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(54) **Pivotable leaf of the concealed type provided with means for automatically engaging and disengaging it with/from its guides**

Verdeckter schwenkbarer Flügel mit Mittel zum automatischen Ein- und Aushängen in deren Führungen

Vantail pivotant du type caché et prévu de moyens pour son engagement ou désengagement automatique de ses guides

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(72) Inventor: **Terraneo, Attilio**
20038 Seregno (Milano) (IT)

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(74) Representative: **Michelotti, Giuliano et al**
DRAGOTTI & ASSOCIATI SRL,
Galleria San Babila, 4/C
20122 Milano (IT)

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(73) Proprietor: **MDF Srl**
20123 Milano (IT)

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DE-A- 3 709 331 **US-A- 3 653 158**
US-A- 5 083 847

EP 0 802 294 B1

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Description

[0001] The present invention relates to a pivotable leaf of the concealed type provided with simple means which cause it to engage with and disengage from its guides without the aid of any tool.

[0002] For a long time it has been known of pivotable leaves of the concealed type consisting essentially of a rigid panel, having a substantially rectangular shape and made of either opaque or transparent material, provided on two opposite sides with at least two projecting pins engaging in recessed right-angled guides which allow sliding and pivoting of the said leaves.

[0003] This type of leaf functions extremely well because it is sufficient to choose the shape, dimensions and the material from which the pins and guides are made in order to avoid any problems in terms of the sliding action. However, although there may be no problems as regards operation of the leaves, difficulty is still encountered during disassembly thereof should it be required to carry out an operation, for example replacement, for any reason, of the panels of the same leaves in order to replace broken or damaged parts or simply change a decorated panel with another one having a different decoration.

[0004] Hitherto, since the pins present on the leaves are usually incorporated in linear members fixed by means of screws to the sides of the said leaves, a part of the said screws always remaining covered by the guides, it is necessary, in order to perform disassembly of the leaves, to remove at least one wall of the piece of furniture containing the said leaves with the obvious drawback of extensive work requiring particularly skilful and specialized personnel, or else it is necessary to make holes in the guides and in the underlying walls of the furniture, for access to the said screws, whereby said holes are difficult to cover up and could negatively affect the aesthetic appearance of the furniture containing the leaves. A first attempt of a system for engaging and disengaging a sliding leaf and which system has the features of the preamble of claim 1 is disclosed by US-A-3,653,158 and depicted in figures 1 to 5 thereof. According to such a document, a closure member for a piece of furniture comprises a perimetric frame, supporting a front panel, having two vertical side members each one carrying a guide and retainer assembly provided with two guide pins projecting into inwardly open tracks fastened to walls of said piece of furniture. In order to help the disassembly of the closure member from the piece of furniture, the guide pins are engaged in retainer members fitted in a double wall of each vertical side member so as to can be disengaged from them only through a manual intervention by means of a suitable tool, such as a screwdriver, on a threaded portion of the pins themselves from the inside of the piece of furniture. This kind of intervention is almost as troublesome and time consuming as the removal of one wall of the piece of furniture and thus there is a very poor advantage with

respect to the prior approach of removing a wall. A second attempt to overcome the same problem is disclosed by US-A-5,083,847 and particularly depicted in figures 1, 5 and 6 thereof. According to such a document, a door of a cabinet is provided with two lateral bracket members, each one having two guide posts to be engaged in an associated L-shaped guide track incorporated in a wall of a piece of furniture. The bracket members are fastened to the door by means of a plurality of screws (see specifically the wood screw depicted in figure 6), so as to be able to assembly and disassembly the brackets to and from the door it is sufficient to screw down and unscrew, respectively, the wood screws into and out the door itself. However also this operation is troublesome and time consuming enough and also in this case there is not a very great advantage with respect to the prior approach of removing a wall.

[0005] For the reasons mentioned hereinabove, it has been necessary to devise the system for engaging and disengaging sliding leaves of the concealed type according to the present invention.

