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(71) Applicant *(for all designated States except US)*: **ARCELIK, A.S.** [TR/TR]; E5 Ankara Asfalt üzeri, Tuzla, 81719 Istanbul (TR).

(72) Inventors; and
(75) Inventors/Applicants *(for US only)*: **MIRZA, Alper** [TR/TR]; ARCELIK, A.S., Buzdolabi Isletmesi, 26540 Eski ehir (TR). **CELIK, Ersin** [TR/TR]; ARCELIK, A.S., Buzdolabi Isletmesi, 26540 Eski ehir (TR).

(74) Agent: **ANKARA PATENT BUREAU LIMITED**; ehit Adem Yavuz Sok. No:8/22, K z lay, 06440 Ankara (TR).

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(54) Title: LOCKING MECHANISM

(57) Abstract: This invention is related with a locking mechanism (6) used in the household appliances, preferably refrigerators comprise a cabin (1) and a door (2) closes the cabin (1). Said cabin (1) comprises one or more compartments (3) and an inner door (4) for said compartment (3). A curvilinear and flexible latch (7) placed in a latch-recess (8) formed preferably on the inner door, engages with a locking protrusion (12) on the cabin, in order to provide the locking of the inner door (4).

LOCKING MECHANISM

The present invention relates to a locking mechanism used for household appliances, particularly for refrigerators.

In the state of art, the locking mechanisms of the household appliances, particularly of the freezer compartments of the refrigerators, do not function properly due to various reasons such as the differences in measurements that may occur during the manufacturing and assembly stages of the cabin and its door, or due to the effect of the working environment on the mechanism. Furthermore, a movable handle to be attached to said mechanism is required for the opening/closing of these mechanisms. Additionally, as these locking mechanisms consist of numerous parts, their production and service are quite difficult.

In the state of art, in the UK Patent No. 2251452, a mechanism that indicates to the user, whether the freezer compartment door is fully closed or not is disclosed. A latch provided at the end of the door, engages to a catch placed on the cabin and locks the door; a movable handle that releases the latch from the catch is used to open the door.

In the French Patent No. 2718517, a latch on the door passes through a "U" shaped clips protruding outwards from the cabin frame, in order to close the door. Said locking mechanism is controlled by means of a handle.

In the French Patent No. 2367176 a locking mechanism based on the fact that a latch on the door engages to another latch provided on the cabin frame, is described. In this mechanism a sufficient volume for the lateral extension of the latch and additional parts for transferring the movement of the handle to the latch are required.

The French Patent No. 2538517 describes a locking mechanism for the freezer compartment, where a latch moved by a handle engages to a catch provided on the frame.

The object of the present invention is to realize a locking mechanism comprising a small number of parts, thus occupying less space, which is simple and easy to produce, to mount and to perform the service-after-production, and which does not have to be controlled by an additional part such as a handle, that provides the opening/closing of the door easily without being effected by the differences in measurements that may occur during the manufacturing and assembly stages of the cabin and its door and by the working environment.

The locking mechanism realized to attain the object of the present invention has been illustrated in the attached drawings, wherein:

Figure 1, is the perspective view of a household appliance with a locking mechanism.

Figure 2, is the exploded view of the locking mechanism.

Figure 3, is the three dimensional view of the latch.

Figure 4, is the-dimensional view of the locking protrusion

Figure 5a, is the perspective view of the latch, placed in the latch recess

Figure 5b, is the perspective view of the latch recess

Figure 6, is the profile view of the locking protrusion placed on the cabin

Figure 7a, is the schematic view of the latch and the locking protrusion before locking is started

Figure 7b, is the schematic view showing the movement just before locking, when the latch is engaged to the locking protrusion and is brought to a jump-over point.

Figure 7c, is the schematic view showing the latch when it is released from the locking protrusion and brought to a locking position.

Figure 8, is the perspective view of a household appliance with an alternative embodiment of the locking mechanism according to the present invention.

Figure 9a, is the schematic view of an alternative embodiment of the locking mechanism according to the present invention showing the latch and the locking protrusion before locking is started.

Figure 9b, is the schematic view of an alternative embodiment of the locking mechanism according to the present invention, showing the movement just before locking, when the latch is engaged to the locking protrusion and is brought to a jump-over point.

