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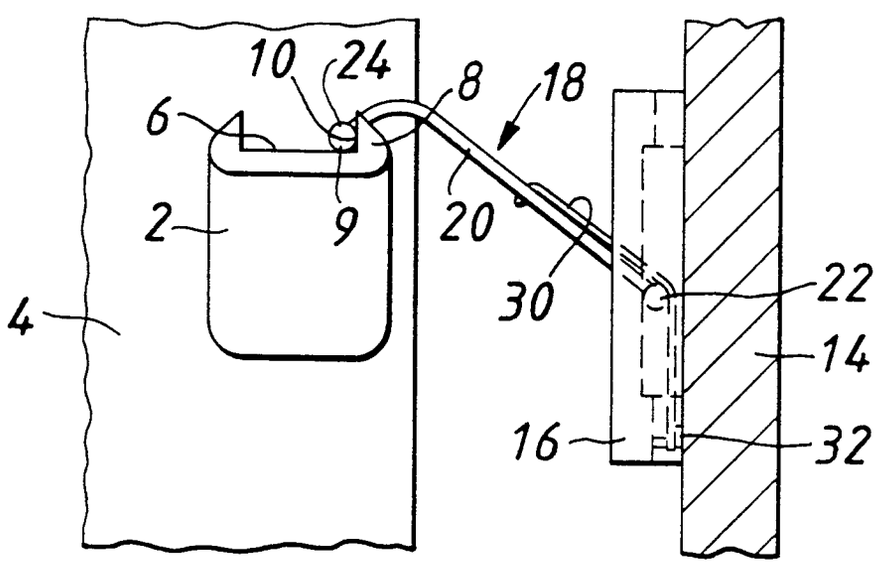
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(54) Improvements relating to catch mechanisms.

(57) A safety catch mechanism is provided which allows limited opening of a cupboard, drawer, or other storage unit. When the catch is engaged, a child cannot gain access to the contents of the storage unit, but an adult can release the safety mechanism when it is in its partially open position thus disengaging the catch and gaining access. The safety catch of the invention includes resilient engagement means (18,118) designed to retract to a non-protruding position relative to the storage unit portion on which it is mounted when it is released from engagement. The absence of protruding hooks or spikes when the storage unit is open enhances the safety of the catch mechanism.

FIG. 1a.



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This invention relates to catch mechanisms, and more particularly to a safety catch mechanism for a cupboard door or drawer.

It is well-known to provide safety catches on cupboard doors or drawers to prevent children gaining access to their contents. Such safety-catches are generally known as child-proof catches, and are designed so that, although the cupboard or drawer cannot be fully opened by a child, the catch allows limited opening of the storage unit thus enabling an adult to release the safety mechanism to open it. However, prior art catch mechanisms require the use of a barbed spike which projects from the back of the cupboard door or drawer to engage with a complementary fixed catch mounted inside the cupboard or drawer opening. Such spikes are dangerous and have been known to cause injury to young children when the cupboard or drawer is open.

A latch assembly described in US 3,889,992 provides a ball on a resilient arm mounted on a door for engagement with a curved resilient stop mounted on the stationary member.

According to the invention there is provided a catch mechanism comprising resilient engagement means and a catch member each adapted to be mountable on respective relatively moveable portions of a storage unit, and arranged to come into mutual engagement when the storage unit portions are brought together, and when so engaged to allow limited separation of the storage unit portions enabling the catch to be released from outside of the storage unit, characterised in that said resilient engagement means is adapted to retract relative to the storage unit portion on which it is mounted from the position of mutual engagement under its own resilience when released from engagement with the catch member.

In order that the invention may be better understood embodiments thereof will be described, by way of example, with reference to the accompanying drawings, wherein:

Figure 1a shows a catch mechanism according to a first embodiment of the invention in a partially opened position,

Figure 1b is an exploded perspective view of the catch mechanism of Figure 1a,

Figure 2 shows a modification of the catch mechanism of Figures 1a and 1b,

Figure 3a is a plan view of a catch mechanism according to a second embodiment of the invention,

Figure 3b shows the catch mechanism of Figure 3a when in its partially opened position,

Figure 4a is a plan view of a catch mechanism of another embodiment of the invention,

Figure 4b is a perspective view of a part of the catch mechanism of Figure 4a,

Figure 5a is a plan view of a catch mechanism according to yet another embodiment of the invention,

Figure 5b shows the catch mechanism of Figure 5a when in its partially opened position,

Figure 6a is a plan view of a catch mechanism according to a further embodiment of the invention, and

Figure 6b shows the catch mechanism of Figure 6a when in its partially opened position.

Referring firstly to Figures 1a and 1b a catch member 2 is shown fixed to an inside wall 4 of a cupboard. It will be appreciated that the catch member 2 could also be used on the floor or ceiling of the cupboard, or on the non-moving carcass of a drawer, with appropriate modifications. The catch member 2 may be fixed in position by screws, adhesive, or any other suitable fixing means. The catch member 2 is formed with a substantially horizontal ledge portion 6, provided on its two edges which extend substantially perpendicularly away from the cupboard wall 4 with four raised locking portions 8 as can best be seen in Figure 1b. Each locking portion 8 has a triangular cross-section with an inner face 10 which is substantially vertical, and an outer face 12 which slopes downwardly towards the respective outer edge of the ledge 6. In the illustrated embodiment this outer face 12 is at an angle of approximately 45° to the horizontal. On each locking portion 8 the intersection of the vertical and sloping faces 10, 12 is rounded off so that the catch member 2 has no sharp projecting parts which may cause injury or damage. The rounded edge also assists in the camming function performed by the locking portions 8 in engagement of the catch mechanism which will be described below.