[0006] Briefly stated, the system for engaging and disengaging sliding leaves of the concealed type, having rectangular shape, comprises lateral right-angled guides and at least two pairs of pins, one pair for each smaller side of the leaf, the said pairs of pins in use being retractable for disengaging from a corresponding said lateral right-angled guide, the pins being provided with resilient means, is characterized in that the said pins are expandable telescopic pins whereby their resilient means ensure the expansion of the telescopic pins for their engagement in the said right-angled guides, the system furthermore comprising at least one relief in the form of a ramp, and whereby the said relief can be provided at the inner end of the travel path of a said right-angled guide occupying the bottom of said right-angled guide and extending until flush with the outside of the said right-angled guide.

[0007] Preferably, the lateral right-angled guides are inserted into small channels formed in the corresponding walls of furniture so as to be flush with the said walls.

[0008] Preferably, the telescopic pins consist of a first solid cylinder of smaller diameter inserted in a cylindrical cavity, having a substantially similar diameter, of a second cylinder of larger diameter, and a resilient means inserted between the first cylinder and the cylindrical cavity so as to allow expansion of the first solid cylinder with respect to the second cylinder of the larger diameter.

[0009] In particular, the resilient means consists of a helical spring inserted between a narrow relief on the internal end of the first solid cylinder and a similar relief projecting from the bottom of the cylindrical cavity of the second cylinder of larger diameter.

[0010] Also in particular, the second cylinder of larger diameter comprises, at the external end, an expanded collar having a diameter greater than that of the cylinder itself so as to allow improved seating and anchoring

thereof.

[0011] The main features of the present invention shall be defined in particular in the claims forming the conclusive part of the present description. However, other features and advantages will emerge more clearly from the following detailed description of a preferred example of embodiment thereof, not to be considered limiting in any way, together with the accompanying drawings, in which:

- Figure 1 is a side elevation view of a first right-angled guide used for leaves containing the present invention;
- Figure 2 is a partial sectioned view, of the same right-angled guide depicted in Figure 1, showing the relief which has the function of disengaging the telescopic pins of the leaves;
- Figure 3 is a sectional view, along the line 3-3 of Figure 1, of the right-angled guide;
- Figure 4 is a sectional view, along the line 4-4 of Figure 1, of the right-angled guide;
- Figure 5 is a side elevation view of a second right-angled guide used for leaves containing the present invention, which is specularly symmetrical with respect to the one depicted in Figure 1;
- Figure 6 is a partial sectional view of the same right-angled guide depicted in Figure 5, showing the relief which has the function of disengaging the telescopic pins of the leaves;
- Figure 7 is an exploded sectioned view of a telescopic pin used in the present invention;
- Figure 8 is a partial view illustrating a telescopic pin inserted in a leaf, emerging so as to engage with a right-angled guide;
- Figure 9 is a partial view illustrating a telescopic pin inserted in a leaf, retracting as a result of engagement with one of the reliefs which has the function of disengaging the telescopic pin;
- Figure 10 is a front view, with parts removed, of a closed leaf containing the present invention;
- Figure 11 is a front view of a leaf, according to the present invention, in the pivoted or open position;
- Figure 12 is a front view showing how a leaf containing the present invention is disengaged after it has been pivoted;
- Figure 13 is a side elevation view of a variant of a right-angled guide having a raised front zone connected to the remainder of a horizontal arm of the guide by means of a curved arch; and
- Figure 14 is a perspective view of a separate device for disengaging leaf pins from the corresponding right-angled guide.

[0012] If we consider Figures 1 to 6 first of all, it can be seen that the right-angled guides 10 and 10a are formed by a rectangular channel member 12 and 12a, which is open at the top, consisting of two arms 14, 14a and 16, 16a connected together by a connecting piece

18 and 18a, bent at 90°. The arms 14 and 16, 14a and 16a comprise a rectangular recess 20, 20a defining the channel of each right-angled guide 10 and 10a. When the leaf is to be removed, it is possible to insert inside the arm 14 or 14a, at its outer end, an insert 22, provided with a ramp-shaped joining portion 24, having the function of disengaging the leaves, as described in detail further below.

