

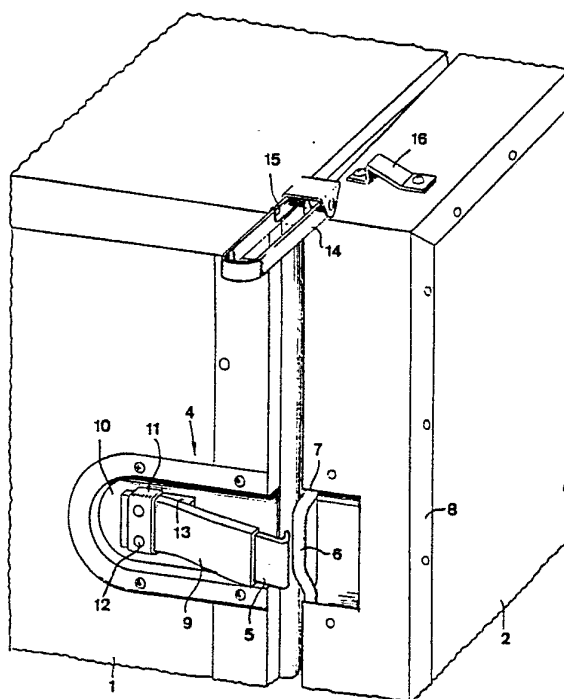


INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(54) Title: LOCKING DEVICE**(57) Abstract**

A locking device to interlock a first part (1) and a second part (2) pertaining thereto. The device comprises at least one hook member (5) and at least one shackle member (6). Each of said members is associated to one of said parts and one (6) of said members is pivotably movable into and out of engagement with the other member (5) to interlock and release said parts. One (5) of said members is connected to a resilient element (9). Said pivotable member (6) is pivotable to its locking position against the action of said resilient element, which is connected to said other member (5) and adapted to automatically locate the same into a position, in which the pivotable member (6) may engage as well as release said other member. The resilient element (9) may comprise an elastic rubber body.



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LOCKING DEVICE

TECHNICAL FIELD

This invention is related to a locking device to interlock a first part and a second part pertaining thereto, comprising
5 at/^{least}one hook member and at least one shackle member, each of said members being associated to one of said parts, one of said members being pivotably movable into and out of engagement with the other member to interlock and release said parts, one of said members being connected to a resilient element, said pivotable
10 member being pivotable to its locking position against the action of said element.

BACKGROUND ART

A device of this kind is disclosed in the US patent specification 2 901 279. In this device, a hook member is rigidly
15 connected to one of said parts and a shackle member is pivotably connected to a rod, which in turn is movably received in a hole in the other of said parts. A stop member, which may be associated to a resilient element in the form of a spring, prevents the rod from disengaging the hole. When the hook and shackle members
20 are in engagement with each other the rod projects considerably out of the hole. When said members are disengaged from each other, the shackle member is completely unguided in that the rod falls back into the hole. When said parts are to be interlocked, the shackle member and the rod must accordingly be directly manipulated in order to bring the shackle member into engagement with
25 the hook member. The spring exclusively serves to counter-act the pivoting of the shackle member to its locking position and to provide a compressing action on a sealing between said parts when they are interlocked.

30 Furthermore, it is known within the food industry to use heat insulating containers for the transportation of temperature sensitive goods. Such containers may comprise a first part,



which is carried by wheels and which has the character of a box, and a second part, which has the character of a door or cover and is connected to the box part via hinges. The height of such a container is preferably large in relation to its bottom surface and may be about the height of a man. In order to lock the cover in a position closing the box, different kinds of locking devices have been used. Such a locking device may comprise a hook member rigidly connected to the cover and a shackle member associated to the box part. The shackle member may be engaged with the hook member and tensioned to a locking position by means of a tensioning arm. The locking device may be located along a vertical side of the container with the hook member on the vertical edge portion of the cover and the shackle member on the outside of one side wall of the box part. Although such locking devices for containers of this kind have been reliable and efficient, they are associated to the disadvantage that the location of the locking device on one side of the container makes it difficult to open and close the cover in that said manoeuvres cannot be performed when a plurality of containers are located side by side in an adjacent relation. This disadvantage is per se eliminated by the device according to the Swedish patent specification 60 159 in that said device comprises two locking members, one of which is pivotable and connected to a transmission element adapted to enable operation of the pivotable member from another side of the container than that side on which the pivotable member itself is located.

