissant de sécurité (11), parallèle à ladite entretoise (9), qui, dans le cas où ladite dent (14) est man-

quante, ou, dans le cas d'une effraction, tend à revenir dans la position faisant finalement rentrer ladite broche de blocage (15), de façon à éteindre l'appareil électroménager, 5

un crochet d'ouverture et de blocage rotatif (5), interagissant avec ladite entretoise (9) et avec ladite dent (14) de la porte, et 10

un levier d'ouverture (7) pour une activation manuelle de l'ouverture, ledit élément coulissant (13) étant entraîné par l'activation dudit levier d'ouverture (7), ledit élément coulissant (13) entraîné provoquant l'entraînement de ladite entretoise (9) vers l'arrière, libérant ledit crochet (5) de ladite entretoise (9), 15

l'interaction entre ledit crochet d'ouverture et de blocage (5) et l'entretoise (9) est telle que, lorsque ladite porte de l'appareil électroménager est forcée de l'intérieur, ledit crochet (5) transmet 20

une action de poussée à l'entretoise (9), qui, soumise à une force donnée, peut effectuer une translation et tourner 25

du fait du déplacement créé par le contact du profil (9a) de ladite entretoise (9) avec ladite came fixe (4a) dudit boîtier, libérant les extrémités du crochet (5) de façon à permettre une rotation 30

du crochet (5) afin de libérer la dent de porte (14).

2. Dispositif pour bloquer et libérer une porte selon la revendication 1, **caractérisé en ce qu'il** présente des moyens élastiques de rappel, de préférence des ressorts, pour ledit crochet d'ouverture et de blocage (5), avec ladite entretoise (9), avec ledit élément coulissant de sécurité et avec ledit levier d'ouverture. 35 40
3. Dispositif pour bloquer et libérer une porte selon l'une des revendications précédentes, **caractérisé en ce que** ledit crochet d'ouverture et de blocage (5) comporte un élément allongé, monté à pivotement sur ledit boîtier (4) pour une rotation entre deux positions, un élément pour interférer avec la dent de porte d'appareil électroménager (14), et un élément pour interférer avec l'entretoise (9). 45 50
4. Dispositif pour bloquer et libérer une porte selon l'une des revendications précédentes, **caractérisé en ce que** ledit levier d'ouverture manuelle, intégré à ladite entretoise (9), est muni d'un cordon de traction (16). 55

