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(54) **Door locking device**

(57) The present invention relates to a door-locking device (1), particularly for a household appliance, provided with a locking pawl (8) that can interact with an electronic system for locking the household appliance door, **characterized in that** it comprises a support (3), a cover (2), a first lever or flexible element (4), obtained on said cover (3), and pivoted so as to oscillate between two positions, and a second lever or flexible element (5), provided on a plane substantially perpendicular with re-

spect to the plane on which said first lever (4) is provided, said second lever (5) being obtained on said support (3), and pivoted so as to oscillate between two positions, said second lever (5) having a first end on which acting to activate the door unlocking mechanism and a second end interacting with the first end of said first lever (4), second end of said first lever (4) interacting with said locking pawl (8), said pawl (8) interacting with the electronic locking system of the household appliance door.

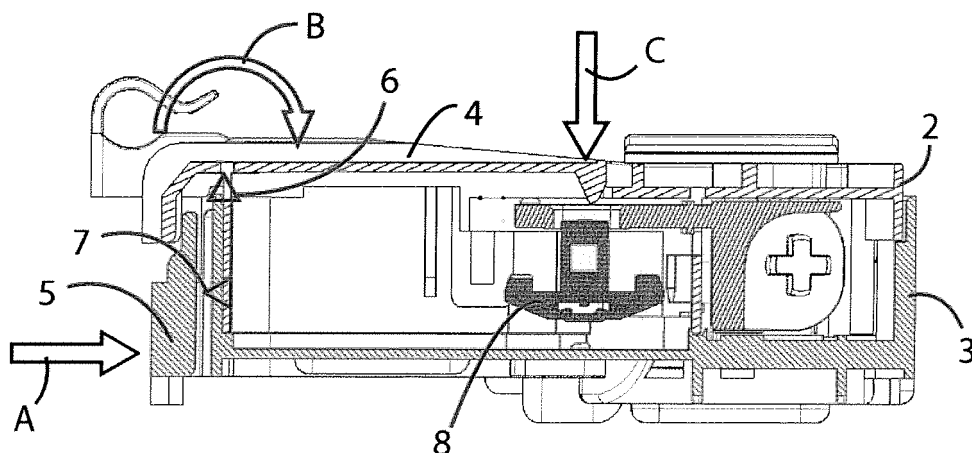


Fig. 3
Sez. III-III

Description

[0001] The present invention relates to a door locking device,

[0002] The invention further relates to an emergency opening system of a door-locking device.

[0003] More specifically, the invention concerns a door-locking device and a system of the above kind, permitting intervening even if a sudden lack of electric supply occurs, without it being necessary opening or moving the machine from its operative position.

[0004] In fact, as it is known, emergency conditions can occur in some door-locking devices, and more particularly in those devices fully controlled by the household appliance electronics, e.g. due to sudden and unpredictable lack of electric supply.

[0005] When such a situation occurs, if the household appliance door is closed, it is necessary acting from outside to open the same.

[0006] At present, emergency opening is carried out by intervention of technical assistance, opening the appliance and/or lifting the same, or providing it with a mechanism that can be operated by the user. Release mechanism can be operated by a cord or like.

[0007] Another example of a device according to the known art is described in US patent 2,325,225, concerning a closure mechanism of the household appliance door, provided with a pair of lever pivoted each other. Mechanism also comprises a lever that can be reached by a user, by which it is possible manually releasing the door closure mechanism. Said device has the drawback of being part itself of the closure mechanism. Therefore, a possible breakage of said closure mechanism can also involve the release device of the same and vice versa.

[0008] In this situation, it is included the solution suggested according to the present invention, permitting releasing the door by a mechanism which is independent with respect to the locking system of the household appliance, without being it necessary acting on or moving the appliance from its operation position.

[0009] A further object of the present invention is that of suggesting an economical solution as far as its realisation is concerned.

[0010] It is therefore specific object of the present invention a door-locking device, particularly for a household appliance, provided with a locking pawl that can interact with an electronic system for locking the household appliance door, **characterized in that** it comprises a support, a cover, a first lever or flexible element, obtained on said cover, and pivoted so as to oscillate between two positions, and a second lever or flexible element, provided on a plane substantially perpendicular with respect to the plane on which said first lever is provided, said second lever being obtained on said support, and pivoted so as to oscillate between two positions, said second lever having a first end on which acting to activate the door unlocking mechanism and a second end interacting with the first end of said first lever, second end of said first

lever interacting with a locking pawl, said pawl interacting with the electronic locking system of the household appliance door.