DISCLOSURE OF INVENTION

The main object of the invention is to improve the locking device according to the US patent specification 2 901 279 so as to make it more easily operated. In addition, the present invention aims at making the locking device defined in the preamble of this specification efficiently applicable in connection with a transmission element of the kind illustrated in the Swedish patent specification 60 159.

This object is obtained in that said resilient element is connected to said other member and adapted to automatically locate the same into a position, in which the pivotable member may engage



as well as release said other member.

According to a preferred embodiment, the resilient element comprises an elastic rubber body, which is firmly connected to said other member and to the part associated therewith.

5 BRIEF DESCRIPTION OF DRAWINGS

In the drawings:

Fig. 1 is a perspective view from above of a container provided with two locking devices according to the invention;

10 Fig. 2 is an enlarged perspective view illustrating the upper portion of the container, a cover being opened;

Fig. 3 is a horizontal section through the locking device, the cover still being opened;

Fig. 4 is a similar section illustrating the cover closed and the locking device in the process of becoming locked; and

15 Fig. 5 a perspective view similar to Fig. 1 but illustrating the cover in a closed position.

BEST MODE OF CARRYING OUT THE INVENTION

20 The container illustrated in Fig. 1 comprises in a conventional manner a box like part 1 and a door or cover part 2, which is pivotably connected to the box part via hinges not illustrated in the drawings. Under the box part 1, there are (not visible) wheels, by means of which the container may be transported in a rolling motion. The box part as well as the cover part are well heat insulated, which is indicated by the comparatively
25 great thickness of the cover part 2. At all four corners of the container, there are handles 3 by means of which the container may be grabbed during transportation.

In order to lock the cover part 2 in the closed position illustrated in Fig. 1, two locking devices 4, 4' are provided.
30 These two locking devices are preferably located opposite the hinges of the cover part and separated vertically from each other to such an extent that they give an equal abutment pressure against the front edges of the box part 1 when closing the cover part.



The upper locking device 4 is more specifically illustrated in Fig. 2 and 3. The two main components of the device are a hook member 5 and a shackle member 6. The shackle member 6 consists in the illustrated example of a crank like projection or portion of a shaft 7, which for the rest is straight and extends vertically within cover part 2. More specifically, the shaft 7 is hidden within a cross sectionally U-shaped edge frame 8, surrounding cover part 2. The shaft is positioned in the rear edge portion of the frame 8 which is located closest to box part 1.

10 The hook member 5, which preferably has a considerable width, is connected to box part 1 via an elastic or resilient element 9, against the resilient action of which the shackle member 6 is pivotable to a locking position. In the illustrated embodiment, the resilient element is a rubber body, in the free end of which the
15 hook member 5 is secured, preferably by being vulcanized into the element. At the opposite end thereof, the rubber body 9 is connected to a plate 10 recessed into the wall of box part 1 by means of an U-section 11 and rivets 12. A wedge 13 may be provided behind the rubber body 9 to hold the rubber body 9 obliquely
20 outwardly from the plate 10 so that the hook member 5 connected to the rubber body automatically will assume a position, in which the shackle member 6 may engage as well as release the hook member. Instead of using a particular wedge of the kind indicated, it is of course also possible to design the rubber
25 body 9 in such a manner that it automatically assumes the desired position.