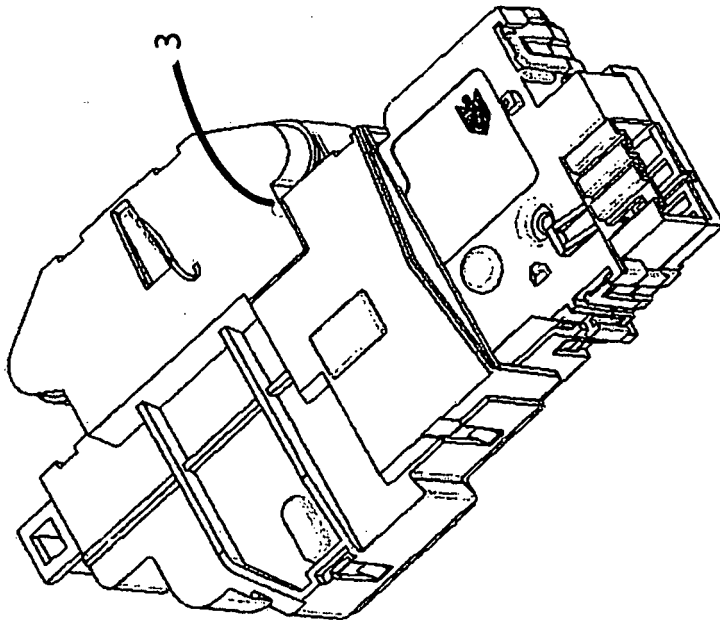


Fig.1

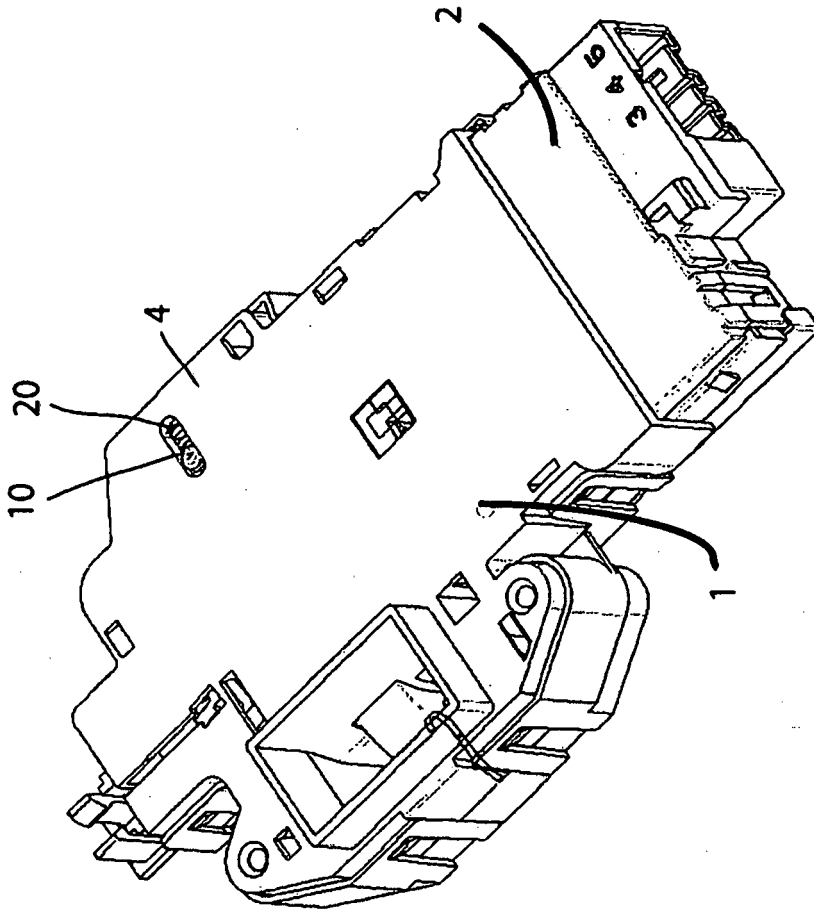


Fig.2

