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(54) **FREEZER DOOR LOCK**

GEFRIERSCHRANKTÜRSCHLOSS

VERROU DE PORTE DE CONGELATEUR

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Description

Technical Field

[0001] This invention relates to opening mechanisms for a freezer door of a refrigerator as well as an indicator system indicating whether the freezer door is opened or closed state.

Background Art

[0002] In the prior art's patent publication No's GB344180, GB422681, US2843409, GB596030, US1905037, systems that can be used as lock mechanisms in refrigerator and/or freezer doors are disclosed. Similar lock mechanisms are also known from FR-A-1104451, US-A-1855996, WO03/018943 and GB-A-08772 A.B. The common point of recited applications is that the separation of latch from the opposing fixed latch is provided by an opening arm. There is a spring at the rear portion of the latch to return back the latter to the previous position. Also, there is a cylindrical member at the each end portion of the parts being used as latch. The essential disadvantage of such systems is that they are comprised of too many parts and the structure of these parts is also complex. In the published patent application No GB442310, a similar mechanism is disclosed except that the opposite of the latch has a movable cylindrical end. In the published patent application No US1940640, a latch which is opened by an opening arm and able to make a closing movement by a separate spring thereon is shown. The latch is pulled away from the opposite of the latch upon the movement of the opening arm and the door is also closed without using the opening arm while it is closed. The parts disclosed in the published patent application No US1940640 are rather designed for to be used by large refrigerator doors and are not suitable for the freezing chamber doors in the refrigerators. None of the applications whose publication numbers were given above has a warning system which indicates that the freezer door is left open. However the warning system indicating that the door is left open is shown in the published patent application No DE9017146, such warning system in said application is composed of too many parts and functions via another mechanism which operates depending on the movement of the latch mechanism.

[0003] This makes the system complex; it takes long time to assemble and/or manufacture and costs increase accordingly.

[0004] In the prior art, since the latch (3) serving as a spring in the door locks of refrigerator freezer (see, Figure 1) makes a stretching movement, opening arm (1) force is dependent to the spring force. Consequently, the latch (3) must be harder to prevent latch (3) from opening by involuntary movements. In this case, the required force exposed to opening arm (1) to open the latch (3) increases inevitably as the opening and the closing forces increase. Disadvantages of this system are that there is too much load for handle, closing the door is getting harder and that it is possible to open the door by pulling away from else where than the handle when the door is closed.

[0005] In the system of the invention, in contrast to prior art which was aforementioned and illustrated in Figure 1, the door can not be opened by the uncontrolled, involuntary forces. Since the latch is operated vertically to the opposite of the latch, in contrary to the prior art, spring force is small enough just to overcome the frictional forces of latch to turn to its closed position. Therefore, opening arm can operates with a much smaller force compared to the prior art. Also, since the colored mark placed on the latch is sufficient to warn that the freezer door is left open, there is no need for an extra warning mechanism and other parts as in the systems of prior art. In the prior art while the latch must be biased during the assembly to prevent from being unloaded, there is no need for this in the system of the invention. In addition, since the system of the invention is composed of lesser parts according to the claims, it is easy and fast to assemble therefore manufacturing time is shortened.

Object of the Invention

[0006] The object of this invention is to provide a freezing chamber door being opened only by using the opening arm, i.e. to prevent freezing chamber door from being opened involuntarily. Also, to provide opened or closed state of the freezing chamber door being indicated by an indicator without using any extra mechanism. Another object of the invention is to provide indicator, on the latch of the door, which can be seen by user. Another object of the invention is to construct a latch having spring like members, made of same material with latch, integrated with it; in order to reduce the number of parts used on the door lock.

Description of the Drawings

[0007] The system of the invention is illustrated in the accompanying figures, in which:

Figure 1, is a top cross section view of opening-closing mechanism for freezing chamber door of the prior art.

Figure 2, is a top cross section view of the door lock mechanism of the freezer.

Figure 3, is a front view of the latch in the door lock of the freezer from the side with an indicator.

Figure 4, is a top cross section view of the door lock of the freezer while it is opened.

Figure 5, is a front view of the door lock of the freezer while it is opened.

Figure 6, is a top cross section view of the door lock of the freezer when it is opened.

Figure 7, is a front view of the door lock of the freezer when it is opened.

Figure 8, is a front perspective view of the door lock of the freezer when it is closed.
Figure 9, is a front perspective view of the door lock of the freezer while it is opened.
Figure 10, is a front perspective view of the door lock of the freezer when it is opened.