On the inside of the cupboard door or the drawer front 14 (shown in section), a mounting plate 16 is attached by screws or other fixing means. The mounting plate 16 is provided with a recessed portion which retains an arm member 18 arranged to engage with the catch member 2, when the cupboard or drawer is closed.

The arm 18 comprises a relatively flat elongate member 20, formed at each of its ends with a transverse cylindrical bar 22, 24. The flat elongate member 20 is additionally shaped to curve through approximately 90° at a position relatively close to one end, so that the arm 18 is L-shaped. In the illustrated embodiment the "L" is inverted so that the shorter leg of the "L" is at the upper end of the arm 18 and extends away from the cupboard door or drawer front 14.

The arm 18 is retained in the mounting plate 16 by engagement of the ends of the cylindrical bar 22 on the lower end of the arm 18 in respective longitudinal slots 26 in the mounting plate 16. The lower cylindrical bar 22 can slide up and down in the mounting plate 16 and also rotate so that the arm 18 is both slidably and pivotably retained by the mounting plate 16.

The arm 18 is further provided at an approxim-

ately central position, half-way along its length, with a tab 28 which is arranged to engage an elastic member 30 such as a rubber band or flexible O-ring. This elastic member 30 is also attached to a position towards the bottom of the mounting plate 16 by passing around a truncated pin 32. The elastic member 30 is arranged to bias the arm 18 to a normal position in which it is retracted within the recess in the front surface of the mounting plate 16 in a substantially vertical position.

The operation of the preferred embodiment of a catch mechanism according to the invention will now be described in relation to its use on a cupboard door; but it will be apparent that it is equally applicable for use on a drawer or any other closure for a storage unit, by which it is intended to include cookers, washing machines or any other container to which it is desired to deny a child access.

When the cupboard door 14 is open the arm 18 is in its normally retracted position as previously described, biassed by the elastic member 30. As the cupboard door 14 is closed the cylindrical bar 24 on the upper end of the arm 18 comes into contact with the sloping outer surfaces 12 of the two closest locking portions 8 on the catch member 2. As the cupboard door 14 is closed further the sloping faces 12 act as camming surfaces, pushing the cylindrical bar 24 and the arm 18 upwardly and inwardly of the cupboard, against the action of the elastic member 30, until the cylindrical bar 24 drops over the edge onto the horizontal ledge 6 to engage behind the vertical faces 10 of the two locking portions 8. The locking portions 8 are spaced apart by an amount sufficient to allow the flat upper part of the arm 18 to pass between them but the spacing is not sufficient to allow the cylindrical bar 24 to pass through it. The cupboard is thus locked in its closed position.

When the cupboard door 14 is opened the cylindrical bar 24 and the locking portions 8 remain in engagement and the lower end of arm 18 therefore starts to slide upwardly in the slots 26 of the mounting plate 16 against the resilience of the elastic member 30. At the same time the arm 18 pivots outwardly from the mounting plate allowing the door 14 to open by about 4 cm before the arm 18 reaches the limit of its upward and outward movement. At this stage the cupboard cannot be opened further without disengaging the arm from the catch member 2.

Disengagement of the catch mechanism can be achieved by inserting a finger into the gap between the door 14 and the cupboard and lifting the arm 18 so that the cylindrical bar 24 at its upper end rises clear of the vertical faces 10 of the locking portions 8. The catch mechanism is thus disengaged and the resilience of the elastic member 30 acts to return the arm 18 to its substantially vertical, retracted position in the mounting plate 16. The mounting plate 16 and the arm 18 are thus substantially flat against the inner surface of the cupboard door 14 so that no potentially harmful protruding parts are present.

Referring now to Figure 2, a modification of the arm 18 and catch member 2 of the previously described embodiment will be explained. As can be seen, the upper part of the arm 18 is provided with a slot 34 which extends from a position just above the tab 28 up to and through the cylindrical bar 24 at the upper end of the arm 18. This slot has the effect of splitting the upper part of the arm 18 into two portions which can be squeezed together. The locking portions 8 on the catch member 2 are provided with grooves 36 adjacent their intersection with the horizontal ledge portion 6. These grooves 36 are shaped to receive and engage the cylindrical bar 24 at the upper end of the arm 18 when the catch mechanism is engaged. Disengagement of the catch mechanism then requires the two portions of the upper arm 18 to be squeezed together to release the ends of the cylindrical bar 24 from the grooves 36 before the arm 18 can be lifted over the vertical faces 10 as previously described.

It will be apparent that many modifications may be made to the catch mechanism described. For instance, the whole device may be oriented at 90° or 180° to the position shown, so that sliding movement of the arm 18 takes place from one side to another or downwardly respectively as the cupboard or drawer is opened.

Moreover, the feature of retraction of the engaging means under its own resilience may be provided in many different forms and some examples are shown in Figures 3 to 6. These will be briefly described below.

