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(54) Emergency device for a household appliance

(57) The present invention concerns an emergency device (1) for a household appliance of the type comprising a door provided with a prong (60), said device (1) being characterized in that it comprises autonomous control means (30), capable to pass from a first to a second position due to an increase of the surrounding temperature and/or of the internal temperature of said household appliance, and an emergency member (40) movable between a rest position, in which it is held by said control means (30), when said control means (30) are in said first position, and an operating position, in which said emergency member (40) is engaged with said prong (60) of said door, when said door is in a closed position and said control means (30) are in said second position.

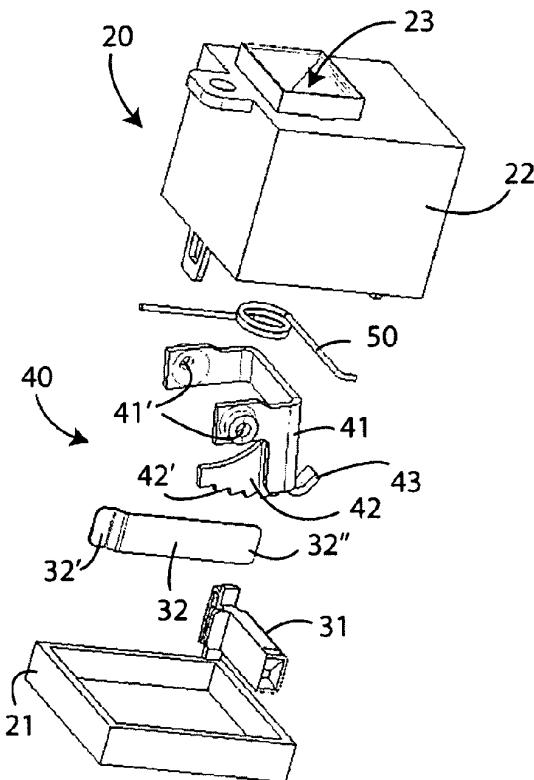


Fig. 2

Description

[0001] The present invention relates to an emergency device for a household appliance.

[0002] More specifically, the invention concerns an emergency device studied and realized in particular for dryers, but which can be used for any kind of household appliance, in which it is necessary to prevent the opening of a door in case of fire inside the household appliance.

[0003] In the following, the description will be directed to a dryer, but it is clear that the same should not be considered limited to this specific use.

[0004] As it is well known, at present on a machine dryer (also known as "dryer"), and in particular on the door, there is only a device for retaining the door when closed. Said device is also known as "door-latch".

[0005] The door-latches are devices which provide the function of closing the door, holding the door of the machine in the closed position, but not using any interlock function.

[0006] This kind of device comprises, in general, a locking hook with which the prong associated with the door can engage, a spring, adapted to hold the locking hook engaged with the prong, and an electric switch (micro) for checking the status of the door.

[0007] In the driers, for example, it happens that clothes, subjected to drying, can burn. This can happen for several factors, such as for the synthetic material of which the clothes can be made, the high temperatures of drying and the filling degree of the drying chamber. Therefore, in the field, the need to provide a device that is capable to lock the door in case of the internal temperature of the machine increases over a presettable threshold, is felt.

[0008] In view of the above, it is, therefore, an object of the present invention to provide an emergency device for a household appliance, in particular a dryer, capable of locking the door following an increase of the preset temperature, without necessarily provide for an electronic support.

[0009] It is therefore a specific object of the present invention an emergency device for a household appliance of the type comprising a door provided with a prong, said device being **characterized in that** it comprises autonomous control means, capable to pass from a first to a second position due to an increase of the surrounding temperature and/or of the internal temperature of said household appliance, and an emergency member movable between a rest position, in which it is held by said control means, when said control means are in said first position, and an operating position, in which said emergency member is engaged with said prong of said door, when said door is in a closed position and said control means are in said second position.