As is apparent from Fig. 2, the transmission shaft 7 is rotatable by means of a U-shaped arm 14. This arm is hingedly connected to a cross piece which is rigidly connected to the
30 upper end of shaft 7. A spring 15 strives to hold the arm 14 in the horizontal position illustrated in the drawing but the arm is pivotable somewhat upwardly against the action of spring 15 to be able to pass a stop 16 on the upper side of cover part 2 when rotating the arm 180°. The stop 16 has an inclined surface
35 and a transverse vertical surface, behind which the arm 14 is held when the locking devices are in a locking position (see Fig. 5). The stop 16 is provided to prevent accidental rotation of shaft 7 towards an opening position.

In Figs. 2 and 3, the recess in which the shackle member 6 is pivotable is denoted 17. The recess for the rubber body 9 is denoted 18. A sealing, elastic packing 19 extends about the entire frame like front edge surrounding the opening in the box part 1.

In Fig. 1, it appears that the shaft 7 has two crank like shackle members, namely the member 6 for locking device 4 and the member 6' for locking device 4'. Thus, it is evident that both hook members co-operating with the shackle members 6, 6' may be engaged simultaneously by a single operating movement of shaft 7.

The locking devices described operate in the following manner: When the cover part 2 is open as illustrated in Figs, 2 and 3, the hook member 5 automatically assumes a position suitable for engagement by shackle member 6 due to the elastic rubber body 9, which, however, has some stiffness. The shackle member 6 is in turn pivoted to a position in which the member is facing obliquely rearwardly out of the recess 17 in that arm 14 has been loosened from the engagement with stop 16 and rotated 180° so that it is pointing outwardly from the frame 8 of the cover part. The cover part 2 is now pivoted into the position illustrated in Fig. 4, in which the inner side of the cover part abuts against the packing 19 and shackle member 6 is located within the outer portion of hook member 5. At this stage, the arm 14 is rotated 180° to the position illustrated in Fig. 5. During the rotation of shaft 7 thereby obtained, the shackle member 6 is moved past a dead center or balance position (as long as possible away from the U-section 11). After passage of said dead center the resilient element strives to retain the shackle member in a position, in which said member abuts against the bottom of recess 17. This retaining action is normally fully adequate to obtain a reliable locking of the cover part to the box part but as an additional safety measure, the stop 16 has been provided. In this manner, the locking devices cannot be released even through severe external strains, such as vibrations of a transport vehicle and the like.



The cover part is opened in the reverse manner.

It is indicated in Fig. 1 by means of dotted lines that cover part 2 is pivotable 270° in relation to box part 1. By providing a retainer pin 20 at the back edge of the upper side of the box part, the arm 14 previously mentioned can be used in a preferable manner to retain cover part 2 in the rearwardly pivoted position.

The advantages of the invention are evident in that it makes it possible to open and close the cover part of the container in a simple and convenient manner due to the provision of the resilient element 9.

The invention is of course not limited only to the embodiment described and illustrated in the drawings. Thus, it is e.g. conceivable to apply the locking device according to the invention to other parts than cover and box like parts of the kind described. The number of shackle and hook members may vary considerably. It is also possible to use other transmission elements than a shaft, and the location of the transmission element may deviate from the one exemplified. Furthermore, the resilient element may be designed in an other manner, e.g. as a helical spring, than a solid rubber body.

CLAIMS

1. A locking device to interlock a first part (1) and a second part (2) pertaining thereto, comprising at least one hook member (5) and at least one shackle member (6), each of said members being associated to one of said parts, one (6) of said members being pivotably movable into and out of engagement with the other member (5) to interlock and release said parts, one (5) of said members being connected to a resilient element (9), said pivotable member (6) being pivotable to its locking position against the action of said element, c h a r a c t e r i z e d in that said resilient element (9) is connected to said other member (5) and adapted to automatically locate the same into a position (Figs. 2, 3 and 4), in which the pivotable member may engage as well as release said other member.
2. A device according to claim 1, c h a r a c t e r i z e d in that the resilient element (9) comprises an elastic rubber body, which is firmly connected to said other member (5) and to the part (1) associated therewith.
3. A device according to claim 2, c h a r a c t e r i z e d in that the hook member (5) is connected to the rubber body (9).
4. A device according to any preceding claim, c h a r a c t e r i z e d in that the pivotable member (6) is connected to a transmission element (7) adapted to enable operation of the pivotable member (6) from another side of the part in question than that side on which the pivotable member itself is located.
5. A device according to any preceding claim, wherein said pivotable shackle member (6) is adapted to pass a dead centre or balance position during its pivoting movement and said resilient element (9) is adapted to retain the shackle member in its locking position after the passage thereof through said dead centre, c h a r a c t e r i z e d in that the transmission element (7) comprises a shaft rotatable by means of an arm (14) pivotably connected to a free end of the shaft, said arm co-operating with a safety stop (16) provided to prevent accidental rotation of the shaft toward a releasing position.