In Figure 3a a catch mechanism is shown in its engaged position with the cupboard or drawer closed, and in Figure 3b when the cupboard or drawer is partly open. In this embodiment the catch member 102 is attached to the door of a cupboard 114 and a mounting plate 116 held in position on the inside of the cupboard on one of its walls, the ceiling or floor 104, by screws 105. The catch member 102 includes a hooked portion 103 formed with a smoothly contoured outer surface, the function of which will be explained below. Additionally the catch member 102 is designed to have substantially no projecting parts which might cause injury or damage. Attached to the mounting plate 116, or integrally formed with it, is an arm 118 which has a hook 119 formed at its free end. The arm 118 is preferably made of resilient, springy material which reverts to its normal shape after being deformed, such as a semi-rigid plastics material. As can be seen in Figure 3a the arm 118 normally extends from its point of attachment on the plate 116 in a direction substantially parallel to the cupboard opening and then curves through 90° so that the free end of the arm 118, which incorporates the hook 119, extends towards the opening in a direction substantially perpendicular to the plane of the opening, but does not

protrude beyond that opening.

When the cupboard door 114 is in its closed position, as shown in Figure 3a, the hooks 103 and 119 on the catch member 102 and arm 118, respectively, are engaged with each other.

When the door 114 is opened the hooks 103, 119 remain in engagement and the arm 118 flexes allowing the door 114 to be opened by a limited amount of about 1″ (or 2.5cm). This is the situation is shown in Figure 3b. The cupboard door 114 is effectively locked and no access can be gained to the contents of the cupboard.

In order to release the safety catch mechanism an adult can insert a finger into the gap between the door 114 and the body of the cupboard and apply a sideways force (to the left in the arrangement shown in Figures 3a and 3b) which causes the hooks 103, 119 to disengage, and allows the door 114 to be opened.

When hook 119 is released, arm 118 springs back to its original position behind the plane of the cupboard opening. There are therefore no hooks or spikes protruding from the opening of the cupboard when it is open, and it will be appreciated that this arrangement therefore enhances the safety of the catch mechanism.

When the cupboard door 114 is closed again the head of the hook 119 on the arm 118 comes into contact with the head of the smoothly contoured outer surface of the hook 103 on the catch member 102. This surface acts as a cam face, and as the door 114 is closed further hook 119 is forced downwards and leftwards against the resilience of the arm 118 until the two hooks 103, 119 can snap into engagement under the spring action of the arm 118, thus locking the catch mechanism again and holding the cupboard door 114 closed.

Figures 4a and 4b illustrate a modification of the embodiment just described. In this modified embodiment the hook on the arm 118 is replaced by a cylindrical bar 124 and the hook 107 on the catch member 102 is slotted, as can best be seen in Figure 4b. This arrangement allows a certain amount of rolling action between the bar 124 and slotted hook 107 when the cupboard door 114 is opened. The catch mechanism illustrated in Figures 4a and 4b operates in the same manner as that described in relation to Figures 3a and 3b, except that the rolling action of the bar 124 in the slotted hook 107 reduces the stress on the resilient arm 118 just above the bar 124 when the cupboard is first opened.

Referring now to Figures 5a and 5b, another embodiment of the invention is shown. In this embodiment the arm 118 is rotatably attached to the mounting plate 116, by a pivot 111, at a point towards the left-hand side of the mounting plate 116. The arm 118 extends across the mounting plate 116 in a direction away from the hook end and passes between two stop pins 113, 115, the function of which will be described below.

As can be seen in Figure 5b, when the door 114 is opened the arm 118 is allowed to rotate about the pivot 111 by a small amount until the end of the arm 118 comes into contact with the stop pin 113. The arm 118 then deforms as before, allowing limited opening of the cupboard door 124. The hooks 103, 119 are released in the same way as described above with reference to Figures 3a and 3b to allow the cupboard door 114 to be opened fully, and the arm 118 then retracts to its normal position behind the plane of the cupboard opening. When the door 114 is closed again the two hooks 103, 119 engage as previously described, stop pin 115 restraining the movement of the arm 118 and preventing it from being pushed too far back into the body of the cupboard.

Figures 6a and 6b illustrate a further embodiment of the invention in which the resilience of the arm 118 is provided by means of a compression spring. The arm 118 extends in a direction generally perpendicular to the plane of the cupboard opening. It passes through two stops 121, 123 positioned one at either edge of the mounting plate 116, and is provided with an annular flange 125 which is fixed in position on the arm 118 between the two stops 121, 123, and a compression spring 127.

As before the arm 118 is provided with a hook 8 which, when the cupboard door 114 is in its closed position, is in engagement with the hook 103 of the catch member 102. In this position the spring 127, acting against stop 121 and flange 125, biases flange 125 against stop 123, keeping the door 114 shut.

When the door 114 is opened against the action of the spring 127, the spring is compressed against stop 121 by flange 125. When the spring 127 is compressed, as shown in Figure 6b, the hooks 103, 119 can be disengaged by applying the same sideways force as previously described. The action of the spring 127 then returns the arm 118 to its normal position, with flange 125 contacting stop 123, hook 119 thus being retracted into the body of the cupboard so that it does not protrude therefrom.

When the door 114 is closed again the two hooks 103, 119 pass over each other as before, the outer surface of hook 103 acting as a cam face and pushing hook 119 to the left, bending arm 118 slightly, until the two hooks snap into engagement.

As will be apparent from the foregoing description various modifications are possible without departing from the broad ambit of the invention, and all such modifications are deemed to be included herein.