[0010] Always according to the invention, said prong could have a slot and said emergency member could comprise a emergency hook, capable to insert in said slot, to engage with said prong, when said emergency

member is in said operating position.

[0011] Still according to the invention, said emergency hook of said emergency member could have a toothed profile, said toothed profile having a shape so that the teeth are able to engage with said slot of said prong, to compensate the closure tolerances for different insertion depths of said prong, thus making constant the plays constant in the opening/closing direction of said door, regardless of the penetration level and/or position of said prong, once said emergency member assumes said operating position.

[0012] Further according to the invention, said device could comprise pushing means, such as a spring or the like, suitable to exert a force on said emergency member 40 to engage said emergency member with said prong when said emergency member passes from said rest position to said operating position.

[0013] Advantageously according to the invention, said control means could comprise a safety slider, movable from a first to a second position, and a bimetal element, in particular a bi-metal plate, fixed to said safety slider, said bimetallic element being capable of bending due to the increase of the surrounding temperature and/or of the internal temperature of said household appliance, so that said safety slider passes from said first to said second position, and said emergency member being arranged so as to be held in said rest position by said safety slider, when the latter is in said first position, and so as to be free to move from said rest position to said operating position, in which said safety slider is engaged with said prong of said door when said door is in closed position and when said safety slider is in said second position.

[0014] Always according to the invention, said device could comprise a container and said emergency member could be pivoted with said container.

[0015] Still according to the invention, said device could comprise a tongue capable to interact with said safety slider to hold said emergency member in said second position.

[0016] 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:

45 figure 1 shows a perspective view of an emergency device for a household appliance according to the present invention;

50 figure 2 shows an exploded view of the emergency device according to figure 2;

figure 3 shows a perspective view of an emergency member of the emergency device according to figure 2;

55 figure 4 shows the assembly of the components of the emergency device according to the invention in rest position;

figure 5 shows a plan view of the emergency device according to figure 4;

figure 6 shows the sectional view taken along the line AA of the emergency device according to figure 4;

figure 7 shows the sectional view taken along the line BB of the emergency device according to figure 4;

figure 8 shows a perspective view of the assembly of the components of the emergency device according to the invention in blocked position;

figure 9 shows a plan view of the emergency device according to figure 8;

figure 10 shows the sectional view taken along the line CC of the emergency device according to figure 8;

figure 11 shows the sectional view taken along the line DD of the emergency device according to figure 8;

figure 12 shows the emergency device according to the invention in the blocked position, in which the prong is inserted according to a first tolerance; and figure 13 shows the emergency device according to the invention in the blocked position, in which the prong is inserted according to a second tolerance.

[0017] In the various figures, similar parts will be indicated by the same reference numbers.

[0018] Referring to figures 1, 2 and 3, an emergency device 1 according to the present invention for a household appliance (not shown in the figures) can be seen, of the type comprising a locking hook and a door (also not shown in the figures), to which a prong (not shown in the figures) is associated, provided with a slot. The prong is capable of engaging with said locking hook, when the door is closed.

[0019] The emergency device 1 is installed in correspondence with said locking hook, so that said prong passes through the emergency device 1 before engaging with the prong locking hook, when the door of the household appliance is closed.

[0020] Said emergency device 1 provides for a container 20 having a base 21, opened, and a cover 22, on which an opening 23 is obtained, in which, the prong of said door is insertable.

[0021] Said emergency device 1 provides control means 30, comprising a safety slider 31, movable from a first to a second position, and a bi-metal plate 32, having a first end 32', fixed to, or held in contact with, said container 20, and a second end 32", fixed to said safety slider 31. Said bi-metal plate 32 is capable of changing its shape, in particular to bend, due to an increase of the surrounding temperature, thereby passing said safety slider 31 from said first to said second position.

[0022] Said emergency device 1 also comprises an emergency member 40, that can be seen in particular in figure 3, having a body 41, pivoted about said container 20 by means of suitable pivots (not shown in the figure) inserted in corresponding holes 41', so as to partially rotate, from a rest position to an operating position, as it

will be better described and illustrated in the following. Said emergency member 40 also comprises an emergency hook 42, having a toothed profile 42', and a tongue 43.