[0008] All parts are numbered individually and reference numerals are given below:

Opening arm of the prior art (1)
Pivot of the prior art (2)
Latch of the prior art (3)
Opposite of the latch of the prior art (4)
Latch body of the prior art (5)
Opening arm (6)
Opening arm extension (7)
Pivot (8)
Latch socket (9)
Latch (10)
Freezer door (11)
Lock spring (12)
Indicator (13)
End portion of the latch (21)
Flat region of the latch (22)
The surface of the latch with convex radius (23)
Inclined plane surface of the latch socket (24)
The space of the latch socket (25)
The inner space of the latch (26)
Freezer door lock (A)

Disclosure of invention

[0009] In the prior art system shown in Figure 1, freezing chamber door is opened by the movement of the opening arm (1) on the pivot (2) axis and by stretching the latch, which also operates on the same axis in the form of a spring, on the same pivot axis and pulling away the latch (3) from the opposite of the latch (4). In the case of closing, the latch (3) springs by the movement from the pivot (2) axis, contacts to the inclined surface of the opposite of the latch (4) and then it comes to a closed position by stretching.

[0010] In Figures 2-10, different views of the freezer door lock of the invention (A) are given.

[0011] Freezer door lock (A) shown in Figure 2 comprises an opening arm (6), an opening arm extension (7), a pivot (8), a latch socket (9) fixed on the refrigerator body and a latch (10) and it is attached to the freezer door (11). The opening arm (6) is in an "L" shaped structure and has the opening arm extension (7) on it and is attached to freezer door (11) to turn on a pivot (8) thereon, The linear axis of the pivot (8) also extends in parallel to the turning axis of the freezer door (11) (not shown in the figures). The latch (10) is also on the freezer door (11) and extends in free movable edge of this door (11) and is seated to be able to move toward the inside of the freezer door (11) and vertically to the pivot (8) axis. The latch (10) receives the opening movement from the opening arm extension (7) and the closing movement from the lock springs (12) on it. In the assembled state of the freezer door lock (A), opening arm extension (7) is freely inserted in the latch inner space (26) on the surface of the latch (10). Latch end portion (21) belonging to the latch (10) extends also towards the latch socket space (25) in the latch socket (9). As shown in Figure 2, when the freezer door (11) is closed, latch end portion (21) and latch socket flat region (22) are in contact with each other.

[0012] In Figure 3 front view of the latch (10) is shown. There is a colored indicator (13) on the front surface of the latch end portion (21). Moreover, there is flexible lock spring (12) at the other side on the latch (10) serving as a spring. Lock spring (12) may be integrated with the latch (10) or may be manufactured from the springs in various geometries to be fitted on the latch (10). The essential function of the lock spring (12) is to operate as a compression spring. In a preferred embodiment of the invention, spring lock (12) is on the latch (10) and takes place as a part of this latch (10). Lock spring (12) has a geometrical structure capable of being stretched as a string and is fixed to the latch (10) from one end. The other end is free and when the latch (10) is pushed inside the freezer door (11) this free end contacts with the fixed point on the freezer door (11) and compresses by stretching. As in the preferred embodiment of the invention in Figure 3, at least two lock springs (12) are used such that one is at the bottom and the other is at the top. The latch inner space (26) on the front face is constructed for inserting the opening arm extension (7) in the assembled state of the freezer door lock (A).

[0013] In Figures 4-7 and Figures 8-10, the states of the freezer door (11) changing from a closed state to an opened state are shown. As shown in Figures 4 and 5, when the opening arm (6) is pulled away, the opening arm (6) and the opening arm extension (7) connected to former turn on the pivot (8) axis and opening arm extension (7) unfixes the latch (10) from the latch socket (9) by pushing it inside to the freezer door (11). At this moment, lock spring (12) compresses. As shown in Figure 6 and 7, after the freezer door (11) is opened by pulling from the opening arm (6), the opening arm (6) is released and the latch (10), the opening arm extension (7) and the opening arm is returned to their former positions by the compressed lock spring (12). The operation mode shown in Figures 4-7 is also shown in Figures 8-10. In Figure 7 and Figure 10, the freezer door (11) is shown in an opened position. In this position of the freezer door (11), colored indicator (13) on the latch (10) indicates that the door is opened. When the freezer door (11) is closed, since the indicator (13) remains in the latch socket (9) it can not be seen and this shows that the freezer door (11) is closed.