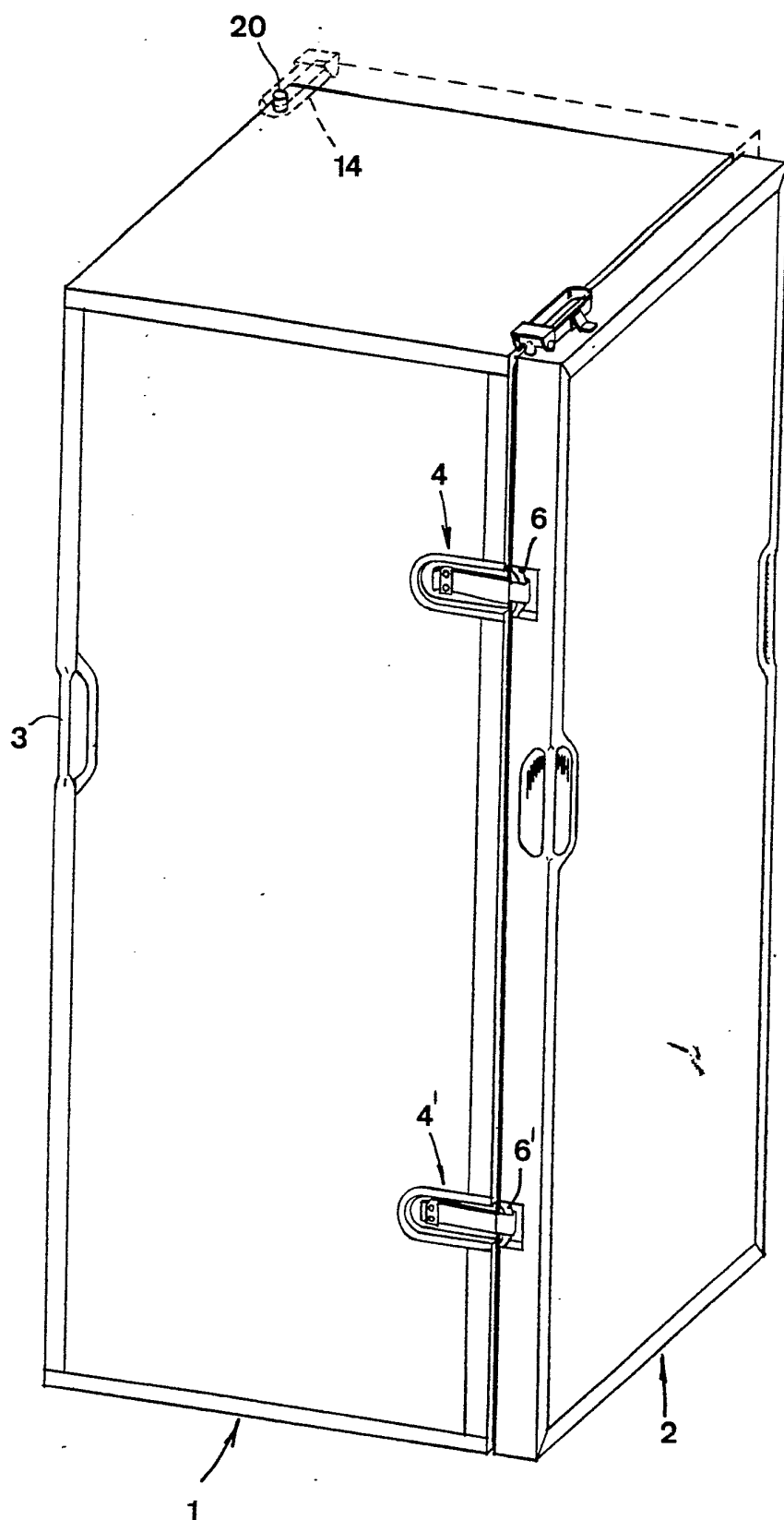


FIG 1

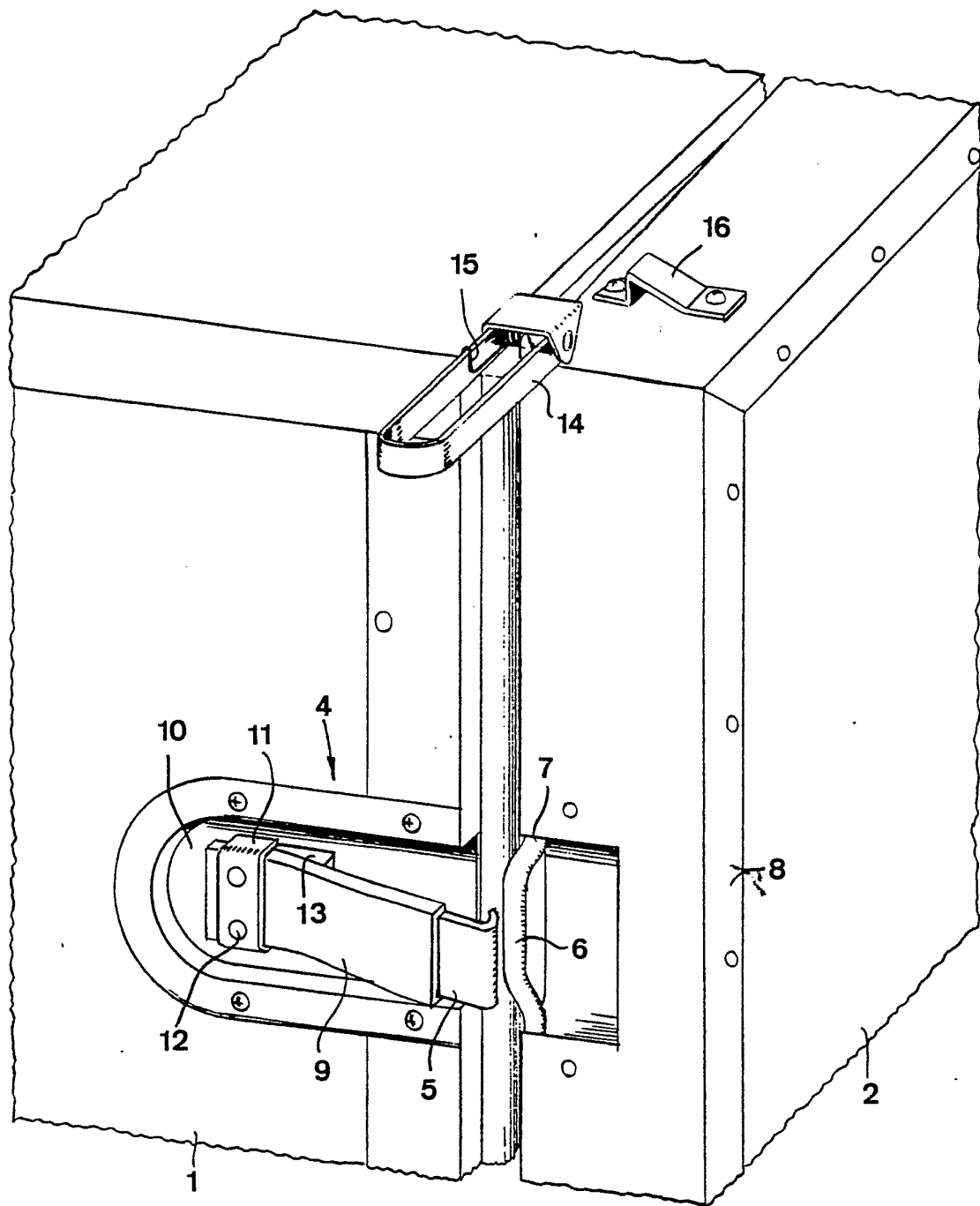