5 [0023] Said emergency device 1 further comprises pushing means, in particular a spring 50, adapted to exert a force on the body 41 of said emergency hook 40, to allow the passage from said rest position to said operating position.

10 [0024] The operation of the emergency device 1 described above is as follows.

[0025] Usually, the elements of the emergency device 1 are in the configuration shown in figures 4 - 7, in which emergency member 40 is in said rest position, so that emergency hook 42 does not interact with the prong when the household appliance door is closed.

[0026] Spring 50 exerts a force on said body 41, so as to force the latter to move from said rest position to said operating position. At the same time, safety slider 31 is

20 in said first position, in which it interacts with said tongue 43, thus preventing, with its dimensions that said emergency hook 42 passes from said rest position to said operating position.

[0027] In case of, for example, a high temperature in-

25 crease occurs within the dryer, for example in case of clothes catch fire, and referring now to figures 8 - 11, bimetallic plate 32 would bend, by passing said safety slider 31 from said first position to said second position, sliding in the direction of the arrow V, releasing said emergency hook 42. The action of said spring 50 allows, thus, said emergency member 40 to move from said rest position to said operating position. In this way, since the door is closed, emergency hook 42 of said emergency member 40 can be inserted in the slot of the prong, by engaging with it, holding the door closed.

[0028] Thereafter, the door can be opened again by means of an appropriate mechanism or member, which acts on the safety slider 31, or even only with the intervention of an operator, so that, once the bi-metal plate **40** has cooled, it is possible to return emergency member 40 in rest position.

[0029] Referring now to figures 12 and 13, it can be seen how the shape of the toothed profile 42' of the emergency hook 42 of the emergency member 40 allows said **45** emergency hook 42 to engage with the slot 61 of said door prong 60 and to hold it strongly by compensating the possible manufacturing tolerances and wear of the seals.

[0030] In particular, said toothed profile 42' of the **50** emergency hook 42 operates as follows. Considering figure 12, it is observed that emergency member 40 is in said operating position. Then emergency hook 42 is engaged with said slot 61 by first tooth of said toothed profile 42'. In case of, as shown in figure 13, the closing position of said door has a different position of the prong 60, such that the prong 60 is more inserted into said opening 23, or a force were exerted on the door as shown in arrow P, which would tend to introduce prong 60 further within

said opening 23, the slot 61 would shift toward the direction of the arrow P of figure 13, and the emergency hook 42 would rotate according to arrow R, so that said emergency hook 42 introduces further into said slot 61 by the force exerted by said spring 50 of said emergency member 40. In this way, the slot 61 of the prong 60 engages with one of the teeth consecutive to that which was initially engaged, so that said door remains, as said, strongly blocked.

[0031] An advantage of the emergency device according to the present invention is that the patent is able to function without being connected with any external control unit, so it is totally autonomous and independent with respect to the household appliance on which it is installed.

[0032] 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. Emergency device (1) for a household appliance of the type comprising a door provided with a prong (60), said device (1) being **characterized in that** it comprises

autonomous control means (30), capable to pass from a first to a second position due to an increase of the surrounding temperature and/or of the internal temperature of said household appliance, and an emergency member (40) movable between a rest position, in which it is held by said control means (30), when said control means (30) are in said first position, and an operating position, in which said emergency member (40) is engaged with said prong (60) of said door, when said door is in a closed position and said control means (30) are in said second position.

2. Device (1) according to claim 1, **characterized in that** said prong (60) has a slot (61) and **in that** said emergency member (40) comprises a emergency hook (42), capable to insert in said slot (61), to engage with said prong (60), when said emergency member (40) is in said operating position.