Claims

1. A catch mechanism comprising resilient engagement means (18, 118) and a catch member (2, 102) each adapted to be mountable on respective

relatively moveable portions of a storage unit, and arranged to come into mutual engagement when the storage unit portions are brought together, and when so engaged to allow limited separation of the storage unit portions enabling the catch to be released from outside of the storage unit, characterised in that said resilient engagement means (18, 118) is adapted to retract relative to the storage unit portion on which it is mounted under its own resilience when released from engagement with the catch member.

2. A catch mechanism according to claim 1 wherein opening of the storage unit beyond said limited separation of the storage unit portions requires release of the resilient engagement means and the catch member from mutual engagement.

3. A catch mechanism according to claim 1 or claim 2 wherein release of the resilient engagement means and the catch member from mutual engagement requires the storage unit portions to be in a separated position thereby providing access to the catch mechanism between said portions and enabling disengagement of the resilient engagement means from the catch member.

4. A catch mechanism according to any preceding claim wherein the resilient engagement means comprises an elongate member (18) arranged to have one end slidably and pivotably engaged with a mounting plate (16) secured to one of said storage unit portions, and an elastic member (30) attached to said elongate member (18) and said mounting plate (16) for providing the resilience for retraction of the elongate member (18).

5. A catch mechanism according to claim 4 wherein said elastic member (30) is arranged to bias the elongate member (18) to a normal position in which it is retracted within a recess in the mounting plate (16).

6. A catch mechanism according to claim 4 or claim 5 wherein said elongate member (18) is arranged to slide along the mounting plate and pivot outwardly therefrom against the resilience of the elastic member (30) to allow said limited separation.

7. A catch mechanism according to any one of claims 4 to 6 wherein the free end of said elongate member (18) includes a hook portion (20, 24) for engagement with a complementary hook portion (8) on said catch member (2).

8. A catch mechanism according to claim 7 wherein said elongate member hook portion (20, 24) comprises a cylindrical bar (20, 24).

9. A catch mechanism according to claim 8 wherein said cylindrical bar (20, 24) and an upper portion of the elongate member (18) adjacent the cylindrical bar are slotted (34) to divide the upper portion of the elongate member (18) into two longitudinal parts which can be forced towards one another, thus providing said upper portion with lateral compressibility.

10. A catch mechanism according to claim 9 wherein the catch member hook portion (20, 24) is provided with grooves (36) adapted to receive the ends of the cylindrical bar (24) when the catch mechanism is in its engaged position, and release of the resilient engagement means (18) and the catch member (2) from mutual engagement requires the two parts of the upper portion of the elongate member (18) to be forced towards one another.

11. A catch mechanism according to any one of claims 1 to 3 wherein said resilient engagement means (118) comprises an elongate flexible member (118) attached to a mounting plate (116), said plate (116) being secured to one of said storage unit portions.

12. A catch mechanism according to claim 11 wherein said flexible member (118) includes a hook portion (119, 124) on its free end, for engagement with a complementary hook portion (103) on the catch member (102).

13. A catch mechanism according to claim 12 wherein said flexible member hook portion (124) comprises a cylindrical bar (124) and said complementary catch member hook portion (103) comprises a slotted hook (103) adapted to enable limited rotational movement of the cylindrical bar (124) when engaged by said slotted hook (103).

14. A catch mechanism according to any of claims 11 to 13 wherein said flexible member (118) is pivotally attached to said mounting plate (116).

15. A catch mechanism according to claim 14 wherein said mounting plate (116) is provided with stop means (113, 115) arranged to limit rotational movement of the flexible member about its pivotal point.

16. A catch mechanism according to any of claims 11 to 15 wherein said flexible member (118) normally extends from its position of attachment on the mounting plate (116) in a direction substantially parallel to the opening of the storage unit before

curving outwardly to extend towards the plane of the opening in a direction transverse thereto.

17. A catch mechanism according to any of claims 1 to 3 wherein said resilient engagement means comprises an elongate member (118) arranged to be displaced axially when the storage unit portions are separated and spring means (127) for providing the resilience to cause the retraction of said elongate member (118).

18. A catch mechanism according to claim 17 wherein said spring means (127) is provided coaxially with the elongate member (118) and mounted between stop means (121, 123) arranged so that when the storage unit portions are separated the elongate member moves against the action of said spring means (127).

19. A catch mechanism substantially as hereinbefore described with reference to Figures 1a and 1b.

20. A catch mechanism substantially as hereinbefore described with reference to Figures 2 and 3.

21. A catch mechanism substantially as hereinbefore described with reference to Figures 3a and 3b.

22. A catch mechanism substantially as hereinbefore described with reference to Figures 4a and 4b.

23. A catch mechanism according to claim 22 having the mounting arrangement as described with reference to Figures 5a and 5b.

24. A catch mechanism substantially as hereinbefore described with reference to Figures 5a and 5b.

25. A catch mechanism substantially as hereinbefore described with reference to Figures 6a and 6b.

FIG. 1a.