[0013] If we consider Figure 7, it can be seen how a telescopic pin 30 according to the present invention is formed. This pin consists of a first solid cylinder 32 and a second hollow cylinder 34 provided with a cylindrical cavity 36 designed to receive a resilient means, such as a spring 38, which remains secured between a narrow relief 40 present underneath the first solid cylinder 32 and a relief 42, also narrow, present on the bottom of the cylindrical cavity 36. The second hollow cylinder 34 is provided with an expanded collar 44 in the form of a flat flange directed towards the first solid cylinder 32 so as to favour seating and fixing of the second cylinder 34 in a suitable cavity of a frame member 50 forming part of a pivotable leaf served by the present invention, as can be seen in Figures 8 and 9. If we continue to examine Figures 8 and 9, it can be seen that each of the telescopic pins 30 is inserted into suitable holes formed in the frame member 50 through a first profiled member 52 and a second profiled member 54 separated by a space 56 from the first profiled member 52, so as to define a substantially tubular frame member 50 for reasons of weight reduction (although it is not excluded that one could also use a frame which is solid or provided with different profiled members). The profiled member 54 houses in one of its internal channels a pane 58 of a panel forming part of a pivotable leaf, whereby said pane 58 may consist of opaque or transparent material, such as simple or decorated glass.

[0014] From an examination of Figures 10 to 12, together with Figures 8 and 9, it can be understood how a pivotable leaf 62 is engaged in the right-angled guides 10 and 10a and how it can be disengaged therefrom.

[0015] As can be seen in particular in Figure 10, which shows a leaf 62 in its position lowered so as to close an opening 64 of a piece of furniture, the leaf 62, formed by the frame 50 surrounding the glass pane 58, is provided with telescopic pins, the ends of the solid cylinders 32a-d of which can be seen projecting and engaging into the arms 16 and 16a of the right-angled guides.

[0016] Obviously, the leaf 62 can be raised from the position shown in Figure 10 into that shown in Figure 11 where the pins 30, while remaining engaged with the ends of the solid cylinders inside the right-angled guides 10 and 10a, keep the leaf engaged in the guides so that said leaf is unable to come out of the opening 64 of the furniture housing it. The reason for this can be fully understood by considering Figure 8 which shows a cylinder 32 of the pin 30 engaged in the channel-shaped recess 20 of the arm 14 of the guide 10.

[0017] In order to obtain disengagement of the cylin-

ders 32 from the guides 10 or 10a, it is sufficient to merely move forwards the pivotable leaf until the cylinders 32 of the telescopic pins 30 are located against the relief 22 introduced into the channel 20 of the right-angled guide 10. In this case the cylinders 32 are gradually pushed by the ramp-shaped joining portion 24 so as to retract inside the hollow cylinders 34 until their external end is located flush with the edges of the arm 14 of the guide 10. Since, as amply depicted by Figures 3, 4, 8 and 9, all the arms of the right-angled guide 10 are embedded in a body 60 of the furniture, for example made of wood, if a cylinder 32 emerges from the channel 20 as a result of being pushed by the relief 22, it is disengaged therefrom, thus allowing the leaf 62 to clear the guide 10 and thus making it disengageable from the opening 64 of the furniture and thus completely freed, as depicted in Figure 12.

[0018] Should leaves of particularly pronounced thickness be required, it is convenient to use a substantially right-angled guide 110 of the type depicted in Figure 13 formed by a channel 112 consisting of two arms 114 and 116 connected by a connecting piece 118, bent at 90°, continuing with a front raised portion 117 joined by a curved piece 119 to the arm 114. The remainder is similar to the right-angled guide 10 of Figure 1, and in fact the numbering of its parts is similar to that of the guide 10 with the addition of the number "1" in front. As for the disassembly insert 122 with its ramp 124, it is entirely similar to the insert 22 of Figures 1, 2 and 4, with the sole limitation that it is short enough not to interfere with the curved piece 119, but long enough to exceed the interaxial distances between the cylinders 32a and 32b or 32c and 32d (see Figure 10) in order to ensure reliable removal of the leaf 62 in the manner depicted in Figure 12.