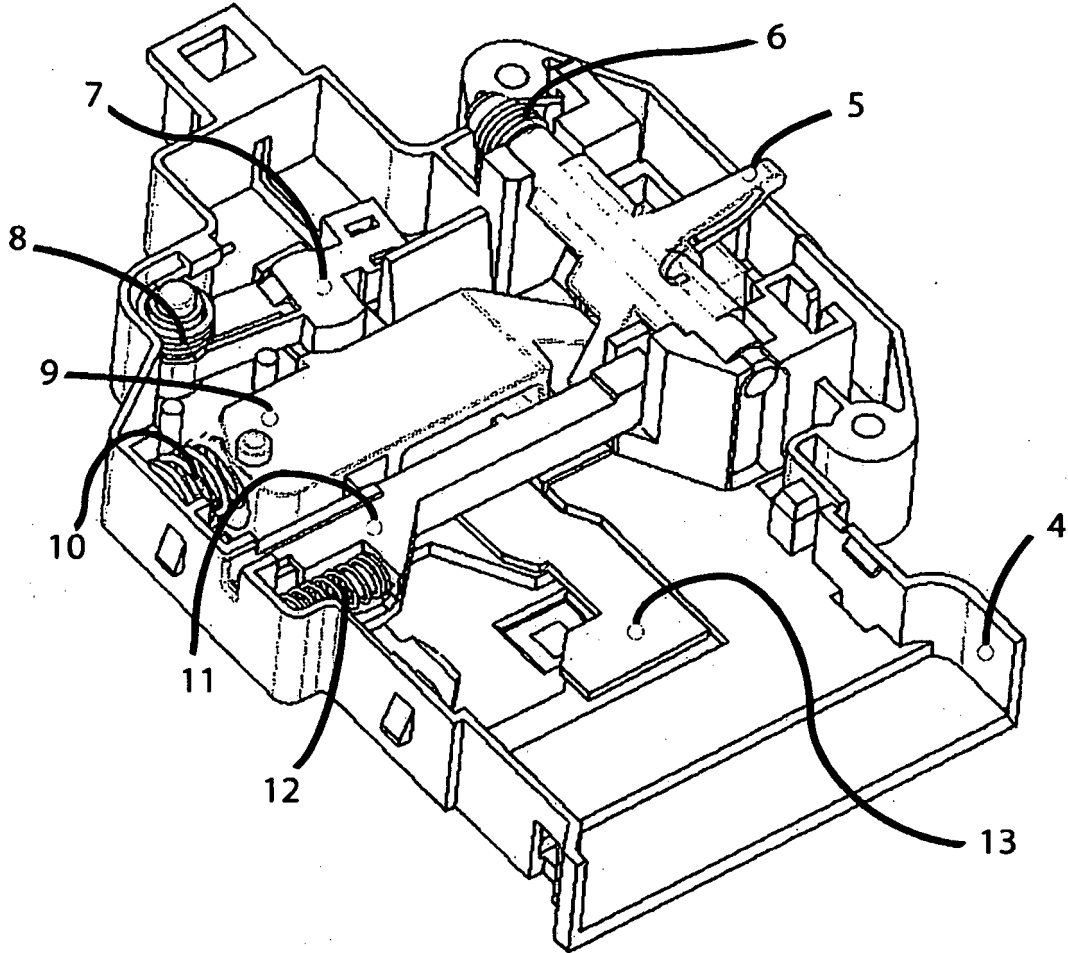


Fig.3

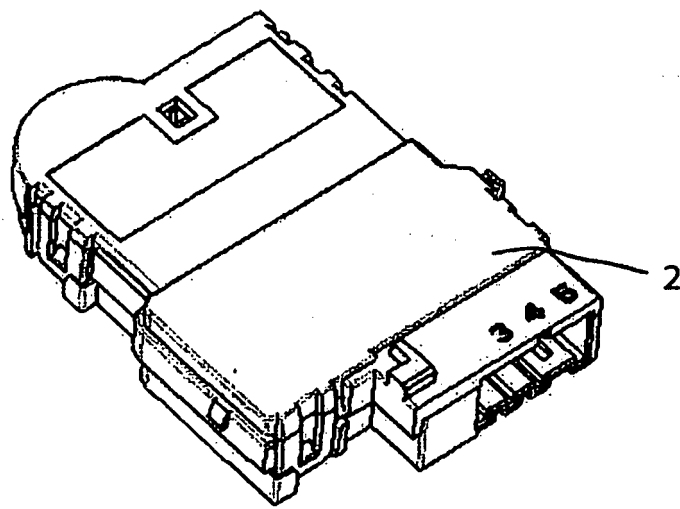


Fig.4

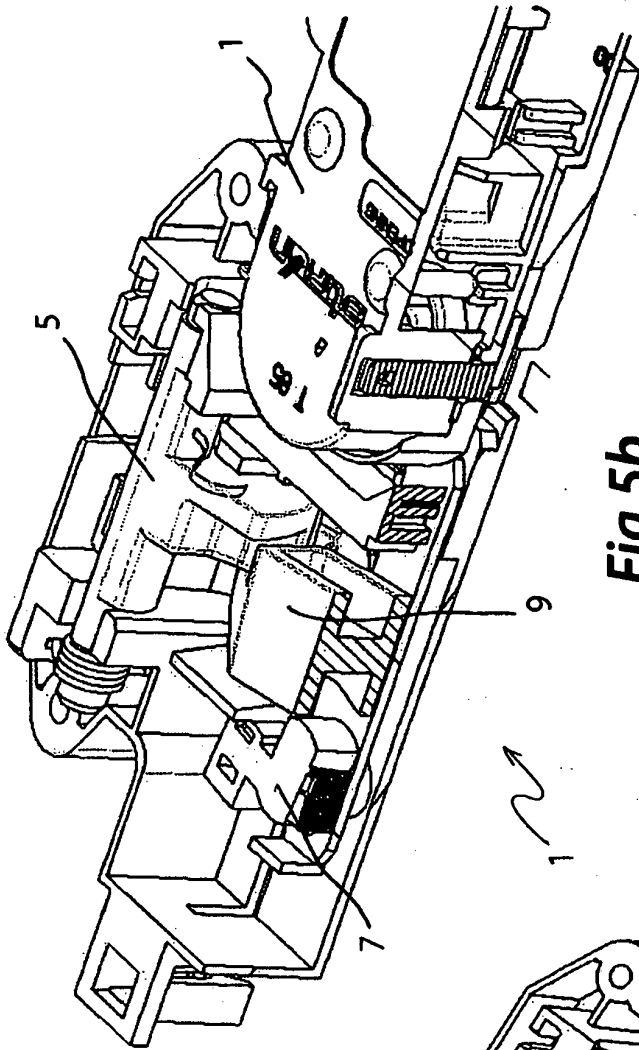