FIG 2

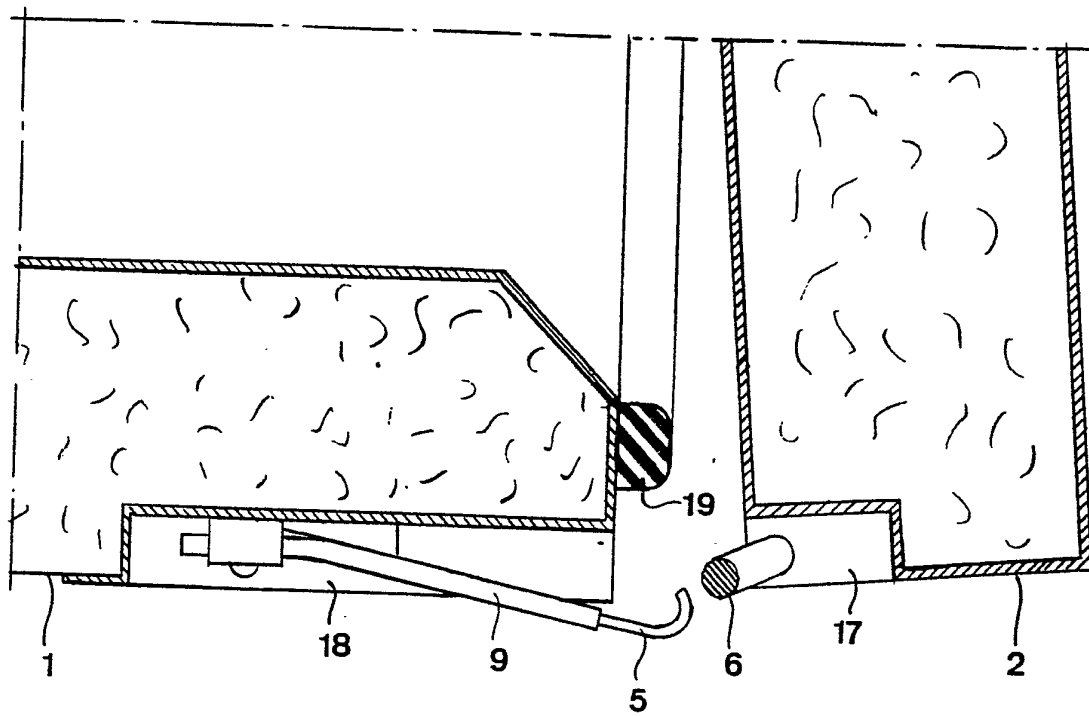


Fig 3