[0014] During the freezer door (11) is closing, while the latch socket inclined plane surface (24) on the latch socket (9) and the surface of the latch with convex radius (23) behind the latch (10) contact each other, the latch

(10) slides into the freezer door (11) and the lock spring (12) compresses. When the freezer door (11) is closed, the lock spring (12) provides locking by pushing the latch (10) into the latch socket (9).

[0015] Preferred freezer door lock (A) above is not intended to limit the protection scope of the invention. In view of the described knowledge by the invention, all modifications on this preferred freezer door lock (A) should be interpreted in the protection scope of the invention, as defined by the appended claims.

Claims

1. A freezer door lock (A), comprising an "L" shaped opening arm (6), with an opening arm extension (7), which is attached to a pivot (8) whose linear axis is in use parallel to a rotating axis of the freezer door (11) and on which said arm is rotatable on said pivot (8); a latch socket (9) fixable on a refrigerator body and a latch (10) in use mountable on the free movable edge of the freezer door (11);
   is **characterized in that**
   to provide opened or closed state of the freezing chamber door (11) being indicated by a colored indicator (13) without using any extra mechanism and to construct a latch (10) having spring like members, made of same material with latch (10), Integrated with it, In order to reduce the number of parts used on the door lock (A);
   a colored indicator (13) is provided on a front face of the end portion of the latch (21) which can be seen when a freezer door (11) is in an opened state and indicates that said door (11) is open;
   said latch (10) being integrated with at least two lock springs (12); which are used such that one is at the bottom and the other is at the top: serving as compression springs, In order to close the latch (10); and each lock spring (12), being in the form of a flexible strip, which is fixed to the latch (10) from one end and free at the other end; when the latch (10) is pushed inside the freezer door (11) said free end contacts with a fixed point on a freezer door (11) and said lock spring (12) is compressed.

2. A freezer door lock (A) according to claim 1, wherein an inner space of the latch (26) is provided, on the front face of the said latch (10), for inserting the opening arm extension (7).

3. A freezer door lock (A) according to claim 1, wherein the latch (10) in use is seated onto the freezer door (11) to be able to move toward the inside of the freezer door (11) and vertically to the pivot axis (8).

Patentansprüche

1. Gefrierfachtürverriegelung (A), die einen "L"-förmigen Öffnungsarm (6) mit einer Öffnungsarmverlängerung (7) aufweist, die an einem Drehgelenk (8) befestigt ist, dessen lineare Achse im Gebrauch parallel zu einer Drehachse der Gefrierfachtür (11) ist, und auf welcher der Arm am Drehgelenk (8) drehbar ist; eine Schnappvorrichtungsfassung (9), die an einem Kühlschrankkörper fixiert werden kann, und eine Schnappvorrichtung (10), die im Gebrauch an der freien beweglichen Kante der Gefrierfachtür (11) anbringbar ist,
   dadurch gekennzeichnet, dass,
   um dafür zu sorgen, dass ein geöffneter oder geschlossener Zustand der Gefrierfachtür (11) durch eine farbige Anzeigevorrichtung (13) angezeigt wird, ohne einen zusätzlichen Mechanismus zu verwenden, und eine Schnappvorrichtung (10) mit federartigen Elementen aufzubauen, die aus demselben Material wie die Schnappvorrichtung (10) hergestellt und in diese integriert sind, um die Anzahl von Teilen zu reduzieren, die in der Türverriegelung (A) verwendet werden;
   eine farbige Anzeigevorrichtung (13) auf einer Vorderseite des Endabschnitts der Schnappvorrichtung (21) vorgesehen ist, die sichtbar ist, wenn eine Gefrierfachtür (11) in einem geöffneten Zustand ist, und anzeigt, dass die Tür (11) offen ist;
   wobei mindestens zwei Feststellfedern (12) in die Schnappvorrichtung (10) eingebaut sind, die so eingesetzt sind, dass sich eine unten und die andere oben befindet, und die als Druckfedern dienen, um die Schnappvorrichtung (10) zu schließen;
   und wobei jede Feststellfeder (12) in der Form eines biegsamen Streifens vorliegt, der von einem Ende her an der Schnappvorrichtung (10) befestigt und am anderen Ende frei ist; und wenn die Schnappvorrichtung (10) in die Gefrierfachtür (11) gedrückt wird, das freie Ende einen Kontakt mit einem feststehenden Punkt an der Gefrierfachtür (11) eingeht und die Feststellfeder (12) zusammengedrückt wird.