3. Device (1) according to claim 2, **characterized in that** said emergency hook (42) of said emergency member (40) has a toothed profile (42'), said toothed profile (42') having a shape so that the teeth are able to engage with said slot (61) of said prong (60), to compensate the closure tolerances for different insertion depths of said prong (60), thus making constant the plays constant in the opening/closing direction of said door, regardless of the penetration level

and/or position of said prong (60), once said emergency member (40) assumes said operating position.

5 4. Device (1) according to anyone of the preceding claims, **characterized in that** it comprises pushing means, such as a spring (50) or the like, suitable to exert a force on said emergency member (40) to engage said emergency member (40) with said prong (60) when said emergency member (40) passes from said rest position to said operating position.

10 5. Device (1) according to anyone of the preceding claims, **characterized in that** said control means (30) comprise
15 a safety slider (31), movable from a first to a second position, and
a bimetal element, in particular a bi-metal plate (32), fixed to said safety slider (31), said bimetallic element being capable of bending due to the increase of the surrounding temperature and/or of the internal temperature of said household appliance, so that said safety slider (31) passes from said first to said second position, and
20 said emergency member (40) being arranged so as to be held in said rest position by said safety slider (31), when the latter is in said first position, and so as to be free to move from said rest position to said operating position, in which said safety slider (31) is engaged with said prong (60) of said door when said door is in closed position and when said safety slider (31) is in said second position.

25 6. Device (1) according to anyone of the preceding claims, **characterized in that** it comprises a container (20) and **in that** said emergency member (40) is pivoted with said container (20).

30 7. Device (1) according to anyone of the preceding claims, **characterized in that** it comprises a tongue (43) capable to interact with said safety slider (31) to hold said emergency member (40) in said second position.