[0011] Always according to the invention, said door-locking device can be comprised of two single parts, respectively the support and the cover, on which said second lever and said first lever are, respectively, realized integrally.

[0012] Still according to the invention, said system for emergency opening can be actuated from outside the household appliance.

[0013] Furthermore, according to the invention, action on said second lever to activate the emergency opening system occurs according to a direction substantially parallel, offset, with respect to the main axis of said first lever, or according to an orthogonal direction, or according to any other activation direction.

[0014] Advantageously, according to the invention, when said second lever is not activated in order to interact with said first lever, said second lever is not in mechanical contact with said first lever.

[0015] Always according to the invention, said system for emergency opening can provide a slot realized on the household appliance, and an external rigid element or tool, that can be inserted through said slot until interacting with said element for activation of the system for emergency opening.

[0016] Still according to the invention, said external rigid element or tool can be comprised of a key.

[0017] The present invention will be now described for illustrative and not limitative purposes according to its preferred embodiments, with particular reference to the drawings, wherein:

figure 1 is a perspective view of a door-locking device according to the invention;

figure 2 is a perspective view of device of figure 1;

figure 3 is a section view taken along line III-III of figure 1;

figure 4 shows an embodiment of emergency opening system according to the invention; and

figure 5 is a perspective view of a tool for the system according to the invention.

[0018] Observing first figures 1 - 3 of the enclosed drawings, it is shown a door-locking device according to the invention, generically indicated by reference number 1, realised in such a way to integrally provide a system for emergency opening of household appliance door.

[0019] Said door-locking device 1 provides a cover 2 and a support 3, on which they are obtained a first lever or flexible element 4, integrally realised on said cover 2, and a second lever or flexible element 5, realised on said support 5.

[0020] Furthermore, in the preferred embodiment, said first lever 4 and said second lever 5 are substantially perpendicular each other, so that direction of mechanical locking action, that, as better described in the following, is realised by said second lever 4, is caused by an inter-

[0021] This permits placing said emergency opening system in every position of the household appliance, regardless the closure mechanism, which is provided on the door.

[0022] Said lever 4 is pivoted on point 6 (see figure 3), while lever 5 is pivoted on point 7 (see always figure 3).

[0023] Emergency opening system can be operated acting for example by an external rigid element, pushing on lever 5 according to the arrow A direction of figure 3.

[0024] Pivoting action of lever 5 on point 7 makes lever 4 rotating according to direction of arrow B. Pivoting of lever 4 on point 6 causes an action according to direction of arrow C on pawl 8, unlocking electronic device, thus permitting opening of machine door.

[0025] Hook 9 of the household appliance door (not shown in the figures) and slider 10 locking the door (that will be note described in greater detail in the following, since they are not part of the invention) are shown in the figures.

[0026] As already said, a further solution (figures 4 - 5) can be implemented on a household appliance provided with a door-locking device as the one shown in figures 1 - 3, permitting unlocking household appliance from outside by a tool 10, e.g. a key (that can be directly provided to the user or to the maintenance service) and that is inserted within a suitable slot 11, e.g. provided at the joint of the household appliance shell.

[0027] A pushing action is applied by tool 10 on door-locking device 1, so as to permit opening of the door under emergency conditions.

[0028] As it can be observed, said action can be carried out by a very small tool.

[0029] Dimensions of slot 11, which is obviously provided in a suitable position to permit to the tool 11 reaching external rigid element 3, will be obviously very small, and thus scarcely visible from outside. Particularly, slot or opening can be realised on the outer part of the household appliance.

[0030] The present invention has been described for illustrative, but not limitative purposes, according to its preferred embodiments, but it is to be understood that variations and/or modifications can be introduced by those skilled in the art without departing from the scope as defined in the enclosed claims.

Claims

1. Door-locking device (1), particularly for a household appliance, provided with a locking pawl (8) that can

interact with an electronic system for locking the household appliance door,

characterised in that it comprises

a support (3),

a cover (2),

a first lever or flexible element (4), obtained on said cover (3), and pivoted so as to oscillate between two positions, and

a second lever or flexible element (5), provided on a plane substantially perpendicular with respect to the plane on which said first lever (4) is provided, said second lever (5) being obtained on said support (3), and pivoted so as to oscillate between two positions, said second lever (5) having a first end on which acting to activate the door unlocking mechanism and a second end interacting with the first end of said first lever (4), second end of said first lever (4) interacting with said locking pawl (8), said pawl (8) interacting with the electronic locking system of the household appliance door.