Fig.5b

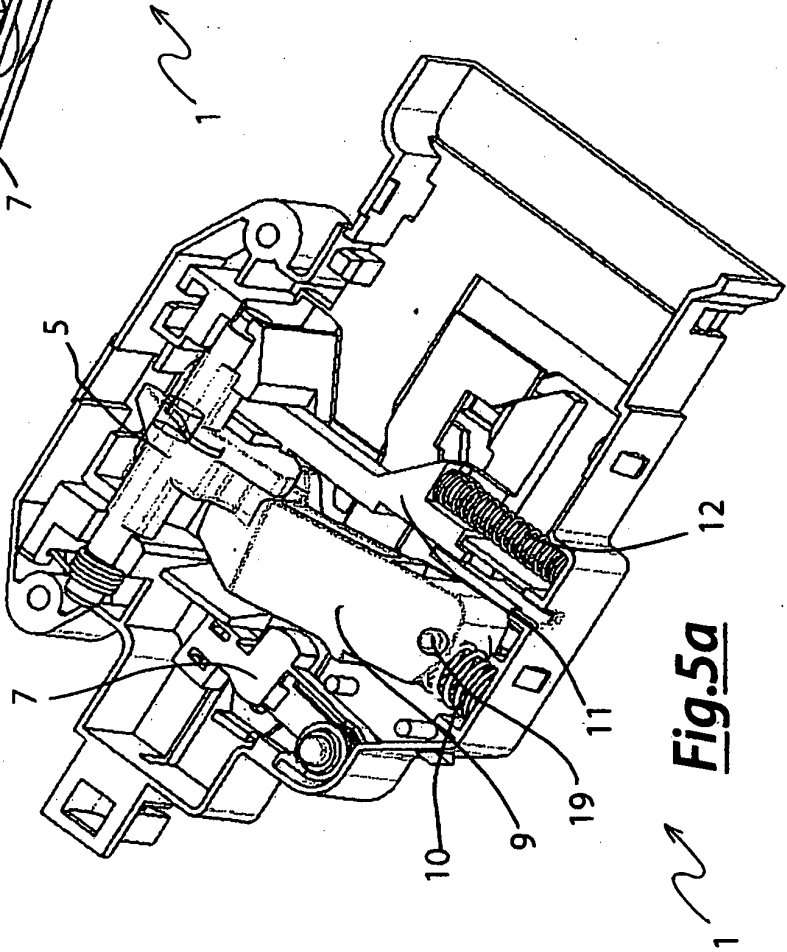


Fig.5a

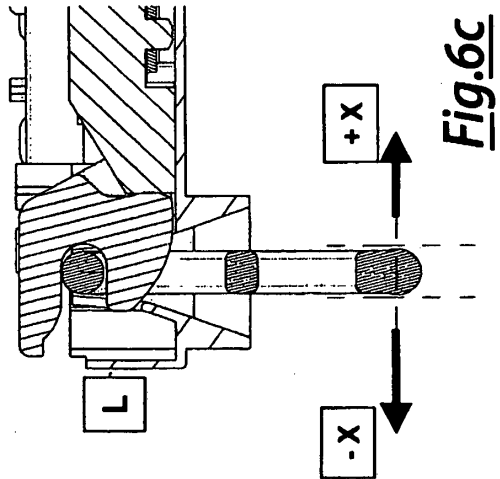