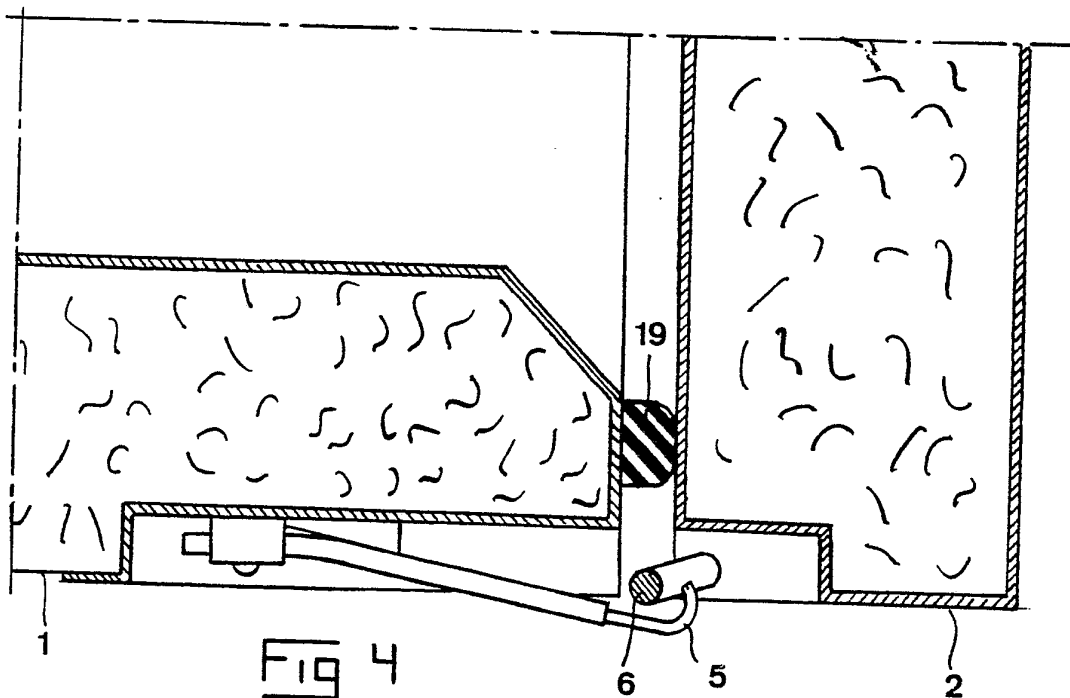
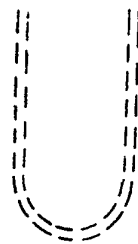


Fig 4