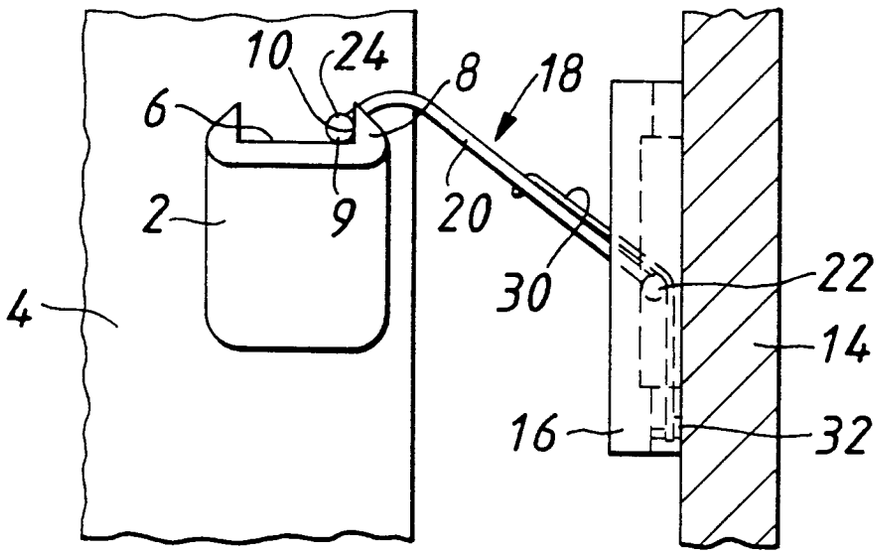
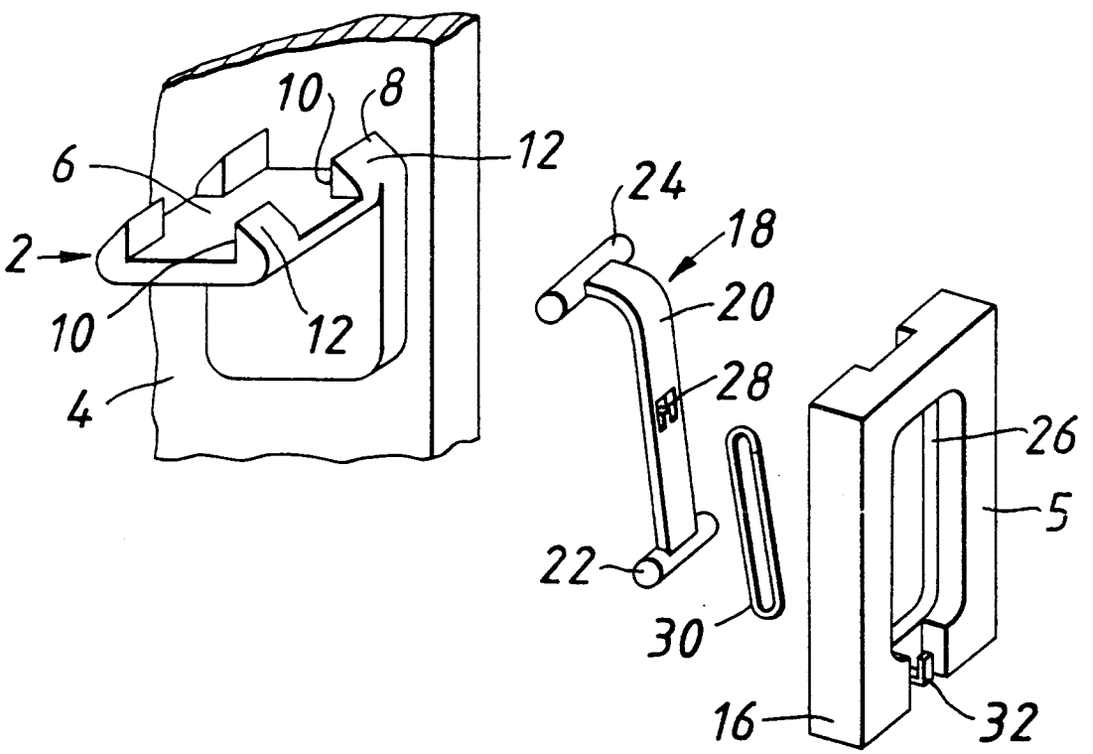

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FIG. 1b.


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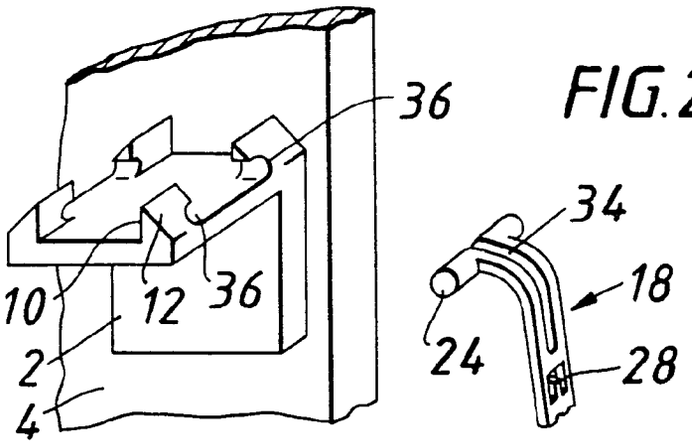


FIG.2.

FIG.3a.