2. Gefrierfachtürverriegelung (A) nach Anspruch 1, wobei ein Innenraum (26) der Schnappvorrichtung auf der Vorderseite der Schnappvorrichtung (10) zum Einstecken der Öffnungsarmverlängerung (7) vorgesehen ist.

3. Gefrierfachtürverriegelung (A) nach Anspruch 1, wobei die Schnappvorrichtung (10) im Gebrauch an der Gefrierfachtür (11) festsitzt, um sich zur Innenseite der Gefrierfachtür (11) und vertikal zur Drehgelenkachse (8) bewegen zu können.

Revendications

1. Verrou de porte de congélateur (A), comprenant un bras d'ouverture (6) en forme de « L », doté d'une extension de bras d'ouverture (7), qui est fixée à un pivot (8) dont l'axe linéaire est, au cours d'une utilisation, parallèle à un axe de rotation de la porte de congélateur (11) et sur lequel ledit bras peut tourner sur ledit pivot (8) ; un support de loquet (9) pouvant être fixé sur un corps de réfrigérateur et un loquet (10) pouvant être monté au cours d'une utilisation sur le bord mobile libre de la porte de congélateur (11) ;
caractérisé en ce que
pour fournir l'état ouvert ou fermé de la porte de chambre de congélation (11) indiqué par un indicateur en couleur (13) sans utiliser de mécanisme supplémentaire et pour construire un loquet (10) présentant des éléments de type ressort, fabriqués à partir du même matériau avec le loquet (10), intégré avec celui-ci ; afin de réduire le nombre de pièces utilisées sur le verrou de porte (A) :

un indicateur en couleur (13) est prévu sur une face avant de la partie d'extrémité du loquet (21) qu'il est possible de voir lorsqu'une porte de congélateur (11) se trouve dans un état ouvert et indique que ladite porte (11) est ouverte ;
ledit loquet (10) étant intégré avec au moins deux ressorts de loquet (12) ; qui sont utilisés de telle sorte que l'un d'entre eux se situe en bas et l'autre se situe en haut ; servant de ressorts de compression, afin de fermer le loquet (10) ;
et chaque ressort de loquet (12), se présentant sous la forme d'une bande flexible, qui est fixé au loquet (10) depuis une extrémité et libre à l'autre extrémité ; lorsque le loquet (10) est poussé à l'intérieur de la porte de congélateur (11) ladite extrémité libre est contact avec un point fixe sur une porte de congélateur (11) et ledit ressort de loquet (12) est comprimé.

2. Verrou de porte de congélateur (A) selon la revendication 1, dans lequel un espace interne du loquet (26) est prévu, sur la face avant dudit loquet (10), pour insérer l'extension de bras d'ouverture (7).

3. Verrou de porte de congélateur (A) selon la revendication 1, dans lequel le loquet (10) au cours d'une utilisation est assis sur la porte de congélateur (11) pour être capable de se déplacer en direction de l'intérieur de la porte de congélateur (11) et verticalement par rapport à l'axe de pivotement (8).