Figure 9c, is the schematic view of an alternative embodiment of the locking mechanism according to the present invention, showing the latch when it is released from the locking protrusion and entered to a locking position.

Figure 10, is the perspective view of an alternative embodiment of the locking mechanism according to the present invention.

The parts shown in the drawings have been enumerated individually as listed below;

1. Cabin
2. Door
3. Compartment
4. Inner door
5. Handle
6. Locking mechanism
7. Latch
8. Latch-recess
9. Twist
10. Locking catch
11. Locking extension
12. Locking protrusion
13. Clasping recess
14. Clasping protrusion

The household appliances, preferably refrigerators comprise a cabin (1) constituting the device; a door (2) to provide the use of the inner cabin (1) by the user; one or more compartments (3) for the most efficient use of the inner cabin (1) volume; and an inner door (4) for opening/closing of the said compartment (3) according to using purposes. Opening/closing of the door (2) and/or inner door (4) is provided by a locking mechanism (6).

In a preferred embodiment, said locking mechanism (6) is only used for the opening/closing of the inner door (4). One or more fixed handles (5) are provided on the inner door (4), which are independent of the locking mechanism and which are used by the user by being pulled or pushed for opening or closing the inner door (4).

Said locking mechanism (6) comprises a latch-recess (8) placed on the inner door (4), a locking protrusion (12) fixed on the cabin (1) so that it faces the latch-recess (8) and a latch (7) made of elastic material, linear or curvilinear, preferably in a "S" form functioning as a spring, placed in the latch-recess (8). Said latch-recess (8) is provided with a clasping recess (13) to attach the latch (7).

The latch (7) is provided, at one end, with a clasping protrusion (14) placed in the clasping recess (13) and with a locking catch (10) that provides opening/closing by moving on the locking protrusion (12); and comprises one or more twists (9) preferably in "S" shape, that provide the operation of the locking mechanism (6) by functioning as a spring between the said latch (10) and the clasping protrusion (14) due to their resilient structure; and a locking extension (11) with such a length that when it is placed in the latch recess (8) it remains outside said recess (8) and when the inner door (4) is closed, it comes over the locking protrusion (12), so tat it enables the locking catch (10) to move over the locking protrusion (12) while closing the inner door (4) by leaving it outside the latch recess (8). In a preferred embodiment, the locking catch (10) is in the form of a triangularprism.

While engaging the latch (7) to the latch-recess (8), the clasping protrusion (14) fits into the clasping recess (13), latch (7) being pushed from the locking catch (10) towards the clasping protrusion (14), is compressed due to its twists (9) and thus its dimensions are minimized so that it is pushed and fitted into the latch-recess (8) and is released after being fitted into its recess (8) so that its escape from the latch-recess (8) is prevented due to its released and thus extended twists (9).

While closing the inner door (4) the inclined lower surface of the locking catch (10) slips over the upper edge of the locking protrusion (12). Meanwhile as the slope of the inclined lower surface of the locking catch (10) and the locking catch (12) is fixed, the latch (7) advances towards the clasping protrusion (14) and is compressed there. The locking catch (10) pushing the latch (7) having a spring function due to its curvilinear structure, passes over the jump-over point, at the upper edge of the locking protrusion (12), slips over the curvilinear rear portion of the upper edge and takes place behind said locking protrusion (12). While the locking catch (10) fits behind the locking catch (12), the latch (7) being compressed by the twists (9) extends and takes its original position. Thus, the inner door (4) is locked.

When the user pulls the inner door (4) towards himself, preferably by using the handle (5), the locking catch (10) starts to advance towards the jump over point on the curvilinear rear surface of the locking protrusion (12). The locking protrusion (12) pushes the catch (10) upwards until it reaches said jump-over point and thus compresses the latch (7). The locking catch (10) thatpassed over the jump-over point, slips over the locking protrusion (12) as the compressed latch (7) pushes it, and is released from the locking protrusion (12); thus the inner door (4) is opened.

In another embodiment of the invention, the latch (7) is fitted into a latch-recess (8) formed on the cabin, and a locking protrusion (12) formed on the inner door (4) as opposing the latch recess (8) is fixed.

In another embodiment, a latch-recess (8) is not used, a flexible, linear latch (7) having spring properties, preferably in a "L" form, one end of which is attached and the other end being free, and opposing said latch (7) a locking protrusion (12) that provides the opening/closing by passing from one side of the latch (7) to the other side is used.