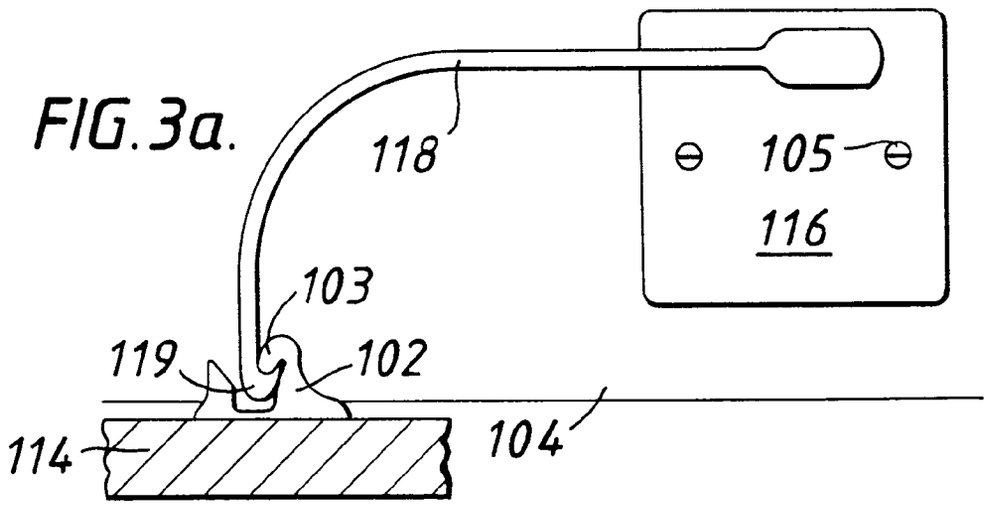


FIG.3b.

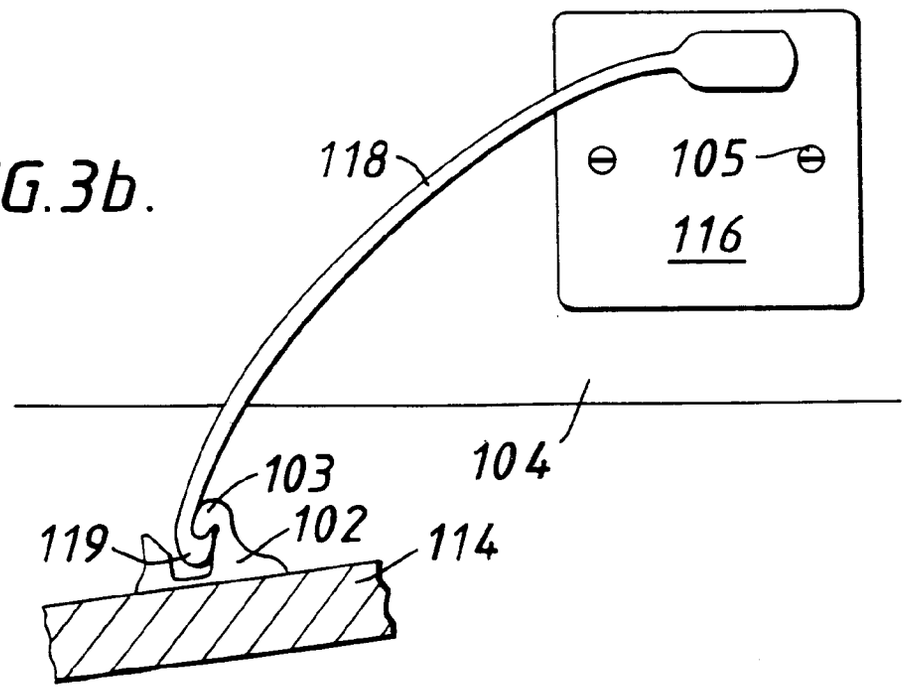


FIG. 4a.

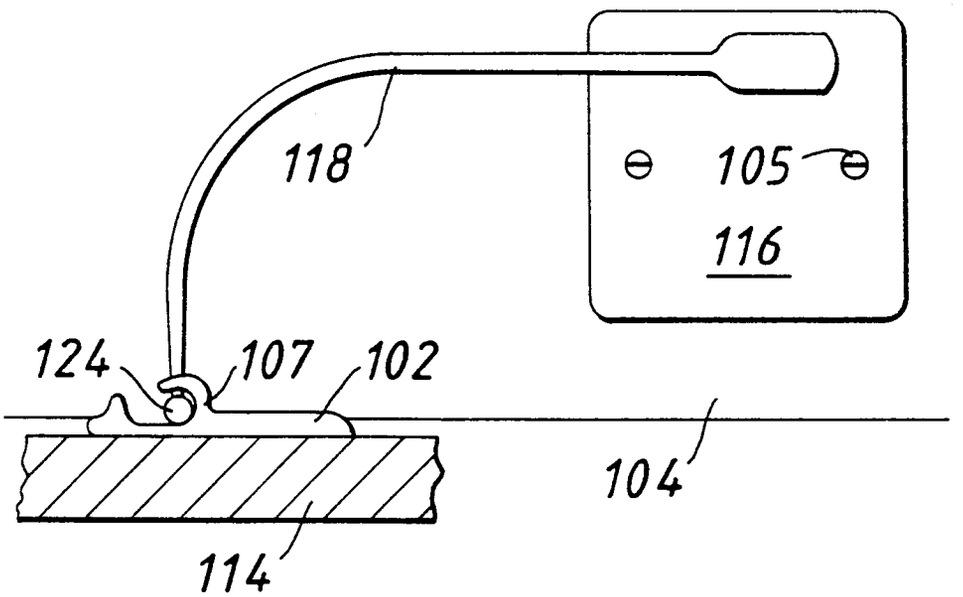


FIG. 4b.