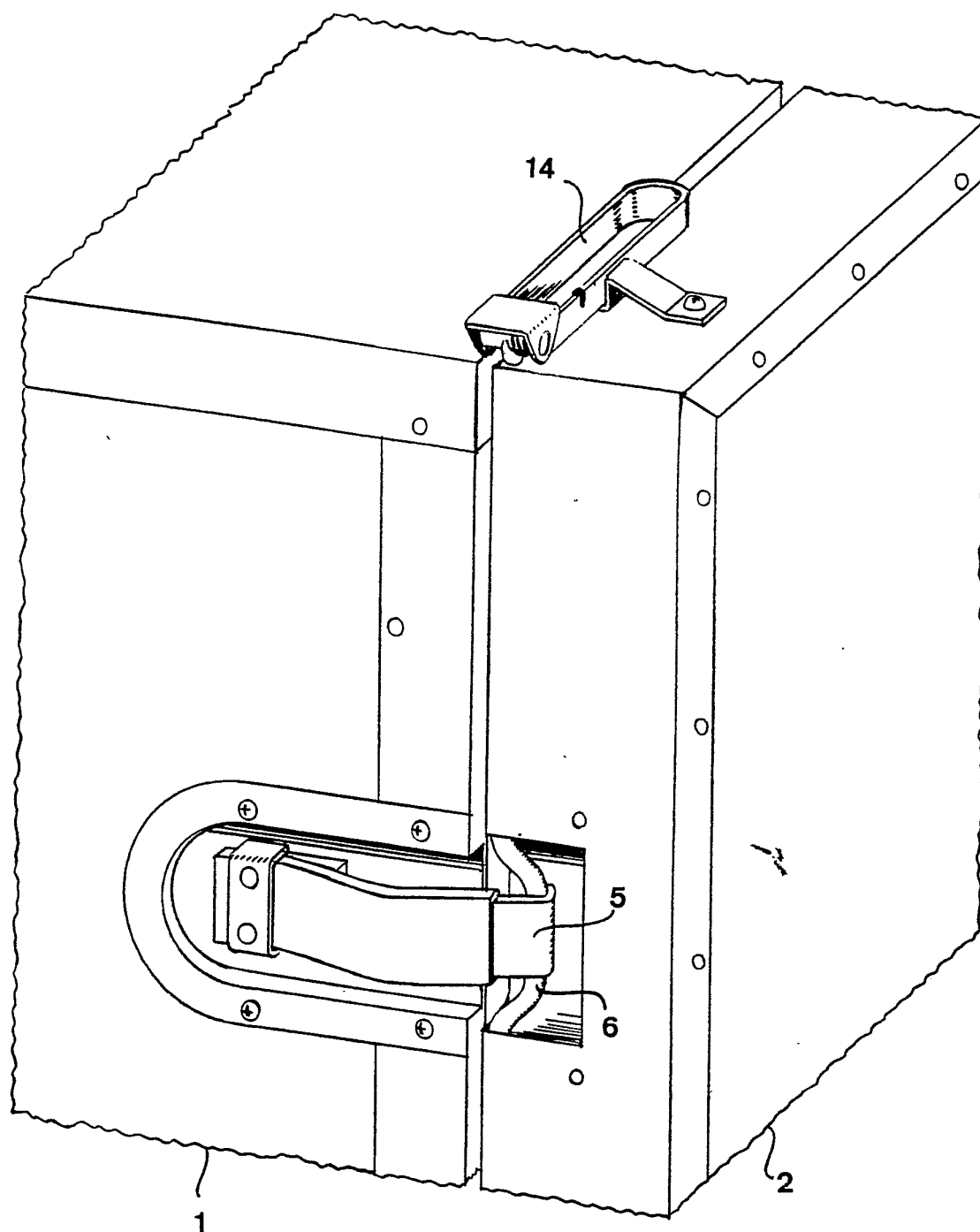
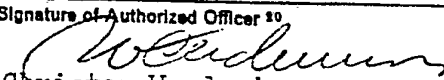