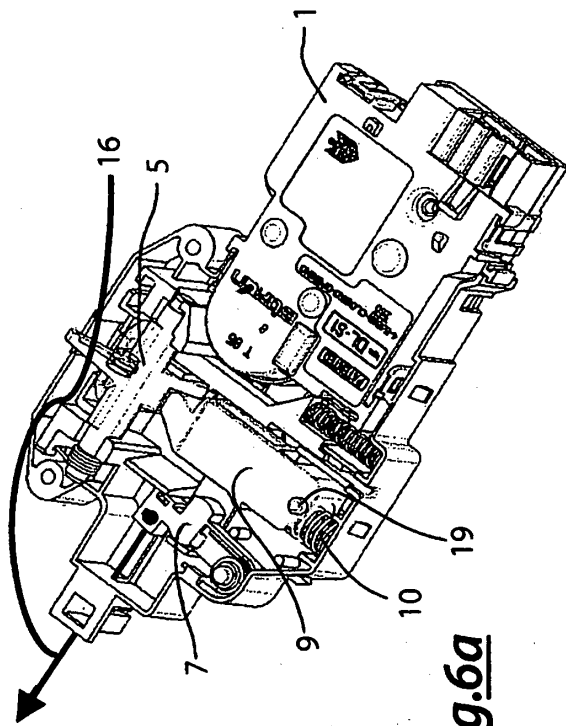
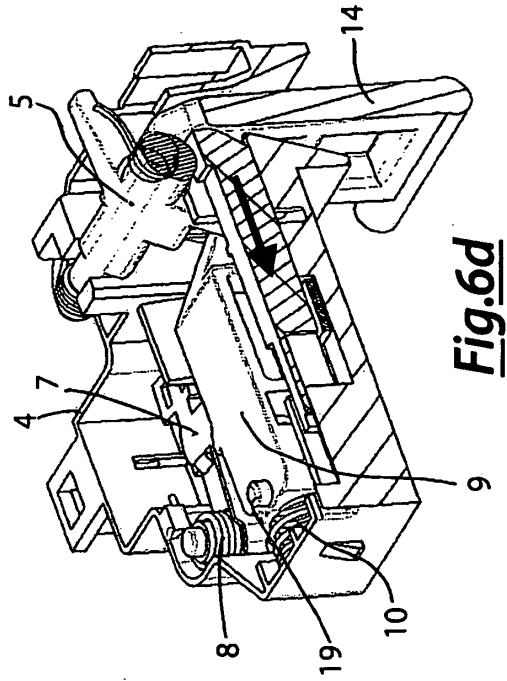
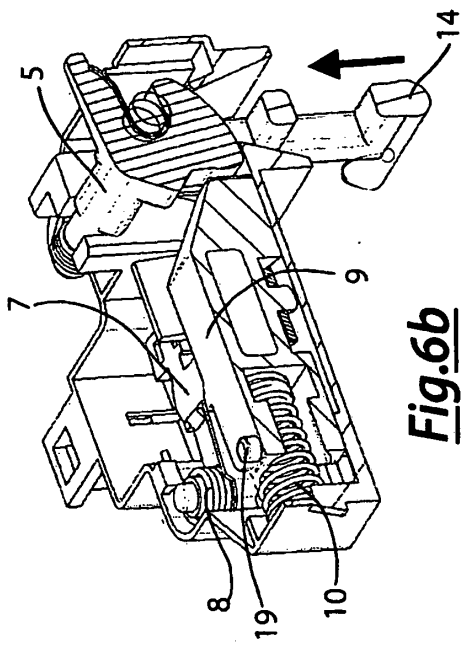