The locking mechanism (6) according to the invention locks the inner door (4) to the cabin (1) properly without being effected by the measurement differences that may originate due to production and/or assembly faults. The locking mechanism (6) operating independently of the handle (5) can easily open or close when the door (4) is actuated and meanwhile the application of undesired forces on the inner door (4) and body is avoided. Furthermore, said locking mechanism (6) occupies a small space in the inner volume of the device. With this invention, a simple locking mechanism (6) with a small number of components, which is easy to produce, to assemble and perform the service procedure, has been realized.

CLAIMS

1. A locking mechanism (6) to be used in the household appliances, preferably refrigerators, which comprise a cabin (1) constituting the device; a door (2) to provide the use of the inside of the cabin (1) by the user; one or more compartments (3) for the most efficient use of the inside of the cabin (1) volume; and preferably an inner door (4) for the opening/closing of said compartment (3); comprises a locking protrusion (12) placed as opposed to the inner door (4) on the cabin (1); a latch-recess (8) placed on the inner door (4) opposing the locking protrusion (12) and a latch (7) made of elastic material, with a linear or curvilinear form, preferably in a "S" form functioning as a spring and, placed in the latch-recess (8).

2. A locking mechanism (6) as defined in Claim 1, characterized with the latch (7) comprising a clasping protrusion (14) placed at one end of said latch (7) for providing to maintain in the latch-recess (8), a locking catch (10), preferably with a triangular prism form, that provides opening/closing by moving on the locking protrusion (12) and placed at the other end of said latch (7); one or more twists (9) preferably in "S" shape, that provide the operation of the locking mechanism (6) by functioning as a spring between the said catch (10) and the clasping protrusion (14) due to their resilient structure; and a locking extension (11) with such a length that when it is placed in the latch recess (8) it remains outside said recess (8) and when the inner door (4) is closed, it comes over the locking catch (10), and it moves easily over the locking protrusion (12) while closing the inner door (4) by leaving the locking catch (10) outside the latch recess (8).

3. A locking mechanism (6) as defined in Claim 1 and 2, characterized with the latch-recess (8) comprising a clasping recess (13) that provides the attaching of the latch (7) by being placed in the clasping protrusion (14).

4. A locking mechanism (6) to be used in the household appliances, preferably refrigerators which comprise a cabin (1) constituting the device; a door (2) to provide the use of the inside of the cabin (1) by the user; one or more compartments (3) for the most efficient use of the inside of the cabin (1); and an inner door (4) for said compartment (3); preferably used for the opening/closing of the inner door (4), comprises a locking protrusion (12) fixed on the inner door (4), a latch-recess (8) placed on the cabin (1) opposing the inner door (4), and a latch (7) made of elastic material, linear or curvilinear, preferably in a "S" form functioning as a spring, placed in the latch-recess (8).