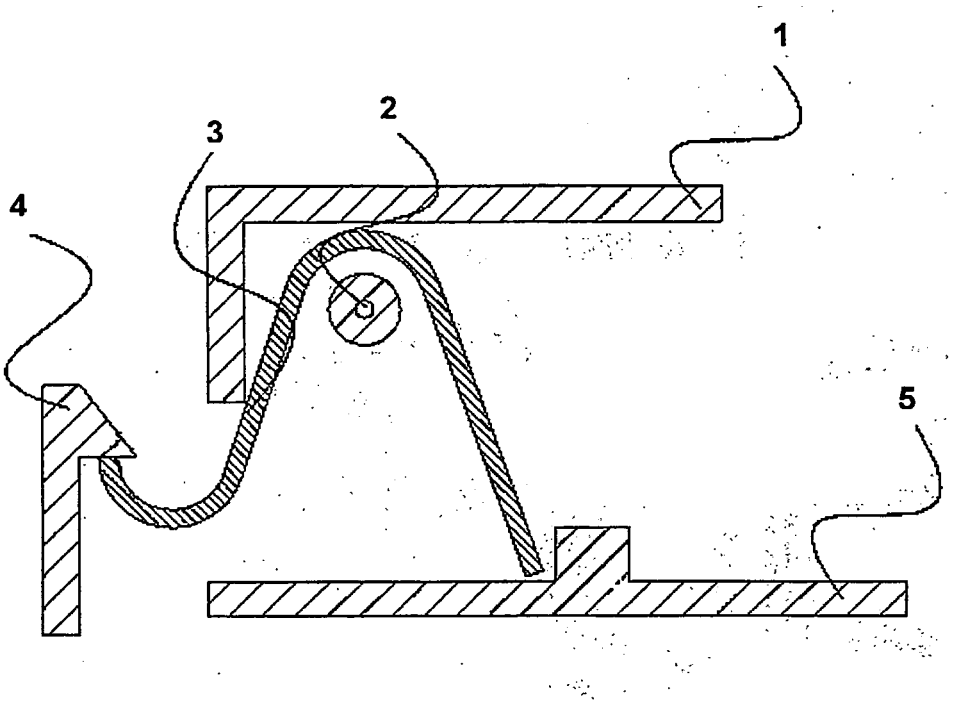

Figure – 1

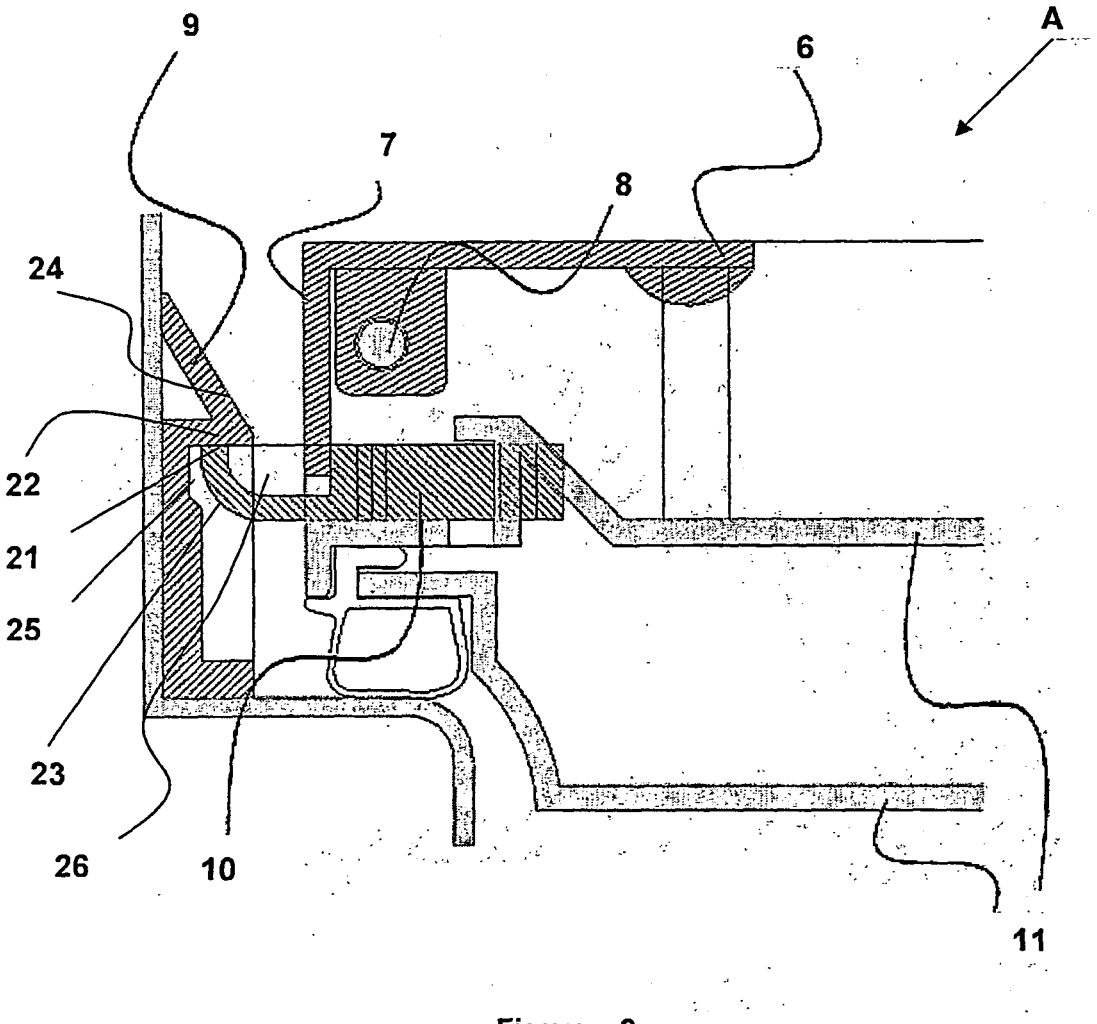

Figure – 2

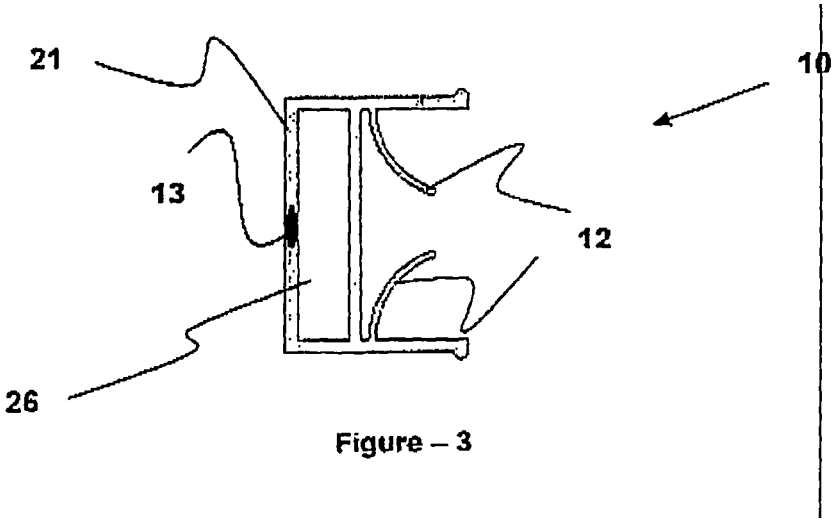

Figure – 3