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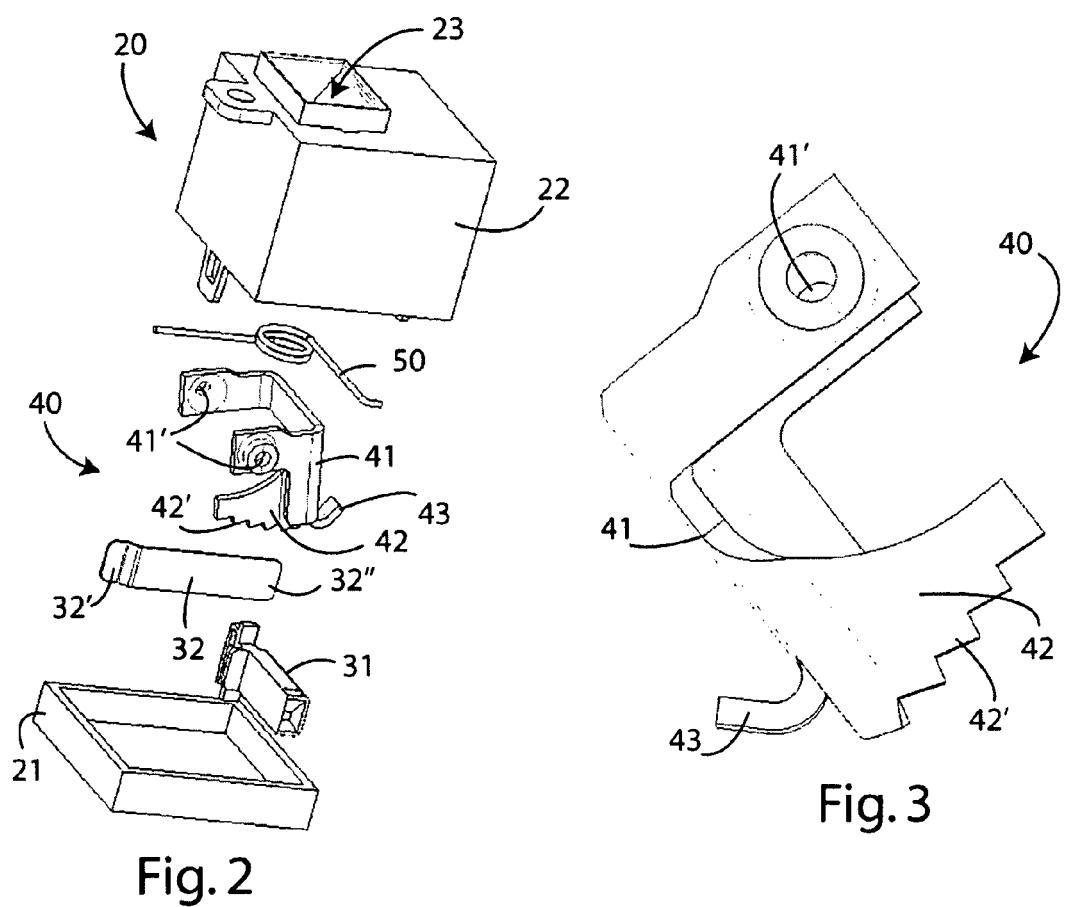
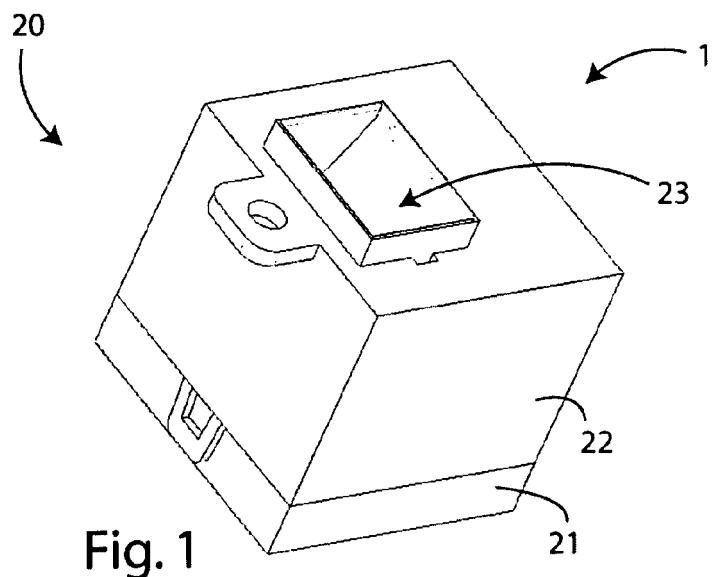
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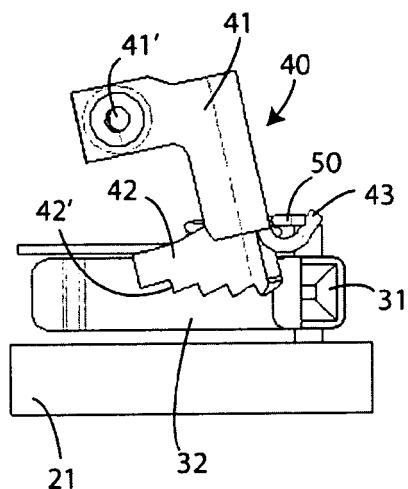


