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

(57) The invention relates to a button device for blocking and releasing a door, particularly a door of a home appliance, comprising an housing (4), provided with a cover (3), an electrical module (2) and a mechanical module (1), said electrical module (2) providing an activation and blocking pin (15) interacting with said mechanical module, said mechanical module (1) providing a blocking slider (13), interacting with said activation and

blocking pin (15) of the electrical module (2), a strut (9), which is movable along a horizontal direction,, and connected with said blocking slider (13), a rotating opening and blocking hook (5), interacting, on one side with said strut (9), and on the other side with prong (14) of the door closure, a safety slide (11), parallel with respect to said strut (9), and an opening lever (7) for manual activation of the opening.

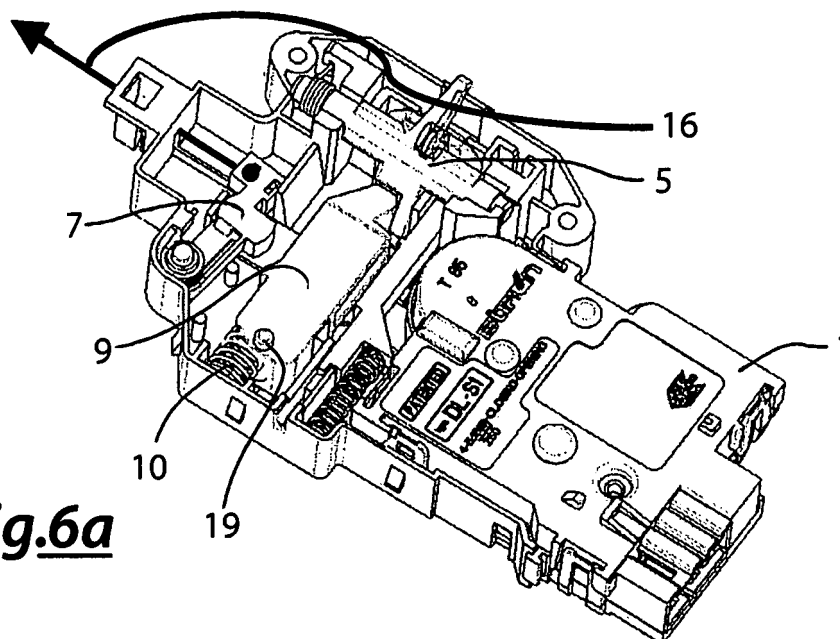


Fig.6a

Description

[0001] The present invention relates to a button device for blocking and releasing a door, particularly a door of a home appliance.

[0002] More specifically, the invention concerns a device of the above kind that can be used both for emergency opening and for cord opening function.

[0003] 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.

[0004] 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").

[0005] 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.

[0006] It is therefore specific object of the present invention a button device for blocking and releasing a door, particularly a door of a home appliance, comprising an housing, provided with a cover, an electrical module and a mechanical module, said electrical module providing an activation and blocking pin interacting with said mechanical module, said mechanical module providing a blocking slider, interacting with said activation and blocking pin of the electrical module, a strut, which is movable along a horizontal direction" and connected with said blocking slider, a rotating opening and blocking hook, interacting, on one side with said strut, and on the other side with prong of the door closure, a safety slide, parallel with respect to said strut, and an opening lever for manual activation of the opening.

[0007] 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.

[0008] Still according to the invention, 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.

[0009] Furthermore, according to the invention, said safety slide, in case prong misses, or in case of tampering, tends going back to the position, making eventually entering back said blocking pin, and consequently switching off the home appliance.

[0010] Still according to the invention, said manual opening lever, integral with said strut, is provided with a traction cord.

[0011] 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.

[0012] 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 and 6b 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.

[0013] 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.

[0014] Device according to the invention, as shown in figures 1 and 2, comprises a mechanical module 1, and electrical module 2, that could have electrical function features similar to those of the module described in the Italian Patent Application T098A001056, and a protection cover 3.

[0015] As already said, 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.

[0016] Coming now to observe figure 3, it is shown 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 sprung 9, provided as well with its relevant spring 10, a safety slide 11, and its return spring 12, and the blocking slider 13.

[0017] Closure of the door (figures 5a - 5b) is obtained by entering of 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 5c), maintaining it blocked. In this condition, translation movement of the safety slide 11 and of blocking slider 13 occurred, releasing blocking pin 15 of electric module 2 that will have now possibility of rotating.

[0018] 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.