Fig. 6a

Fig. 6b

Fig. 6d

Fig. 6c

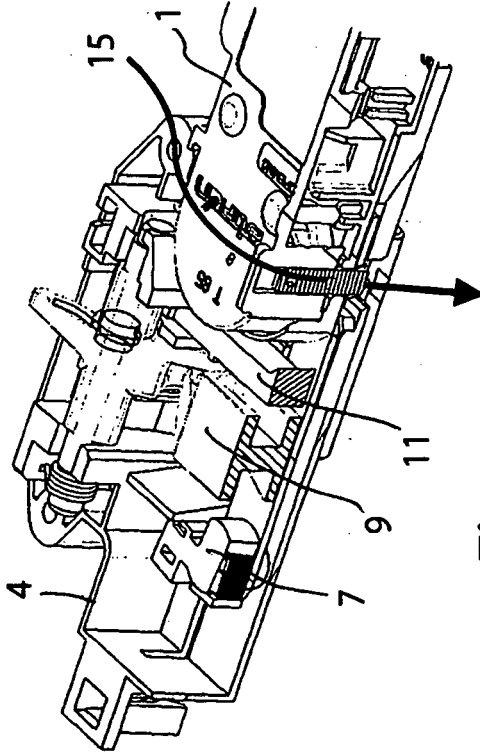


Fig. 7a

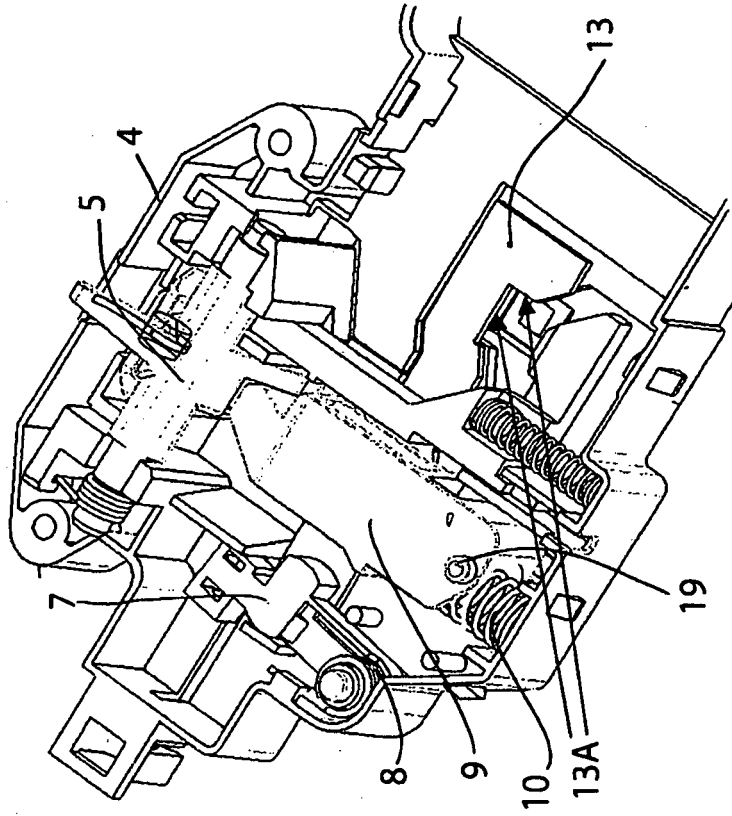


Fig. 7b