[0019] The invention functions as follows:

- if it is required merely to tilt the leaf 62, causing it to stay engaged inside the right-angled guides 10 and 10a, such that it does not come out from the furniture, it is sufficient to raise the said leaf for as long as one can feel it freely sliding. When one feels a resistance to the pivoting movement of the leaf, due to the cylinders 32 which engage with the bottoms of the arms 14 and 14a of the channels 12 and 12a, it is sufficient to stop the pivoting movement of the leaf in order for it to remain raised and tilted as depicted in Figure 11;
- if it is required to separate the leaf 62 from inside the opening 64 of the furniture, it is sufficient to merely introduce the insert 22 into the channel 12 of the right-angled guide 10, overcoming the resistance encountered when the first cylinder 32a meets the ramp-shaped joining portion of the relief 22, and continue pushing inwards until the second cylinder 32b meets the ramp-shaped joining portion 24 of the relief 22;
- at this point the two cylinders 32a and 32b are in

the conditions shown in Figure 9 so that the cylinders 32 of the telescopic pins 30 emerge from the guides encountering the body 60 of the furniture and the leaf 62 slides to one side, as shown in Figure 12, being freed completely from the walls of the opening 64.

[0020] Basically, in order to tilt the leaf 62, it is sufficient to raise it until one feels a resistance to its movement and then a stopping action, while in order to disengage the leaf 62 from the walls of the opening 64, it is sufficient to introduce a relief-shaped insert 22 into the channel 12 of the right-angled guide 10 and continue the same movement, overcoming the resistances which are progressively encountered, until the leaf 62 is entirely disengaged from the walls of the opening 64.

[0021] In order to re-introduce a removed leaf so that it engages in the right-angled guides 10 and 10a, it is sufficient to position the vertical leaf 62 in front of the opening 64, causing for example a cylinder 32a to enter into the corresponding arm 16 of the right-angled guide 10 and pressing with a finger the cylinder 32c so as to make it enter against a wall of the opening 64. At this point, one continues to raise the leaf 62 until the cylinder 32c has entered into the channel 20a of the arm 16a of the right-angled guide 10a. One then raises the leaf 62 until the second cylinders 32b and 32d are also located against the walls of the opening 64, between which they would easily enter if simply pressed with one's fingers. Once the cylinders 32b and 32d have also entered between the walls of the opening 64, it is sufficient to continue to raise the leaf 62 so as to cause also these latter cylinders 32b and 32d to enter into the channels 20 and 20a of the arms 16 and 16a of the two right-angled guides and the leaf 62 is engaged and positioned as shown in Figure 10.

[0022] The above description is just an embodiment of the present invention, to which persons skilled in this particular art may make logical and equivalent changes to be considered herein covered, as defined in the appended claims.

Claims

1. System for engaging and disengaging sliding leaves (62) of the concealed type having rectangular shape, the system comprising lateral right-angled guides (10, 10a) and at least two pairs of pins (30), one pair for each smaller side of the leaf (62), the said pairs of pins (30) in use being retractable for disengaging from a corresponding said lateral right-angled guide (10, 10a), the pins (30) being provided with resilient means (38), characterized in that,

the said pins (30) are expandable telescopic pins whereby their resilient means (38) ensure

the expansion of the telescopic pins for their engagement in the said right-angled guides (10, 10a),

the system furthermore comprising at least one relief (22) in the form of a ramp (24), and whereby the said relief (22) can be provided at the inner end of the travel path of a said right-angled guide (10, 10a) occupying the bottom of said right-angled guide (10, 10a) and extending until flush with the outside of the said right-angled guide (10, 10a).