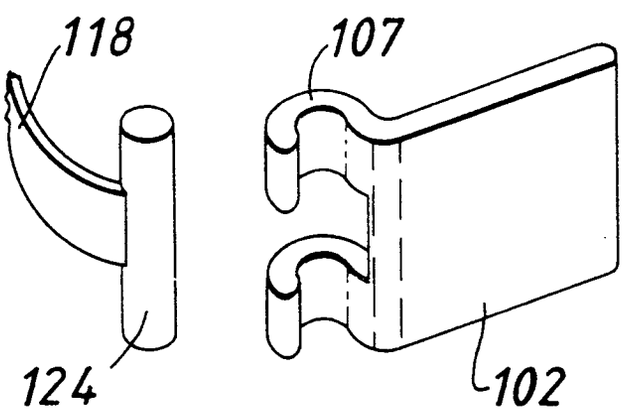


FIG. 5a.

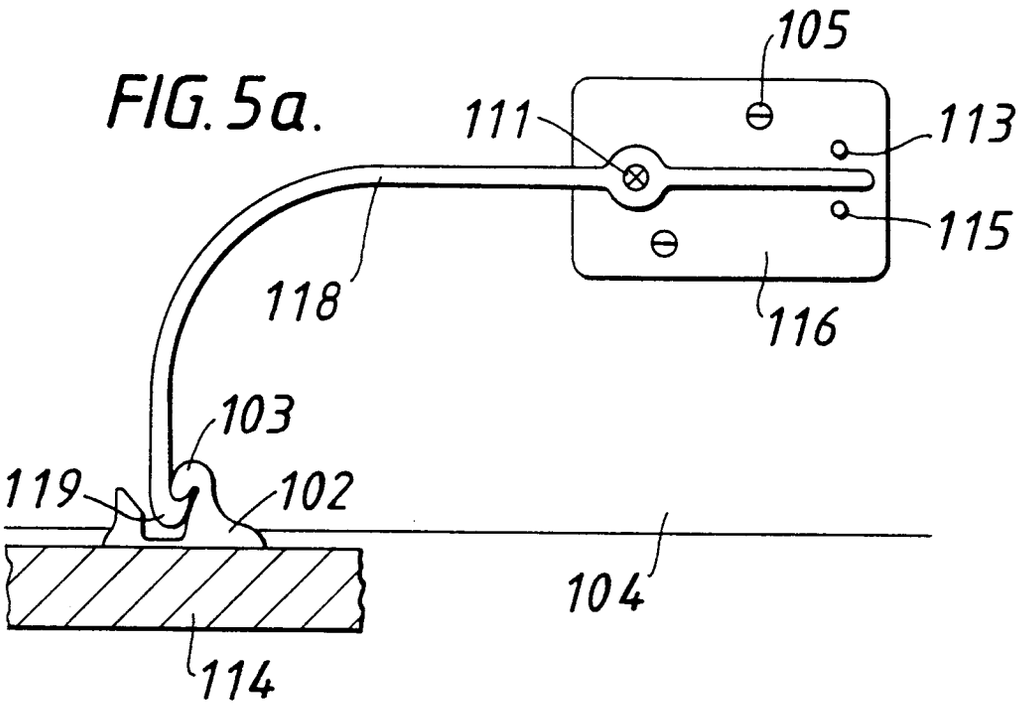

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114

FIG. 5b.

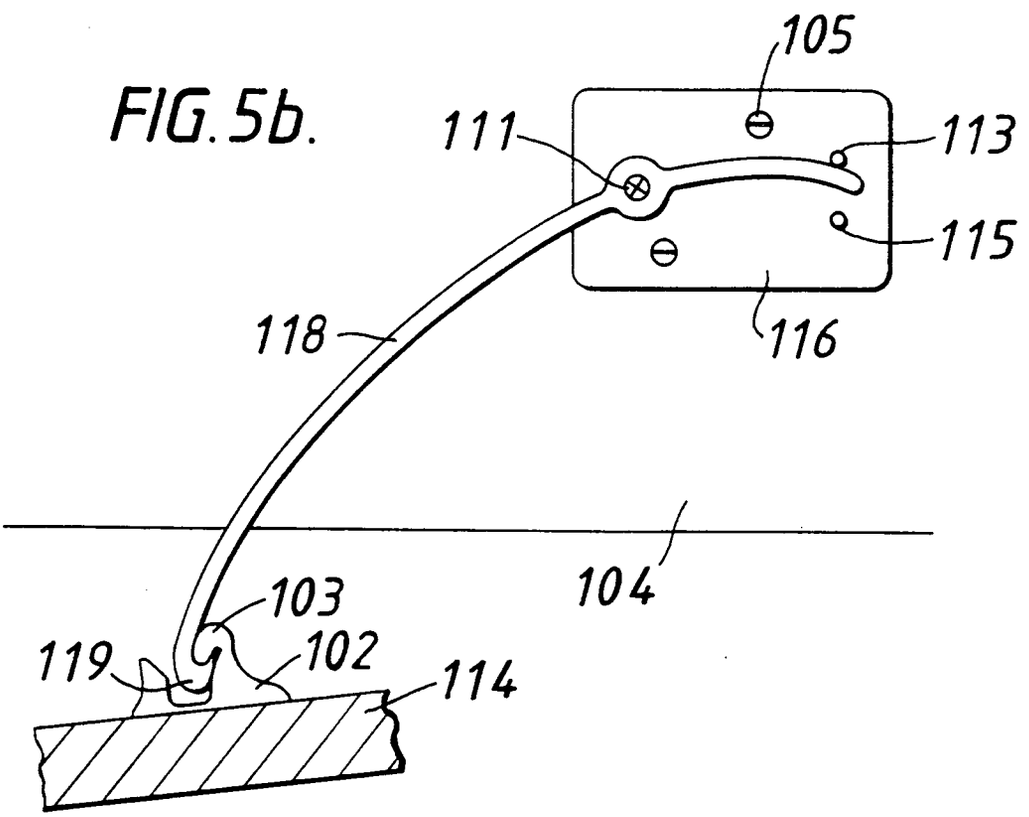

105
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FIG. 6a.