Fig. 4

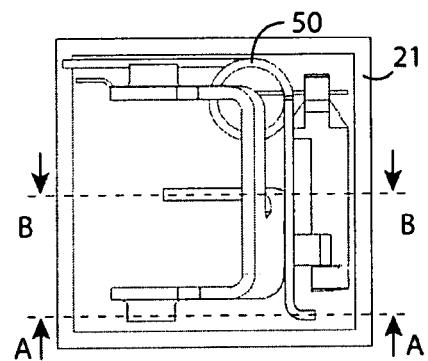


Fig. 5

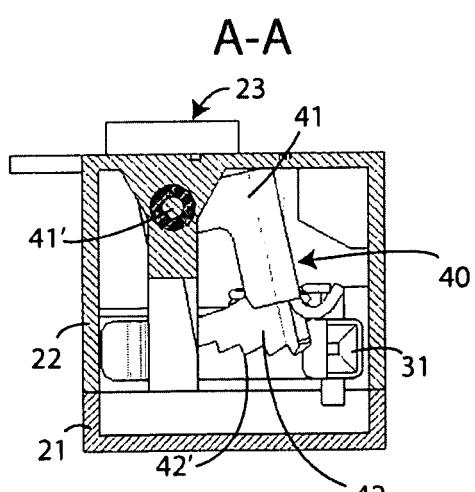


Fig. 6

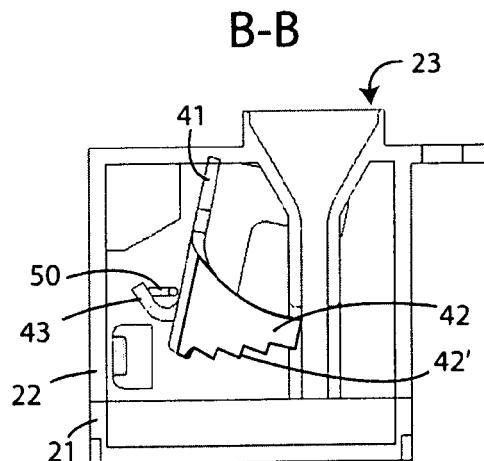


Fig. 7

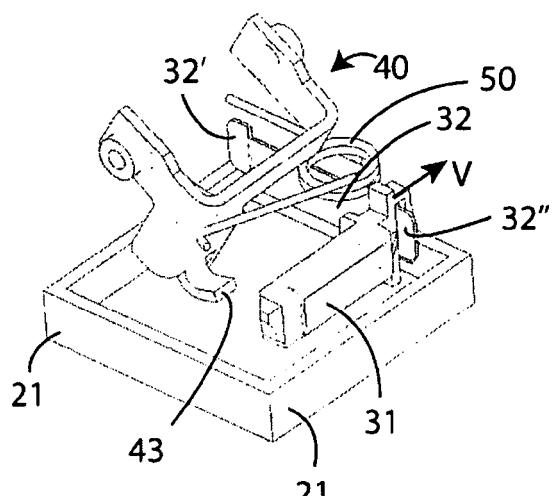


Fig. 8

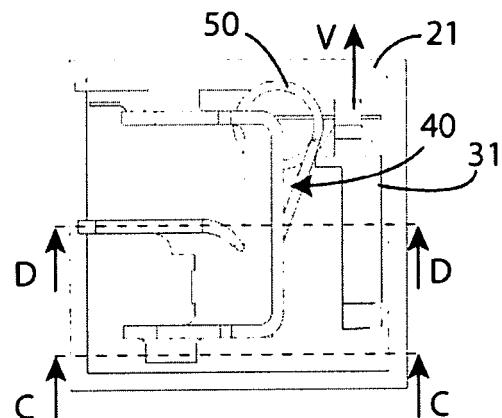


Fig. 9

C-C

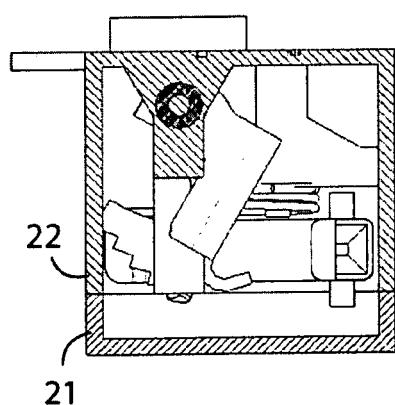


Fig. 10

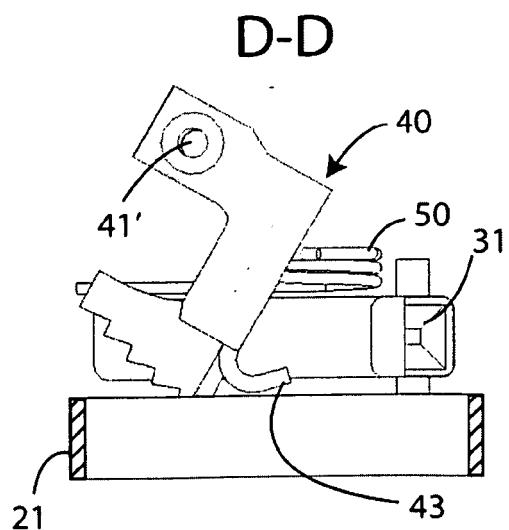


Fig. 11

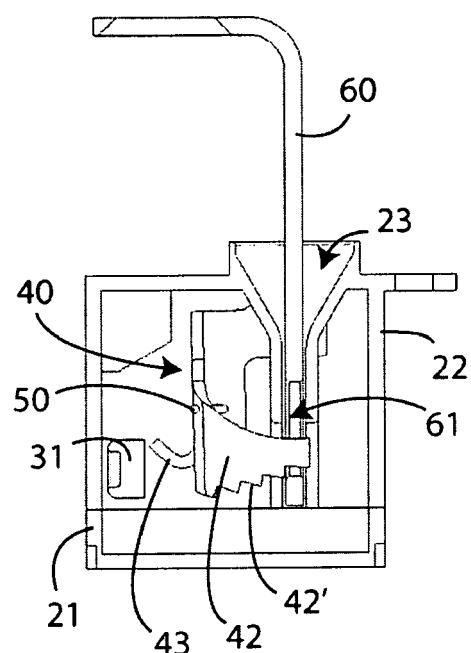


Fig. 12

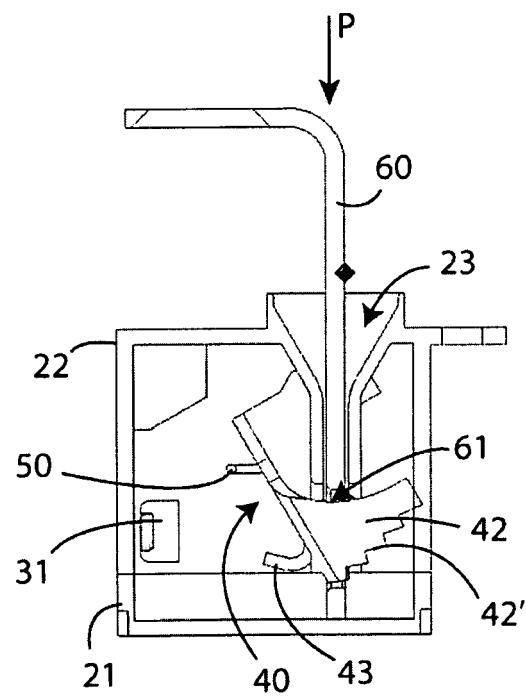


Fig. 13



EUROPEAN SEARCH REPORT

Application Number

EP 12 42 5108

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (IPC)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
X	DE 19 47 986 A1 (LICENTIA GMBH) 15 April 1971 (1971-04-15)	1,2	INV. E05B65/10
A	* page 4, line 22 - page 5, line 23; figures 1-4 *	3-7	D06F49/00 E05B51/00 D06F37/28 E05B47/00
X	US 5 380 053 A (SAINO JOSEPH N [US]) 10 January 1995 (1995-01-10)	1,2	
A	* column 4, lines 43-59; figures 2,4 *	3-7	
X	DE 10 2005 009995 A1 (ASSA ABLOY SICHERHEITSTECHNIK [DE]) 14 September 2006 (2006-09-14)	1,2	
A	* the whole document *	3-7	
X	DE 103 21 802 A1 (DORMA GMBH & CO KG [DE]) 9 December 2004 (2004-12-09)	1	
A	* figures 2, 3 *	2-7	
			TECHNICAL FIELDS SEARCHED (IPC)
			E05B D06F
The present search report has been drawn up for all claims			
1	Place of search The Hague	Date of completion of the search 8 October 2012	Examiner Cruyplant, Lieve
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			

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 12 42 5108

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. The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

08-10-2012

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