2. System according to Claim 1, characterized in that the lateral right-angled guides (10, 10a) are inserted in small channels formed in the corresponding walls (60) of the furniture so as to be flush with the said walls (60).
3. System according to the Claims 1 or 2, characterized in that the telescopic pins (30) consist of a first solid cylinder (32) of smaller diameter inserted in a cylindrical cavity (36), having a substantially similar diameter, of a second cylinder (34) of larger diameter, and a resilient means (38) inserted between the first cylinder (32) and the cylindrical cavity (36) so as to allow expansion of the first cylinder (32) with respect to the second cylinder (34).
4. System according to Claim 3, characterized in that the resilient means consists of a helical spring (38) inserted between a narrow relief (40) on the internal end of the first solid cylinder (32) and a similar relief (42) projecting from the bottom of the cylindrical cavity (36) of the second cylinder (34) of larger diameter.
5. System according to Claims 3 or 4, characterized in that the second cylinder (34) of larger diameter comprises, at the external end, an expanded collar (44) having a diameter greater than that of the cylinder itself (34) so as to allow improved seating and anchoring thereof.

Patentansprüche

1. System zum Eingreifen und Lösen von gleitenden Lamellen (62) des verdeckten Types mit einer rechteckigen Form, wobei das System laterale rechtwinklige Führungen (10, 10a) und mindestens ein Paar von Stiften (30) aufweist, ein Paar für jede kürzere Seite der Lamelle (62), das Paar von Stiften (30) zum Lösen von einer entsprechenden der lateralen rechtwinkligen Führung (10, 10a) zurückziehbar ist, die Stifte (30) mit federnden Mitteln (38) versehen sind, dadurch gekennzeichnet,

daß die Stifte (30) ausziehbare Teleskopstifte sind, wodurch die federnden Mittel (38) das Ausziehen der Teleskopstifte für ihren Eingriff in die rechtwinkligen Führungen (10, 10a) sicherstellen,

daß das System eine Unebenheit (22) in der Form einer Rampe (24) aufweist, wodurch die Unebenheit (22) an dem inneren Ende des Bewegungspfad des rechtwinkligen Führung (10, 10a) vorgesehen sein kann, der den Boden der rechtwinkligen Führung (10, 10a) bedeckt und sich erstreckt, bis er mit der Außenseite der rechtwinkligen Führung (10, 10a) fluchtet.

2. System nach Anspruch 1, dadurch gekennzeichnet, daß die lateralen rechtwinkligen Führungen (10, 10a) in kleine Kanäle eingeführt sind, die in der entsprechenden Wand (60) des Möbelstückes so gebildet sind, daß sie mit den Wänden (60) fluchten.
3. System nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die Teleskopstifte (30) aus einem ersten massiven Zylinder (32) kleineren Durchmessers, der in einen zylindrischen Hohlraum (36) eingeführt ist mit einem im wesentlichen ähnlichen Durchmesser, aus einem zweiten Zylinder (34) größeren Durchmessers und einem federnden Mittel (38), das zwischen den ersten Zylinder (32) und den zylindrischen Hohlraum (36) so eingeführt ist, daß die Ausdehnung des ersten Zylinders (32) in Bezug auf den zweiten Zylinder (34) möglich ist, bestehen.
4. System nach Anspruch 3, dadurch gekennzeichnet, daß das federnde Mittel aus einer Schraubenfeder (38) besteht, die zwischen eine kleine Unebenheit (40) auf dem inneren Ende des ersten massiven Zylinders (32) und einer ähnlichen Unebenheit (42), die von dem Boden des zylindrischen Hohlraumes (36) des zweiten Zylinders (34) größeren Durchmessers vorsteht, besteht.
5. System nach Ansprüchen 3 oder 4, dadurch gekennzeichnet, daß der zweite Zylinder (34) größeren Durchmessers an dem externen Ende einen erweiterten Kragen (44) mit einem Durchmesser größer als der des Zylinders (34) selbst aufweist, so daß ein verbesserter Sitz und Verankerung davon ermöglicht werden.