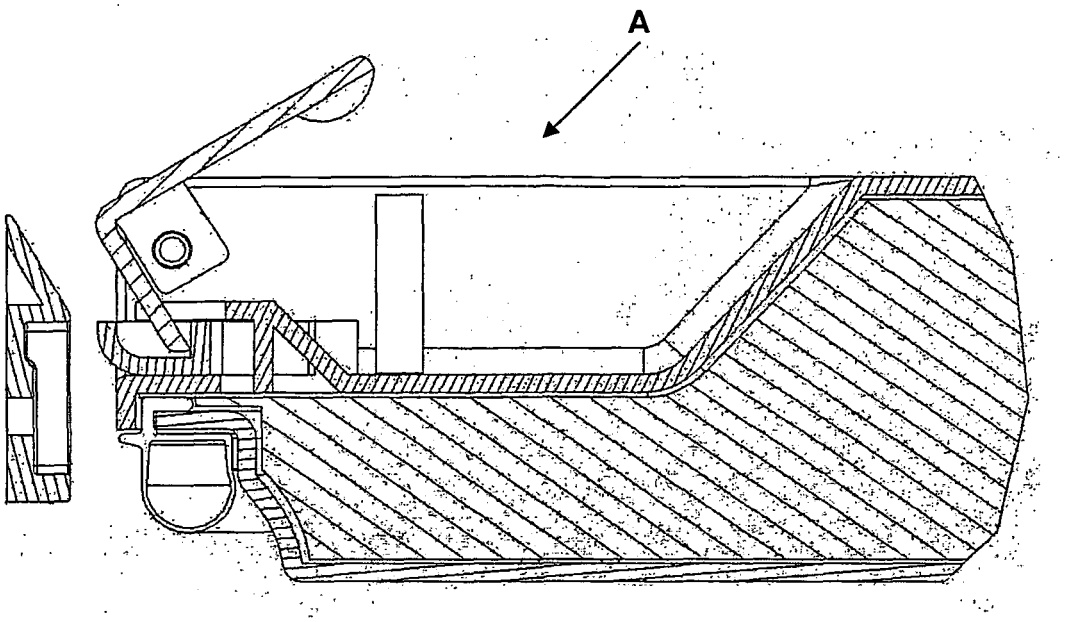

Figure – 4

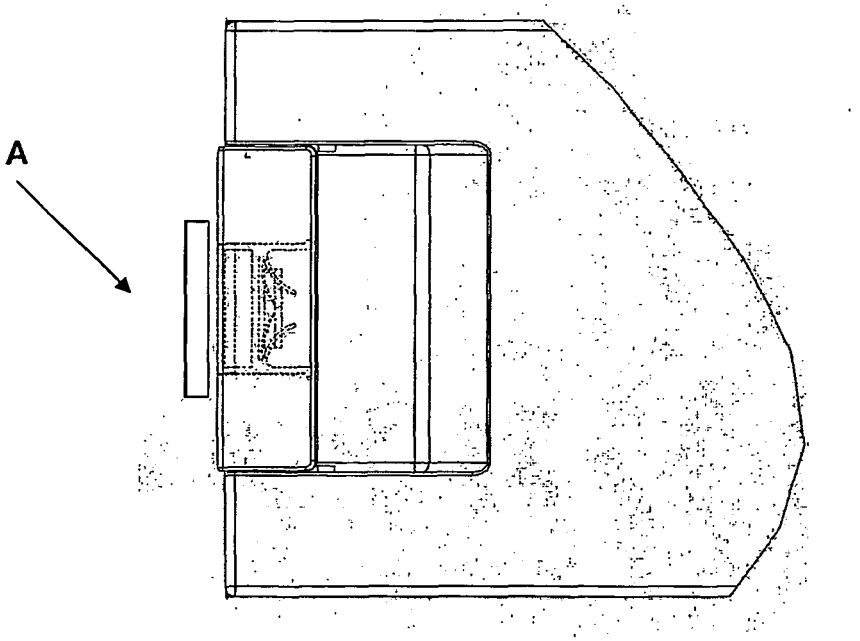

Figure – 5

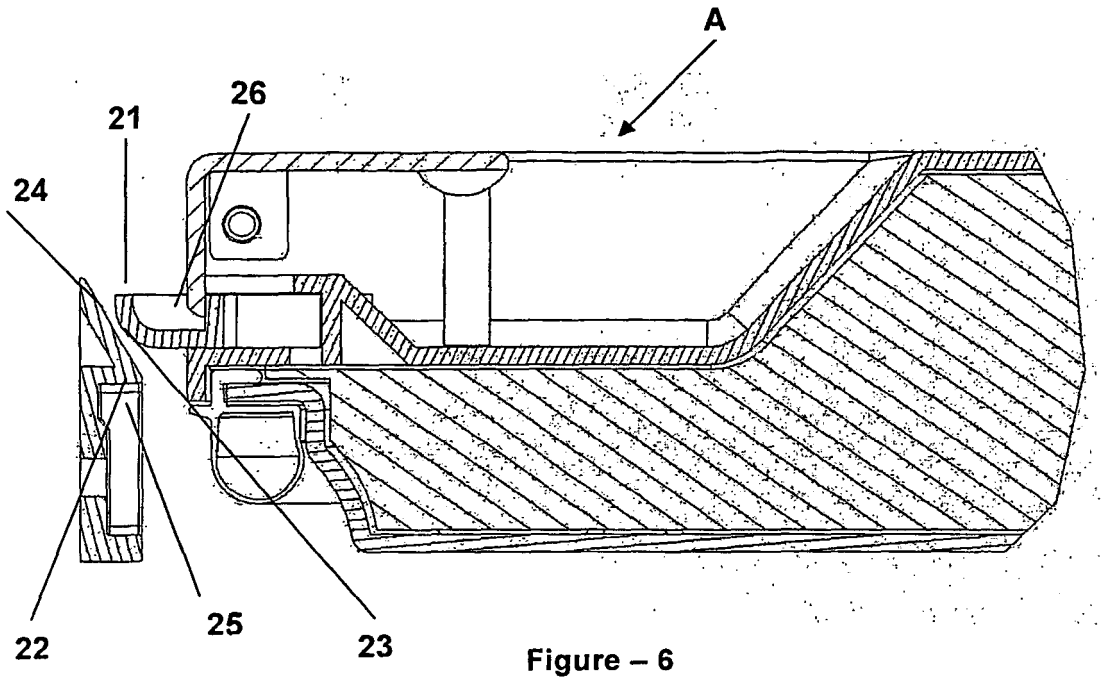