[0019] 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.

[0020] Opening of door (figures 6a - 6d) is instead caused by movement of 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 8, 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.

[0021] 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).

[0022] 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).

[0023] Furthermore, window of a washing machine is maintained blocked during the washing phase.

[0024] 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, comprising an housing, provided with a cover, an electrical module and a mechanical module, said device being **characterized in that** said electrical module providing an activation and blocking pin interacting with said mechanical module, said mechanical module providing a blocking slider, interacting with said activation and blocking pin of the electrical module, a strut, which is movable along a horizontal direction" and connected with said blocking slider, a rotating opening and blocking hook, interacting, on one side with said strut, and on the other side with prong of the door

closure, a safety slide, parallel with respect to said strut, and an opening lever for manual activation of the opening.

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, with said strut, 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 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.
4. Device for blocking and releasing a door according to one of preceding claims, **characterized in that** said safety slide, in case prong misses, or in case of tampering, tends going back to the position, making eventually entering back said blocking pin, and consequently switching off the home appliance.
5. Device for blocking and releasing a door according to one of preceding claims, **characterized in that** said manual opening lever, integral with said strut, is provided with a traction cord.
6. Device for blocking and releasing a door according to one of preceding claims, **characterized in that** 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.

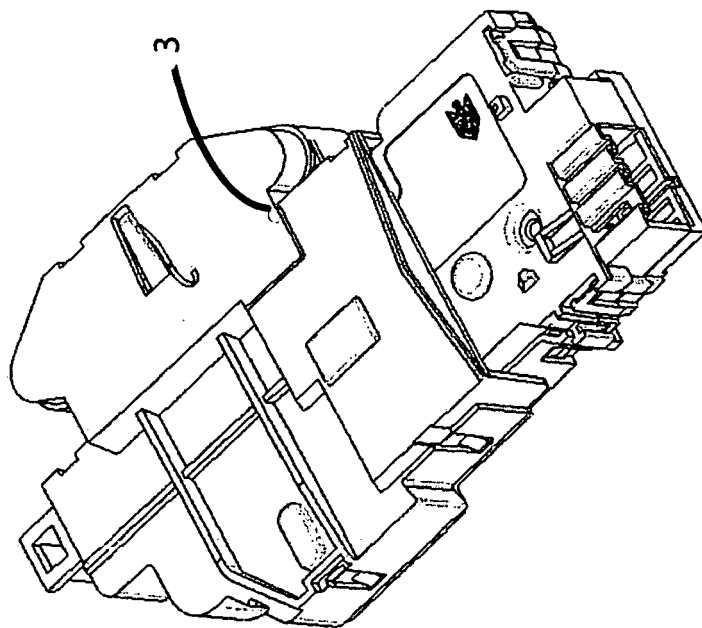


Fig.1

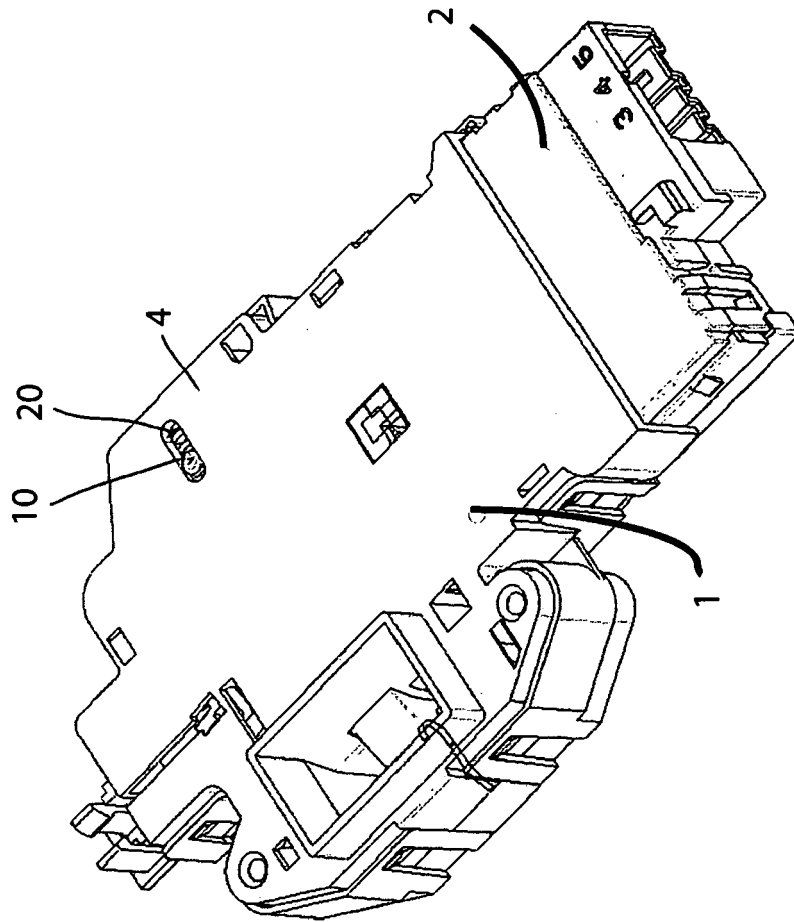


Fig.2

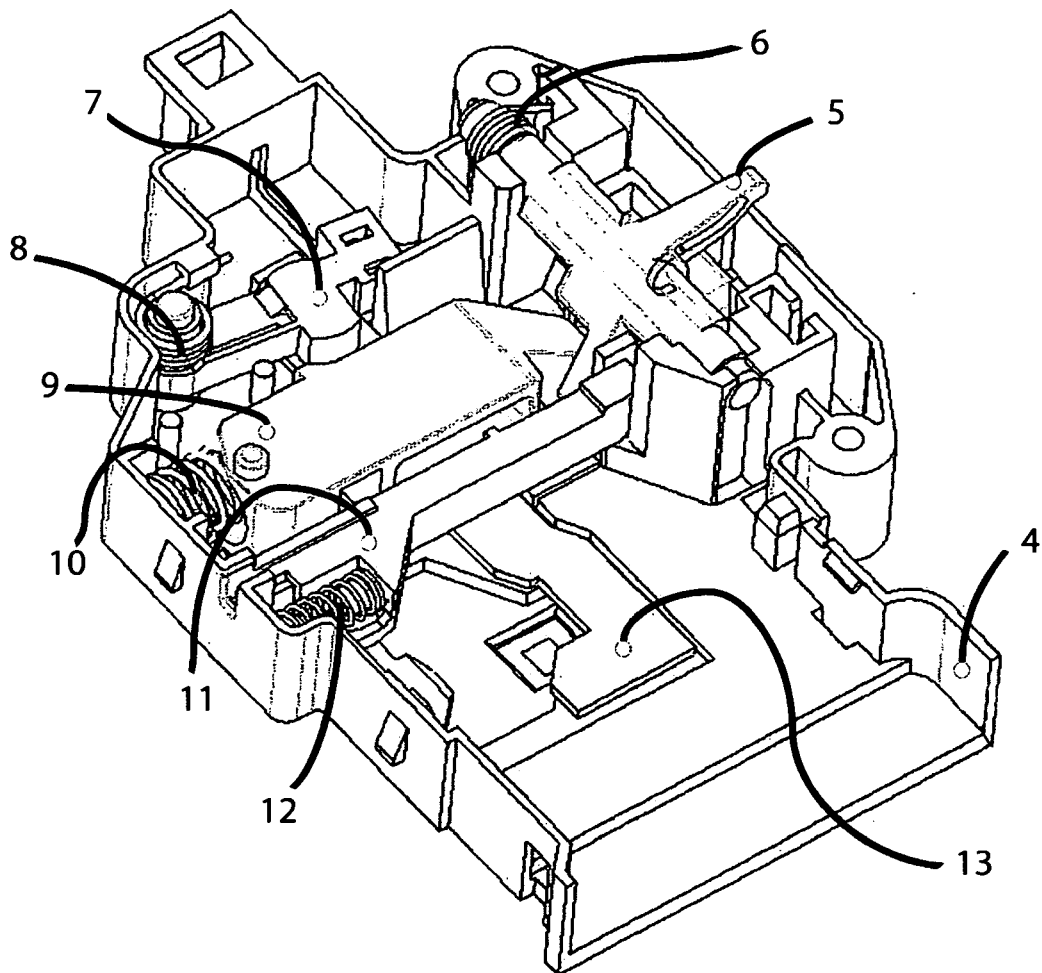


Fig.3

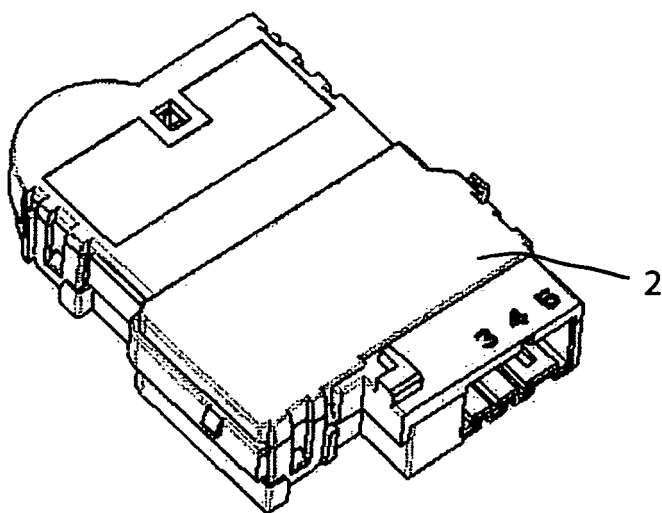
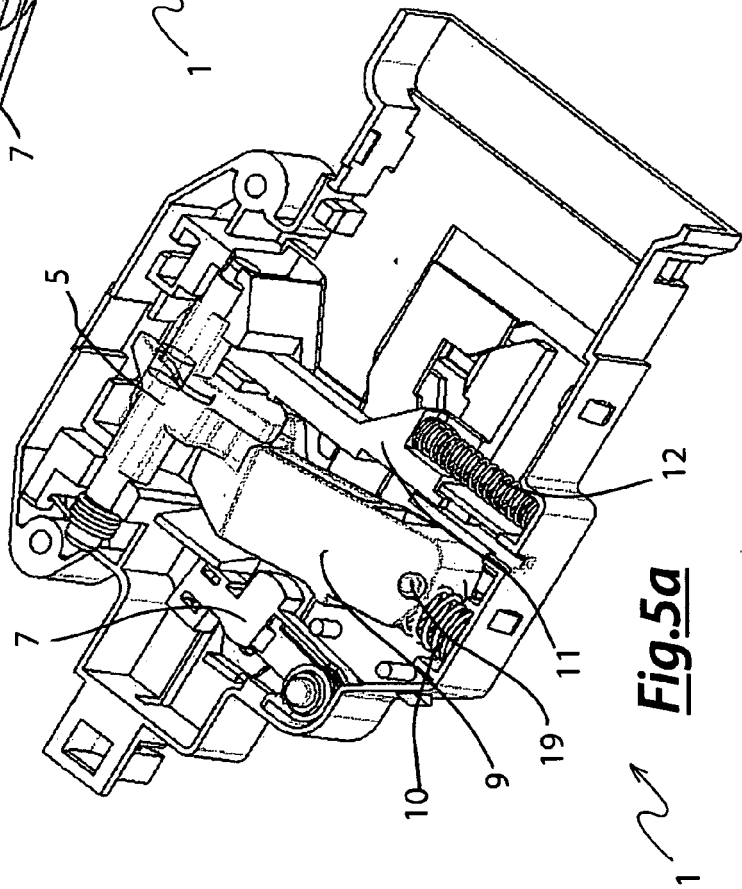
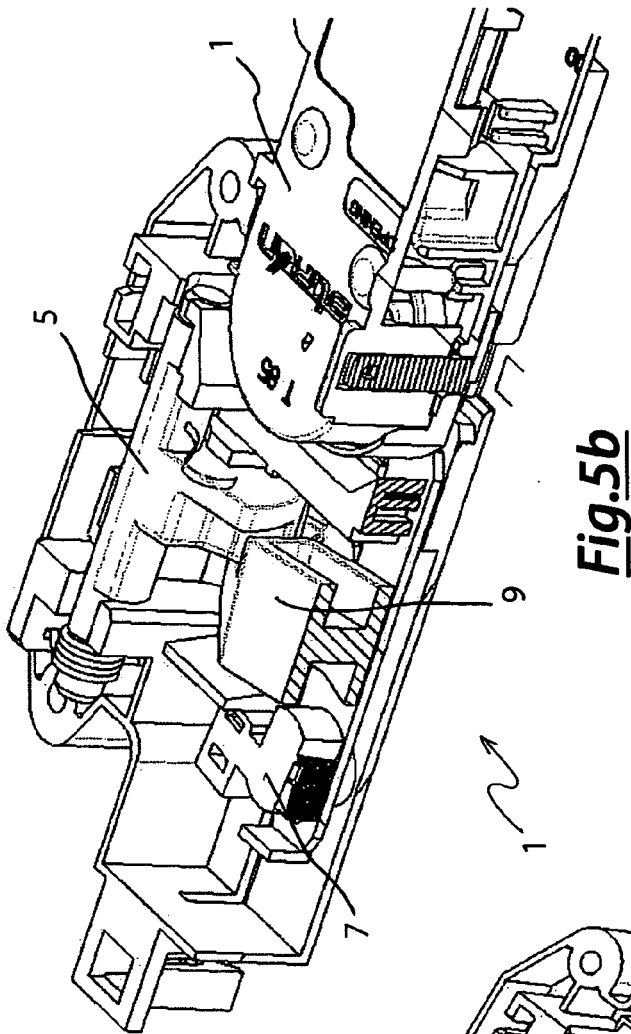
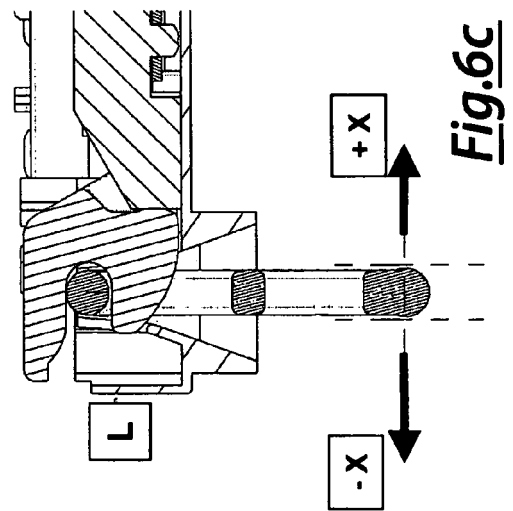
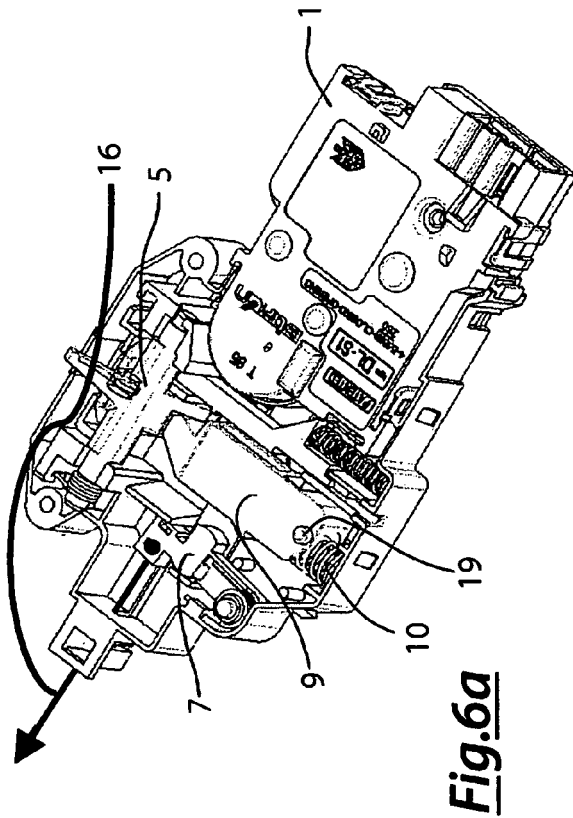
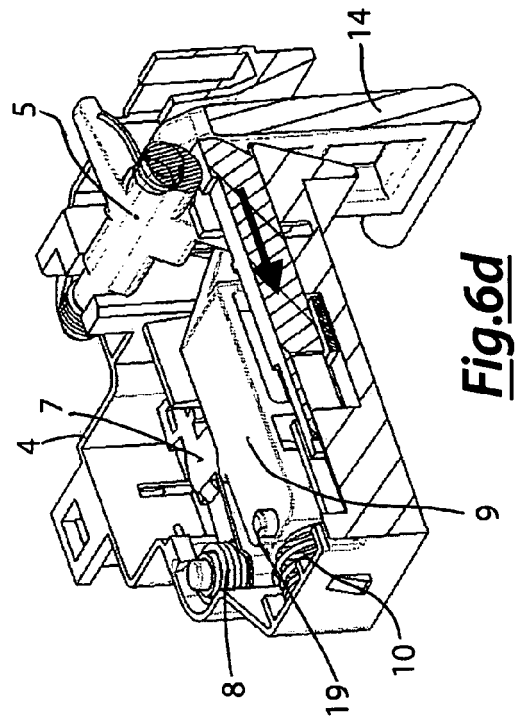
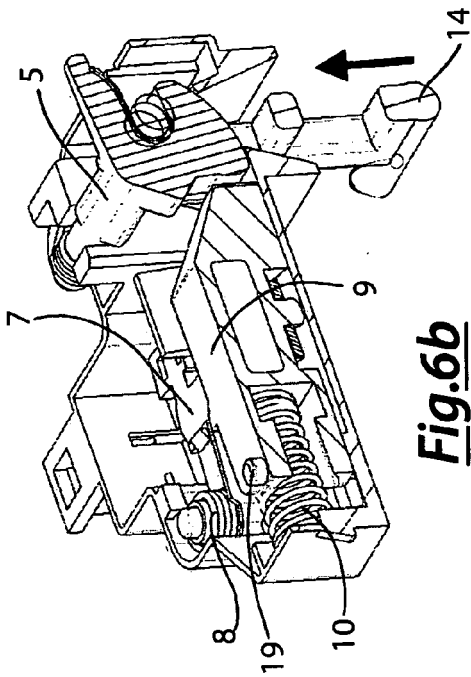