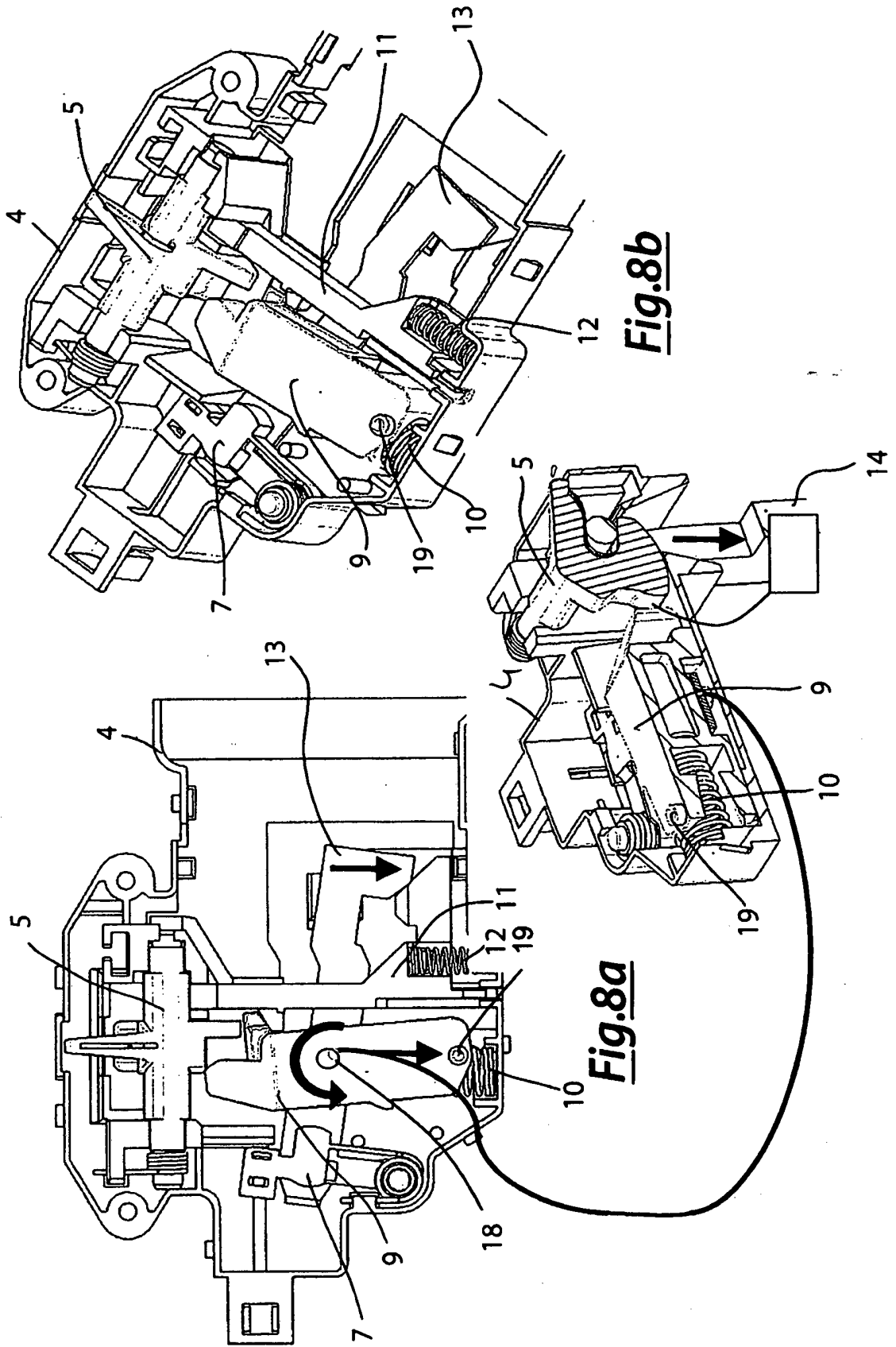


Fig. 8b

Fig. 8a

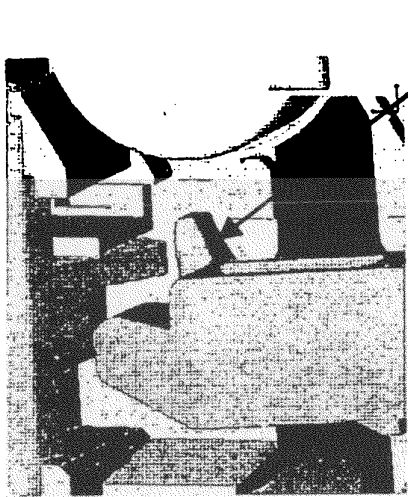


Fig. 9b

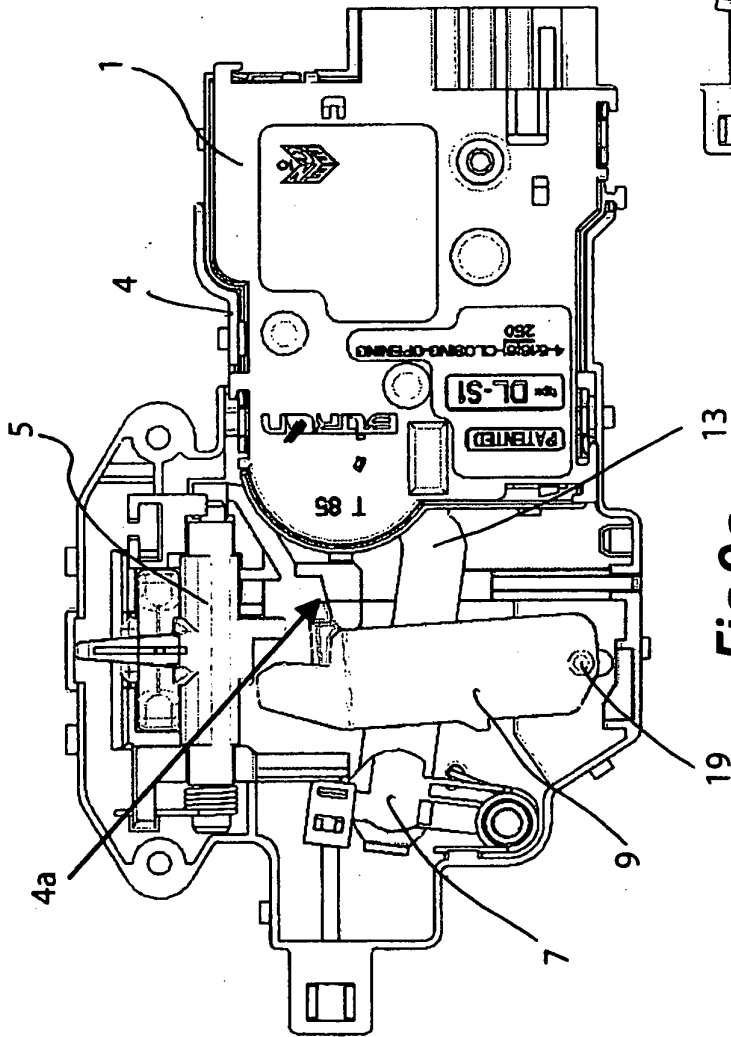