Figure 1

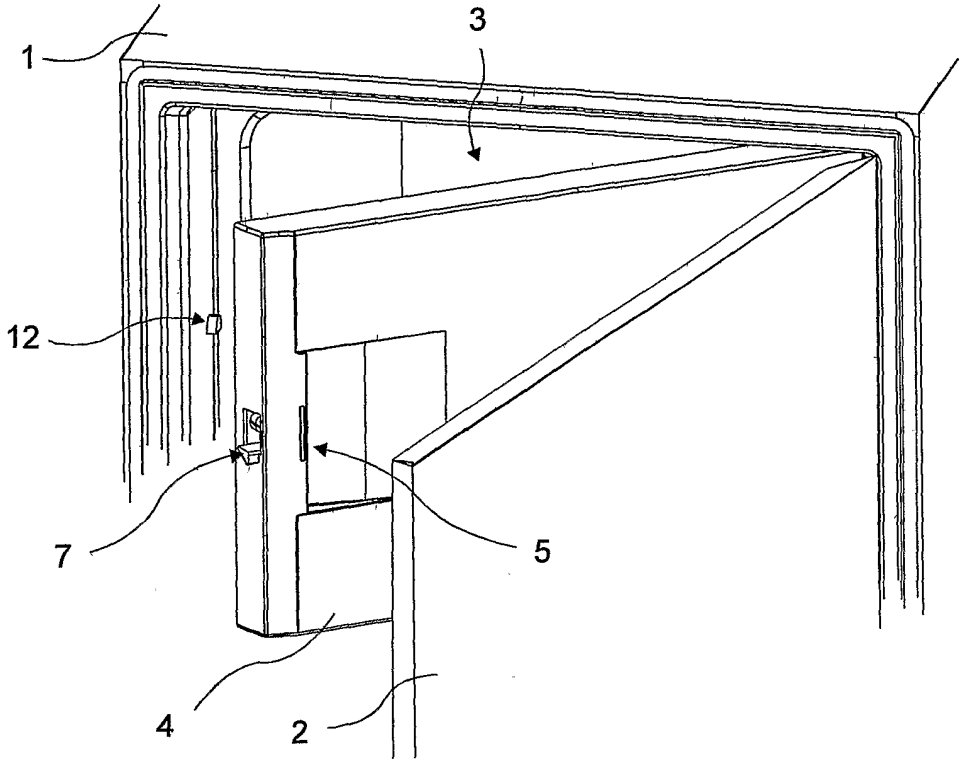


Figure 2

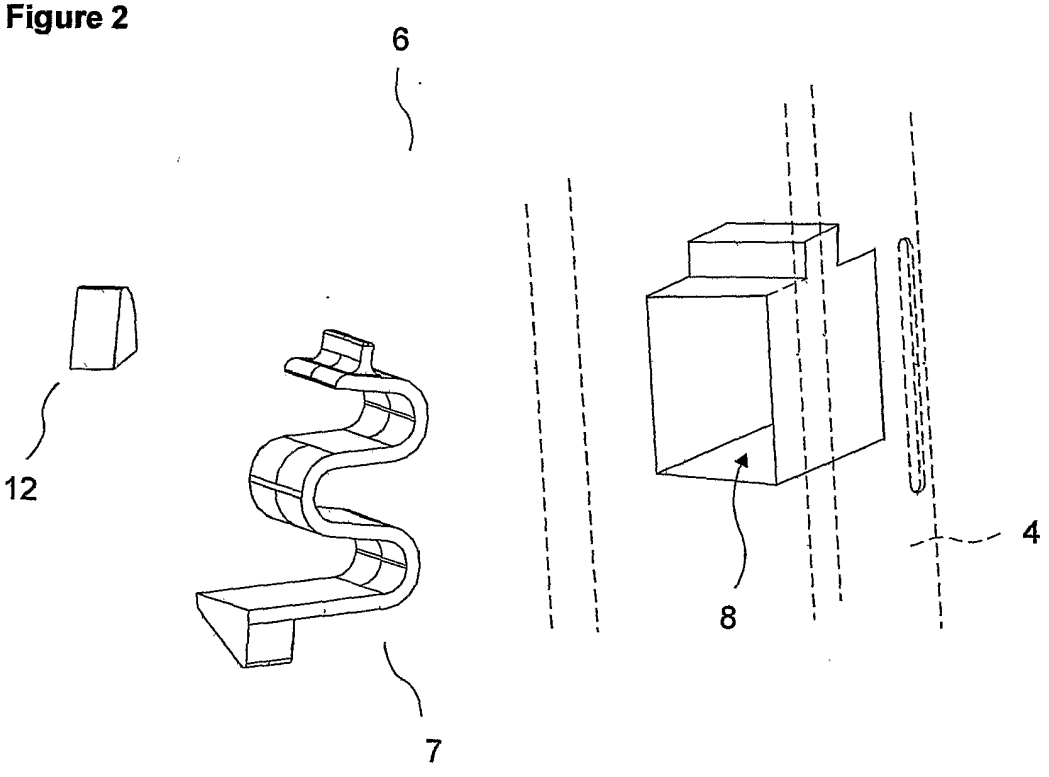


Figure 3

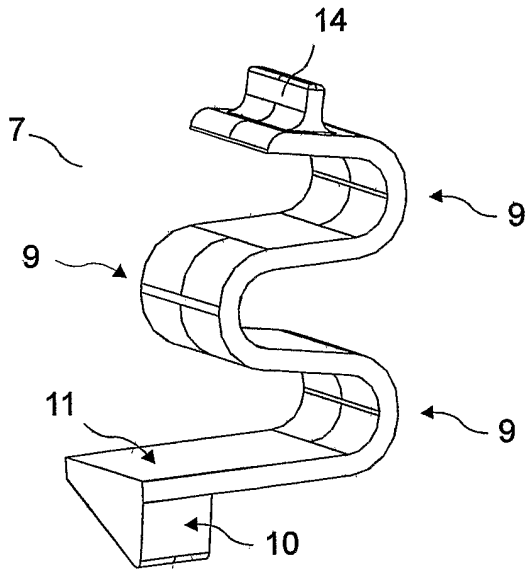


Figure 4

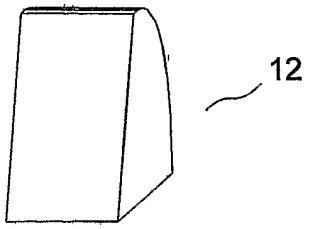


Figure 5b

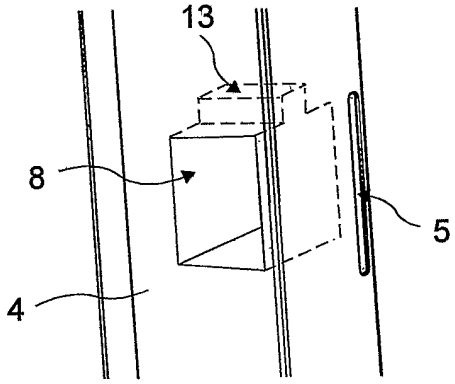


Figure 5a

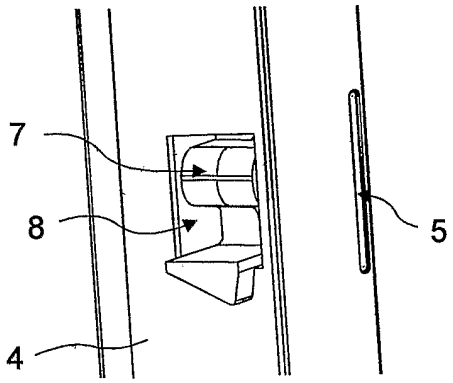


Figure 6

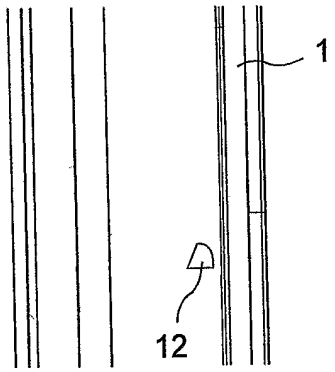


Figure 7a

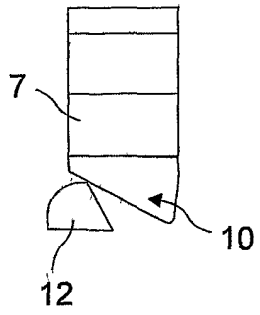


Figure 7b

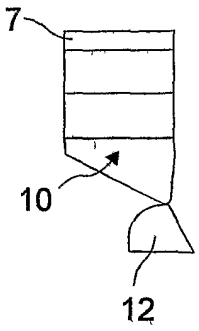


Figure 7c

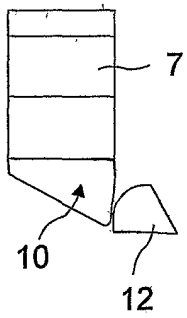


Figure 8

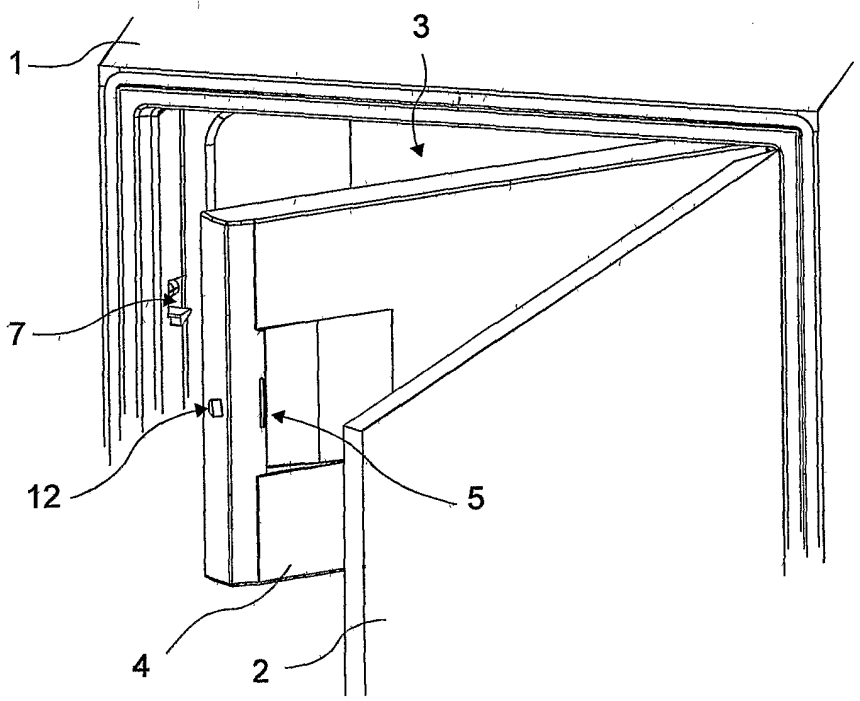


Figure 10

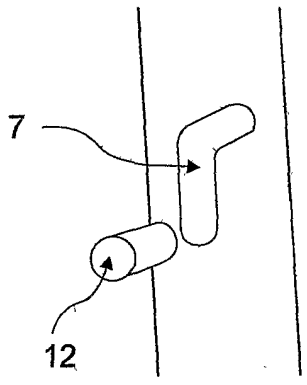


Figure 9a

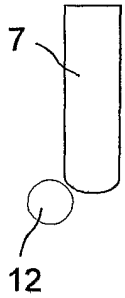


Figure 9b

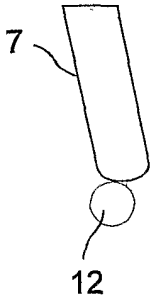
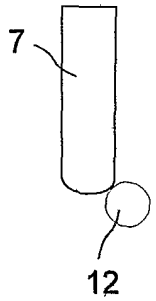


Figure 9c



INTERNATIONAL SEARCH REPORT

Internat[illegible]pplication No
PCT/TR 02/00046