Revendications

1. Système, du type dissimulé, pour mettre en prise et libérer des battants coulissants (62) ayant une forme rectangulaire, le système comportant des gui-

des latéraux à angle droit (10, 10a) et au moins deux paires d'axes (30), une paire pour chaque côté plus petit du battant (62), lesdites paires d'axes (30), en utilisation, pouvant être rétractées pour se dégager d'un guide latéral à angle droit correspondant (10, 10a), les axes (30) étant munis de moyens élastiques (38),
caractérisé en ce que,

lesdits axes (30) sont des axes pouvant s'étendre de manière télescopique de sorte que leurs moyens élastiques (38) assurent l'agrandissement des axes télescopiques pour leur mise en prise avec lesdits guides à angle droit (10, 10a),

le système comportant en outre au moins une partie en relief (22) ayant la forme d'une rampe (24), et dans lequel ladite partie en relief (22) peut être agencée à l'extrémité intérieure du trajet de déplacement dudit guide à angle droit (10, 10a) en occupant le fond dudit guide à angle droit (10, 10a), et s'étendant jusqu'à affleurer l'extérieur dudit guide à angle droit (10, 10a).

2. Système selon la revendication 1, caractérisé en ce que les guides latéraux à angle droit (10, 10a) sont insérés dans des petits canaux formés dans les parois correspondantes (60) du meuble de manière à affleurer lesdites parois (60).
3. Système selon la revendication 1 ou 2, caractérisé en ce que les axes télescopiques (30) sont constitués d'un premier cylindre plein (32) de diamètre plus petit inséré dans une cavité cylindrique (36), ayant un diamètre sensiblement similaire, d'un second cylindre (34) de diamètre plus grand, et de moyens élastiques (38) insérés entre le premier cylindre (32) et la cavité cylindrique (36) de manière à permettre un allongement du premier cylindre (32) par rapport au second cylindre (34).
4. Système selon la revendication 3, caractérisé en ce que les moyens élastiques sont constitués d'un ressort hélicoïdal (38) inséré entre une partie étroite en relief (40) située sur l'extrémité intérieure du premier cylindre plein (32) et une partie en relief similaire (42) faisant saillie à partir du fond de la cavité cylindrique (36) du second cylindre (34) de diamètre plus grand.
5. Système selon la revendication 3 ou 4, caractérisé en ce que le second cylindre (34) d'un diamètre plus grand comporte, à l'extrémité extérieure, un collier expansé (44) ayant un diamètre plus grand que celui du cylindre lui-même (34) de manière à permettre un appui et un ancrage améliorés de celui-ci.