2. Device (1) according to claim 1, **characterised in that** said door-locking device (1) is comprised of two single parts, respectively the support (3) and the cover (2), on which said second lever (5) and said first lever (4) are, respectively, realized integrally.
3. Device (1) according to claim 1 or 2, **characterised in that** said system for emergency opening can be actuated from outside the household appliance.
4. Device (1) according to one of the preceding claims, **characterised in that** action on said second lever (5) to activate the emergency opening system occurs according to a direction substantially parallel, offset, with respect to the main axis of said first lever, or according to an orthogonal direction, or according to any other activation direction.
5. Device (1) according to one of the preceding claims, **characterised in that** when said second lever (5) is not activated in order to interact with said first lever (4), said second lever (5) is not in mechanical contact with said first lever (4).
6. Device (1) according to one of the preceding claims, **characterised in that** said system for emergency opening provides a slot (11) realized on the household appliance, and an external rigid element or tool, that can be inserted through said slot (11) until interacting with said second lever (5) for activation of the system for emergency opening.
7. Device (1) according to claim 6, **characterised in that** said external rigid element or tool is comprised of a key.

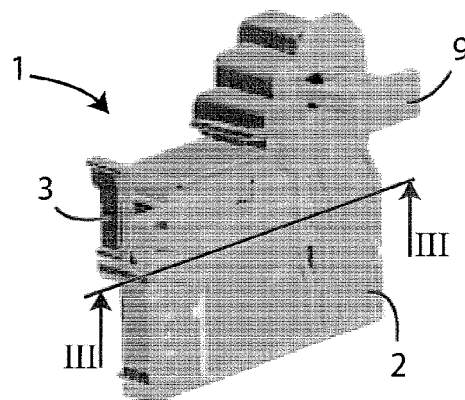


Fig. 1

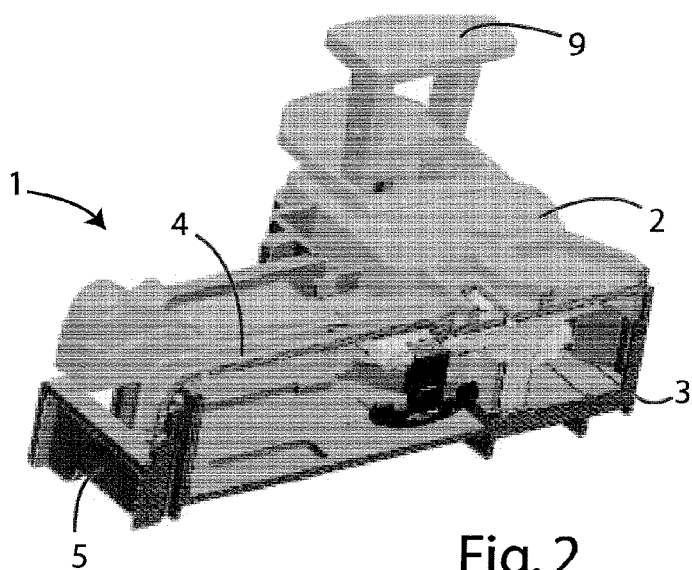