Figure – 6

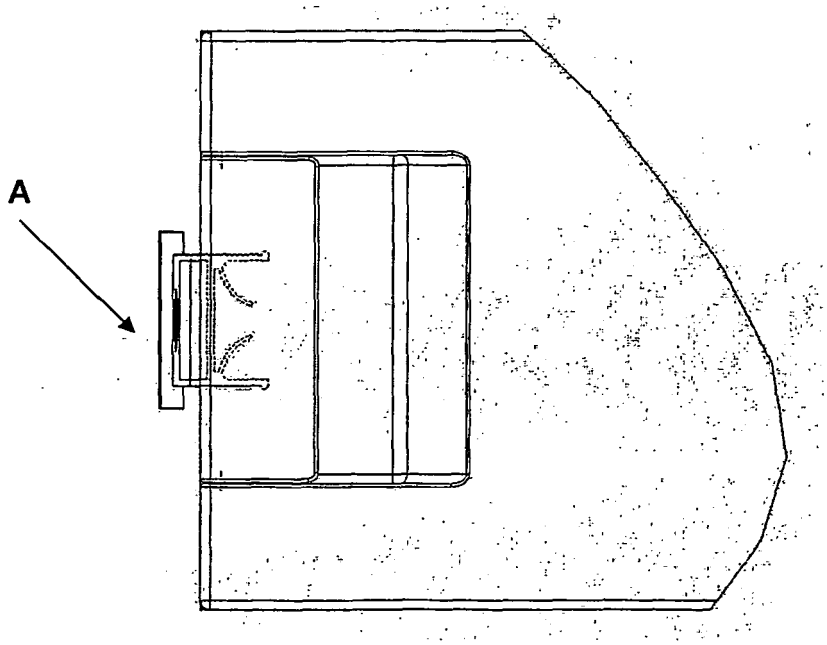

Figure – 7

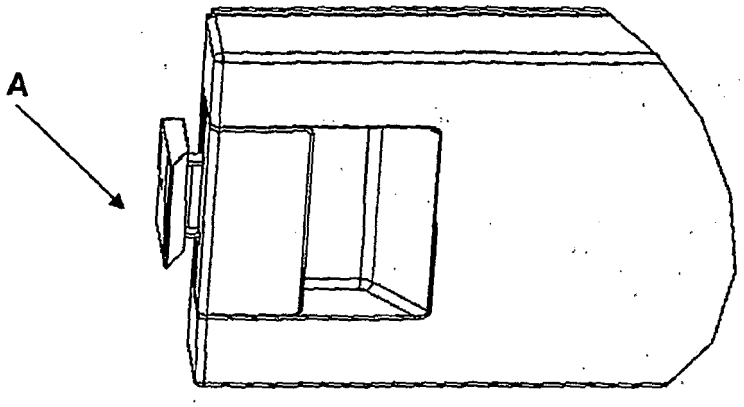

Figure – 8

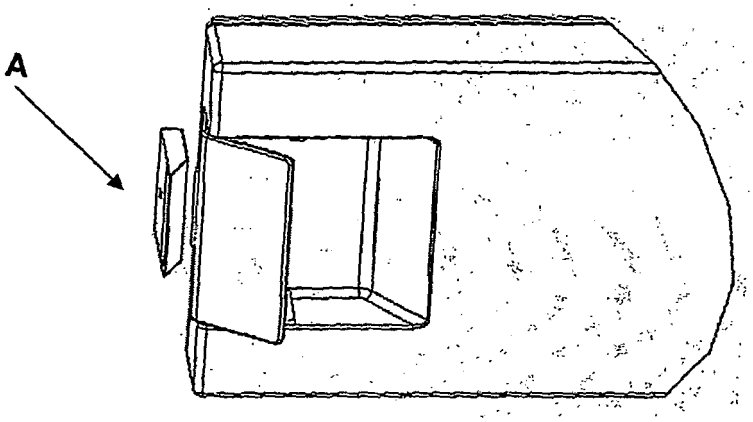

Figure – 9

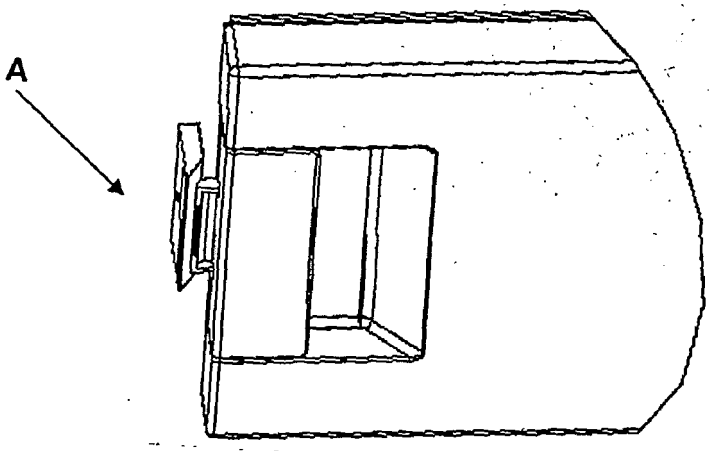

Figure – 10

REFERENCES CITED IN THE DESCRIPTION

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