Fig.4





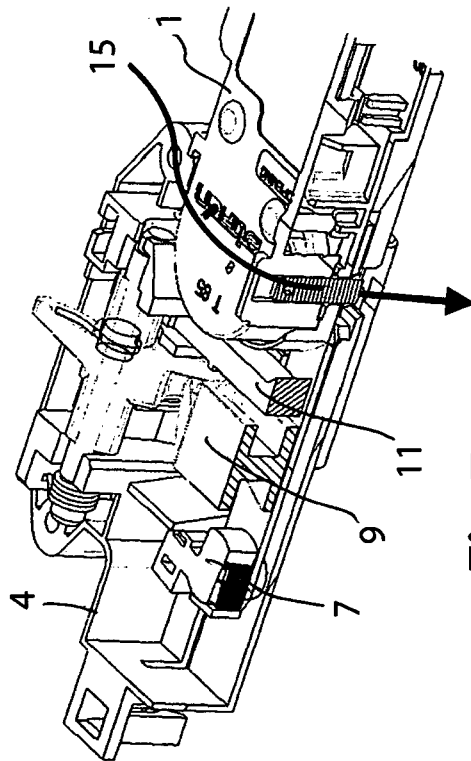


Fig. 7a

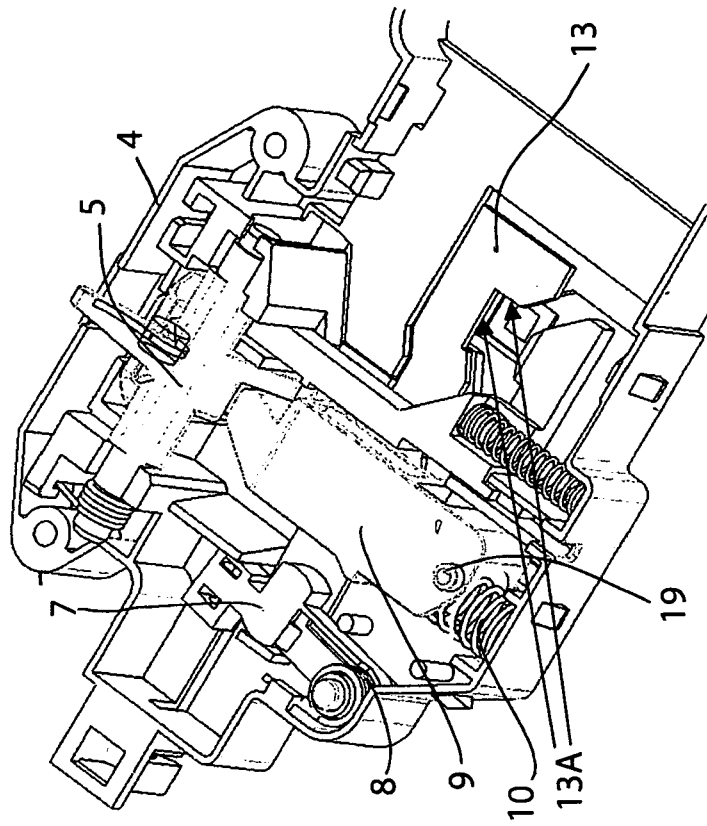
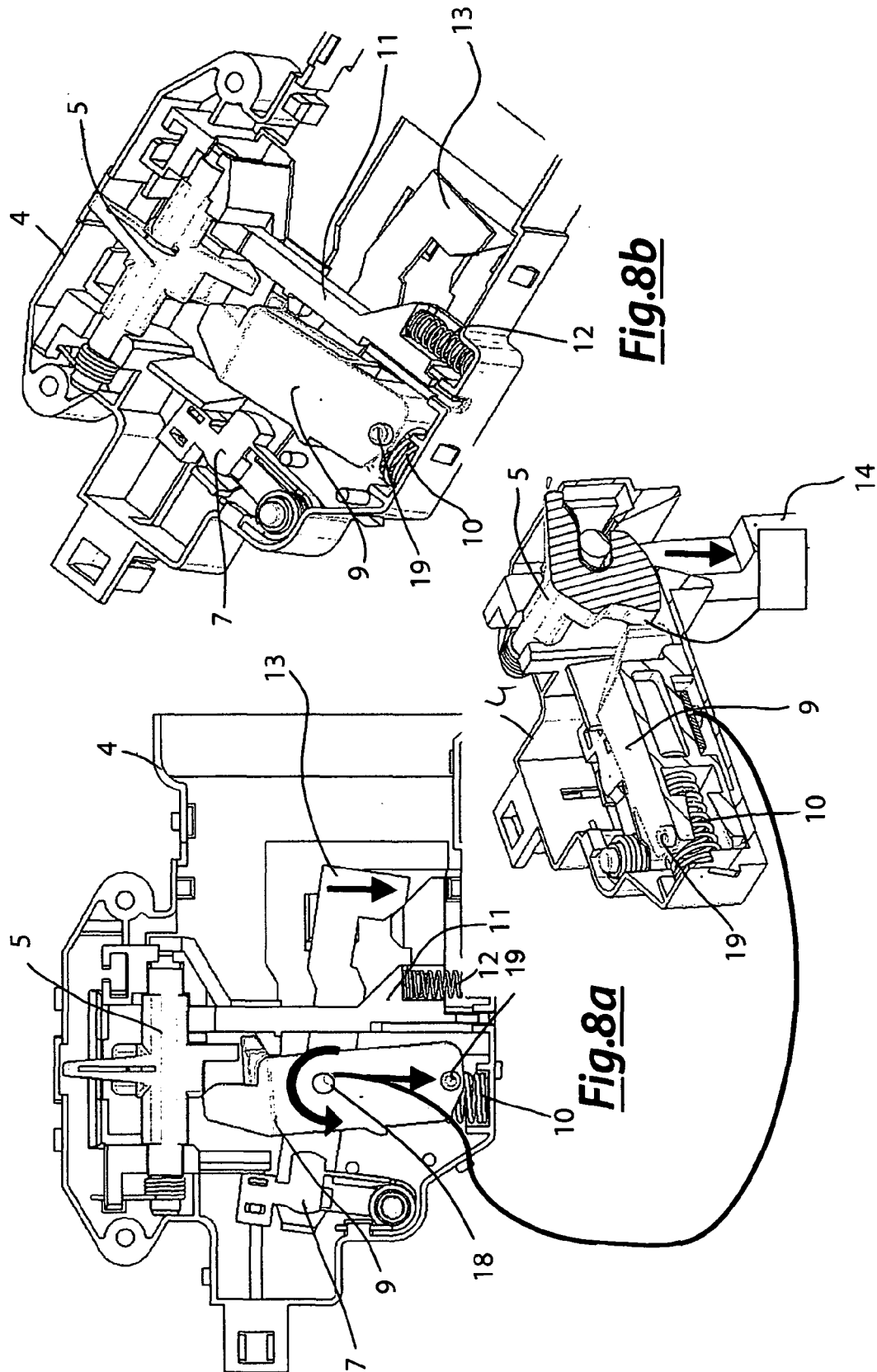
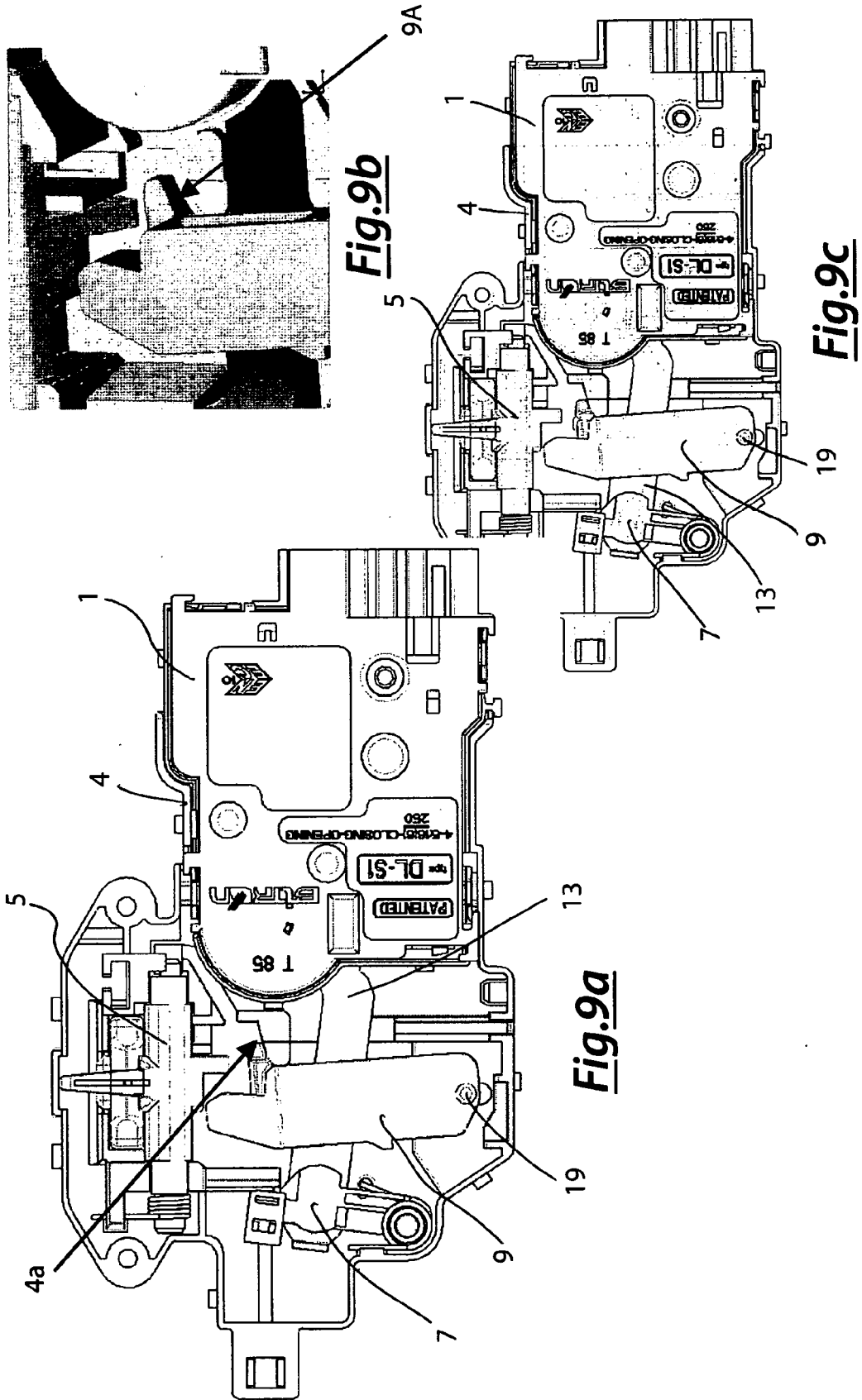


Fig. 7b







EUROPEAN SEARCH REPORT

Application Number
EP 09 42 5032

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	DE 34 26 738 A1 (YMOS AG IND PRODUKTE [DE]) 30 January 1986 (1986-01-30) * column 1, line 14 - column 1, line 54 * * column 2, line 57 - column 3, line 46 * * figures 1-8 *	1-6	INV. A47L15/42 D06F37/42 D06F39/14
A	EP 1 460 163 A (MIELE & CIE [DE]) 22 September 2004 (2004-09-22) * paragraphs [0016] - [0027] * * figures 1-9 *	1-6	
A	DE 39 19 458 A1 (ZANGENSTEIN ELEKTRO [DE]) 20 December 1990 (1990-12-20) * abstract; figure 1 *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			A47L D06F
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 5 June 2009	Examiner Weinberg, Ekkehard
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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EP 09 42 5032

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05-06-2009

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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EP 1460163	A	22-09-2004	AT 421606 T 15-02-2009 DE 10312305 A1 28-10-2004
DE 3919458	A1	20-12-1990	NONE

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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- IT T098001056 A [0014]