Fig. 9a

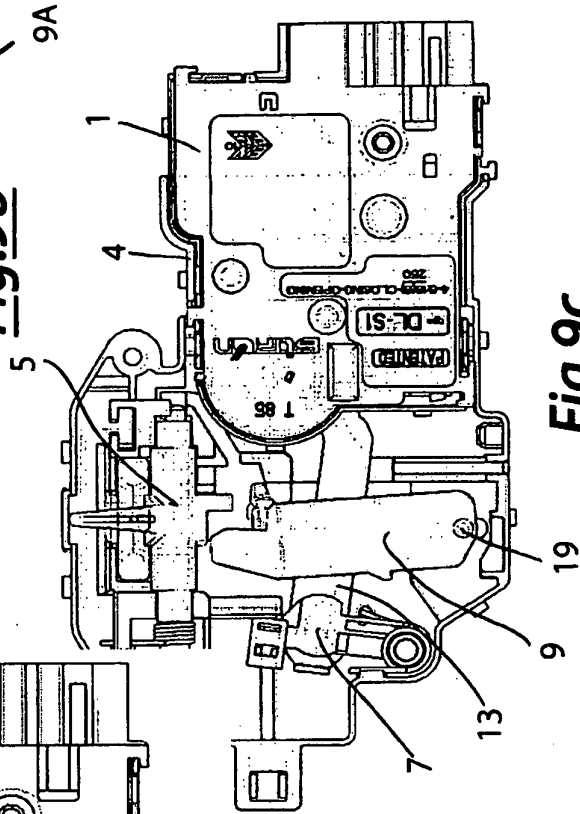


Fig. 9c

REFERENCES CITED IN THE DESCRIPTION

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