Fig. 2

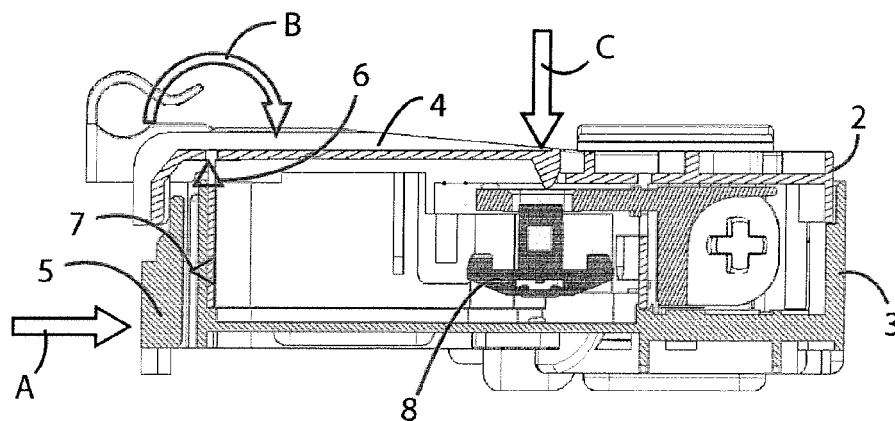


Fig. 3
Sez. III-III

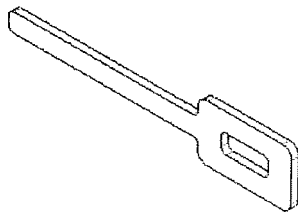


Fig. 5

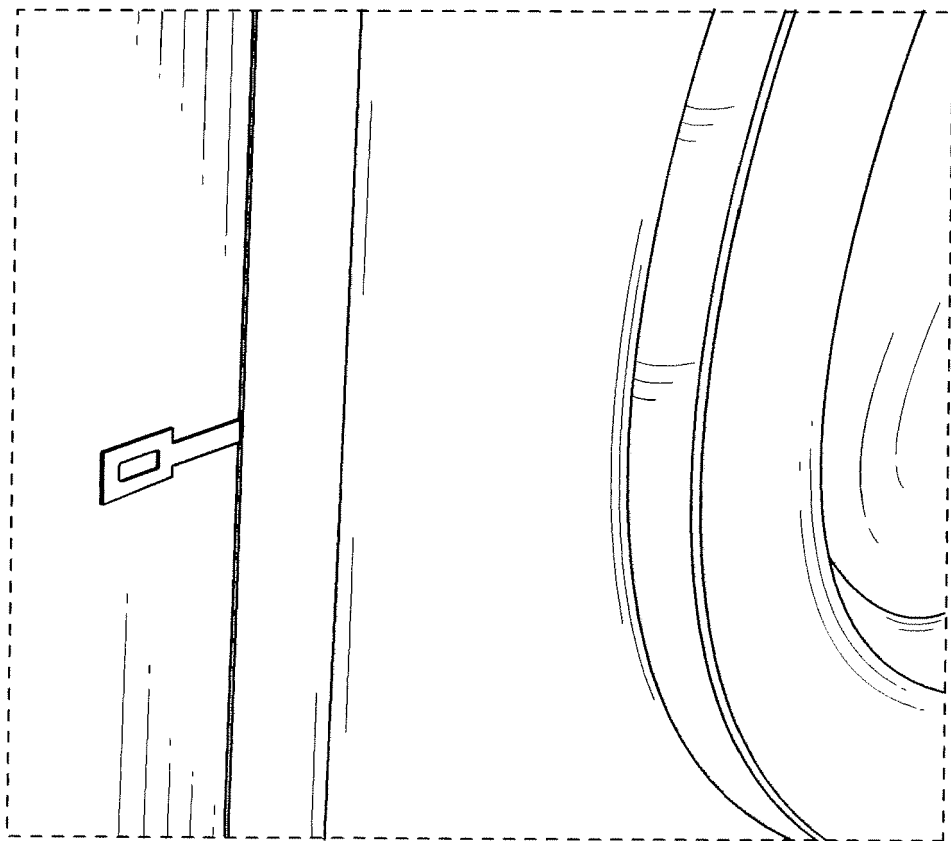


Fig. 4



EUROPEAN SEARCH REPORT

Application Number
EP 10 42 5157

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 2 325 225 A (BURKE WILLIAM O) 27 July 1943 (1943-07-27) * page 1, left-hand column, line 34 - right-hand column, line 30 * * page 2, left-hand column, line 14 - line 31; figures *	1-7	INV. E05B35/00 E05B47/02 ADD. E05C19/06
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A	US 4 406 486 A (WHITE DAVID R [US]) 27 September 1983 (1983-09-27) * the whole document *	1-7	
A	US 4 023 839 A (BISBING ROBERT H) 17 May 1977 (1977-05-17) * the whole document *	1,2,4	
A	GB 2 128 283 A (TEXAS INSTRUMENTS ITALIA SPA) 26 April 1984 (1984-04-26) * the whole document *	1,2,4	TECHNICAL FIELDS SEARCHED (IPC)
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A	EP 1 213 415 A1 (BSH BOSCH SIEMENS HAUSGERAETE [DE]) 12 June 2002 (2002-06-12) * the whole document *	1,2	
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 9 August 2010	Examiner Henkes, Roeland
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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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 10 42 5157

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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09-08-2010

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REFERENCES CITED IN THE DESCRIPTION

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