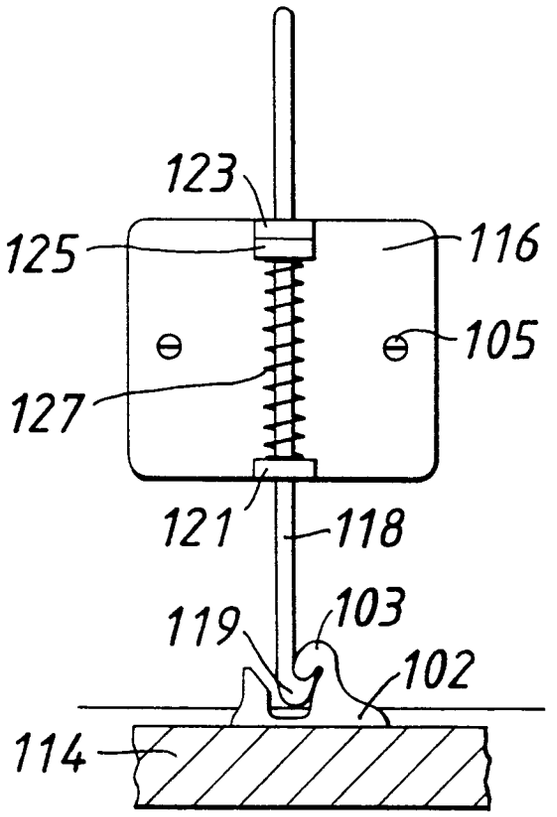
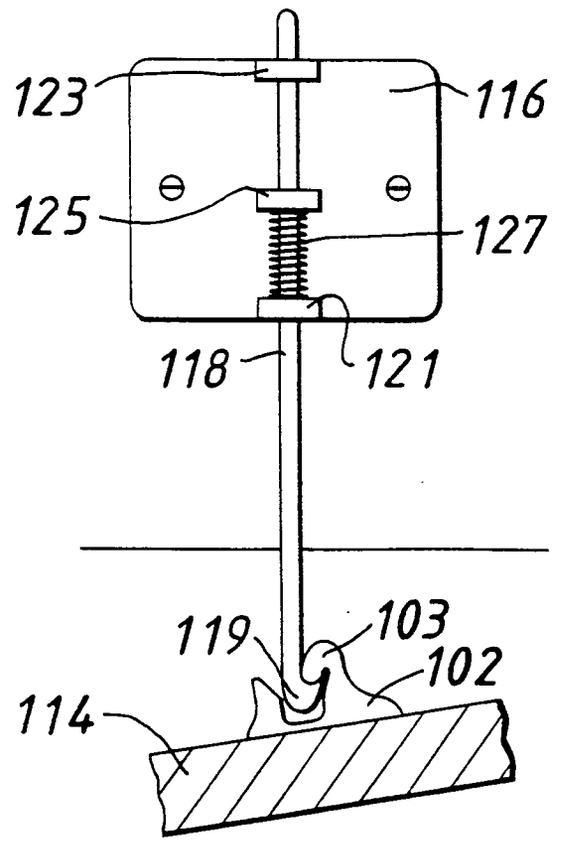

123
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116
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127
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114

FIG. 6b.


123
116
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127
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119
103
102
114

European Patent Office

EUROPEAN SEARCH REPORT

Application Number EP 91305678.4

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	US - A - 4 691 950 (MAYERT et al.) * Fig. 1-4; claims 1-12 * --	1-8, 10,19, 20	E 05 B 1/00
A	GB - A - 2 077 841 (ENRIQUE COSTA BASTART) * Fig. 1-6; claims 1-10 * --	1-6, 19,20	
A	GB - A - 1 466 414 (FLYMO SOCIETE ANONYME) * Fig. 1-3; claims 1-3 * --	1-10, 19,20	
A	GB - A - 1 510 724 (RIXTON-FIRMARK INC.) * Fig. 1-16; claims 1-15 * --	1-5	
A	WO - A1 - 80/00 987 (CAMPER & NICHOLSONS MARINE EQUIPMENT LTD.) * Fig. 1-14; claims 1-37 * --	1-10, 19,20	
A	DE - A1 - 3 020 452 (TEAM FORM AG) * Fig. 1-5; claims 1-18 * --	1-4, 19,20	TECHNICAL FIELDS SEARCHED (Int. Cl.5) E 05 B E 05 C
A	FR - A - 2 547 852 (SA FERMETURES ROSA) * Fig.; claims 1-7 * --	1-18, 21-25	
A	FR - A - 2 529 249 (MOULAGES PLASTIQUES DU MIDI SARL) * Fig. 1/4-4/4; claims 1-11 * --	1-18, 21-25	
A	EP - A3 - 0 273 346 (SALE SECURITY INC.) * Fig. 1-12; claims 1-12 * ----	1-8, 10,19, 20	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	14-08-1991	CZASTKA

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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