Fig 5

INTERNATIONAL SEARCH REPORT

International Application No PCT/SE79/00123

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) *		
According to International Patent Classification (IPC) or to both National Classification and IPC		
E 05 C 19/10, 11/10, 9/08, 3/02		
II. FIELDS SEARCHED		
Minimum Documentation Searched *		
Classification System	Classification Symbols	
IPC	E 05 C 19/08-14, 3/00-10, 11/00 .../...	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched *		
SE, NO, DK, FI classes as above		
III. DOCUMENTS CONSIDERED TO BE RELEVANT 14		
Category *	Citation of Document, 15 with indication, where appropriate, of the relevant passages 17	Relevant to Claim No. 18
X	US, A, 1 499 895 published 1924, July 1, J F White	1 - 5
X	US, A, 2 569 647 published 1951, October 2, A F Alexander	3 - 5
A	US, A, 754 919 published 1909, March 15, F Charron et al	
A	SE, A, 60 159 published 1925, January 21, E V Gustavii	
A	SE, B, 316 416 published 1969, October 20, S-E Nordgren	
<p>* Special categories of cited documents: 18</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>"A" document defining the general state of the art</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document cited for special reason other than those referred to in the other categories</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> </div> <div style="width: 45%;"> <p>"P" document published prior to the international filing date but on or after the priority date claimed</p> <p>"T" later document published on or after the international filing date or priority date and not in conflict with the application, but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance</p> </div> </div>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search 1		Date of Mailing of this International Search Report 2
1979-08-08		1979-08-16
International Searching Authority 1		Signature of Authorized Officer 20
Swedish Patent Office		 Christer Wendenius

FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

II Continuation Fields Searched

Deutsche Klassen: 68b:1/13, 33b:13/01

US Classification: 292: 18, 89, 96-102, 107-108,
116-120, 128, 213-218, 246-250, 256.5V. ☐ OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE ¹⁰

This international search report has not been established in respect of certain claims under Article 17(2) (a) for the following reasons:

1. ☐ Claim numbers _____, because they relate to subject matter ¹² not required to be searched by this Authority, namely:2. ☐ Claim numbers _____, because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out ¹³, specifically:VI. ☐ OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING ¹¹

This International Searching Authority found multiple inventions in this international application as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.2. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:3. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:

Remark on Protest

- ☐ The additional search fees were accompanied by applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.