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 E05C19/06 F25D23/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 E05C F25D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 85 30 507 U (BOSCH-SIEMENS HAUSGERÄTE GMBH) 12 December 1985 (1985-12-12) page 3, line 6 -page 4, line 10; figures 1-5	1-4
X	DE 16 01 094 A (ROBERT BOSCH HAUSGERÄTE GMBH) 6 May 1970 (1970-05-06) page 6, paragraph 3; figures 1,5	1,4
X	US 4 138 151 A (NAKAO TOSHIHIRO) 6 February 1979 (1979-02-06) column 2, line 24 - line 50; figures 1-8	1-4
X	US 3 690 708 A (CONLEY JAMES R ET AL) 12 September 1972 (1972-09-12) column 3, line 50 -column 4, line 30; figures 5,6	1,4

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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Date of the actual completion of the international search	Date of mailing of the international search report
27 November 2002	05/12/2002

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	PEREZ MENDEZ, J

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INTERNATIONAL SEARCH REPORT

Interna Application No
PCT/TR 02/00046

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 829 600 A (CANDY SPA) 18 March 1998 (1998-03-18) figures 1-4	1,2
A	EP 0 020 198 A (THOMSON BRANDT) 10 December 1980 (1980-12-10) page 2, line 16 -page 4, line 3; figure 1	1-4

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INTERNATIONAL SEARCH REPORT

Information on patent family members

Interna olication No
PCT/TR 02/00046

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 8530507 U	12-12-1985	DE 8530507 U1	12-12-1985
DE 1601094 A	06-05-1970	AT 284886 B	12-10-1970
		DE 1601094 A1	06-05-1970
US 4138151 A	06-02-1979	NONE	
US 3690708 A	12-09-1972	NONE	
EP 0829600 A	18-03-1998	IT MI960612 U1	16-03-1998
		DE 69712579 D1	20-06-2002
		EP 0829600 A1	18-03-1998
EP 0020198 A	10-12-1980	FR 2457369 A1	19-12-1980
		DE 3061584 D1	17-02-1983
		EP 0020198 A1	10-12-1980