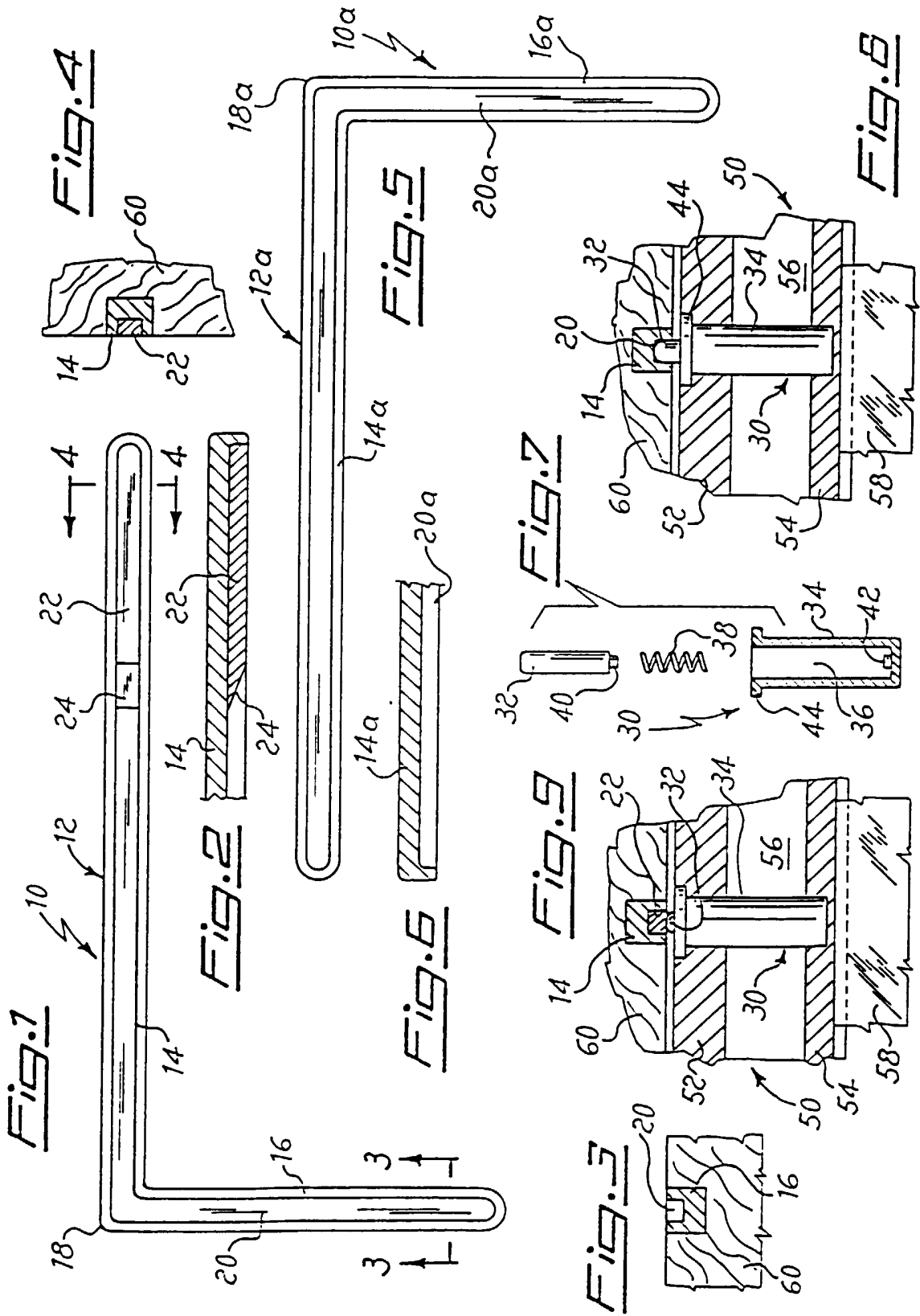


Fig.10

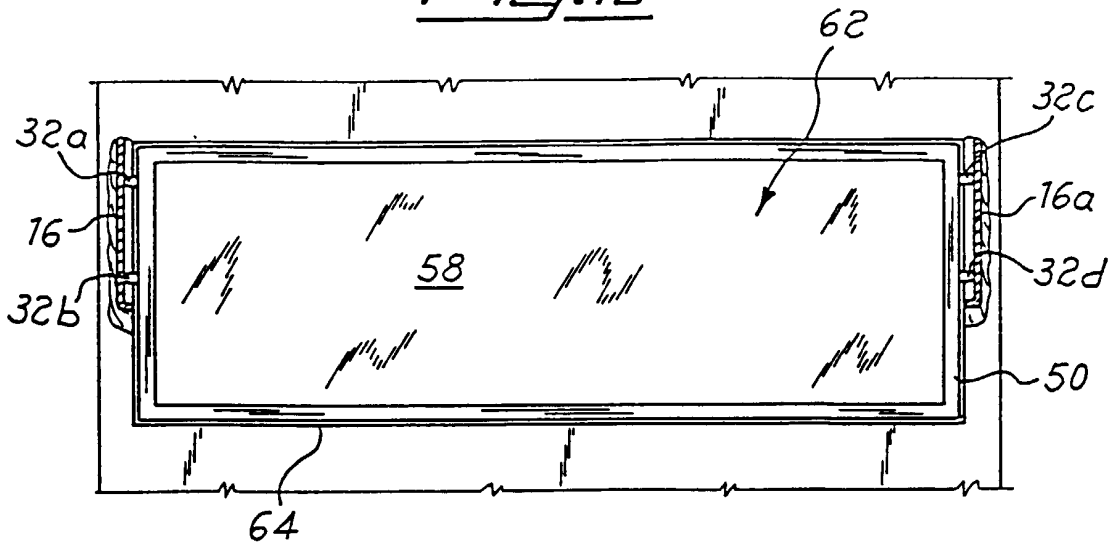


Fig.11

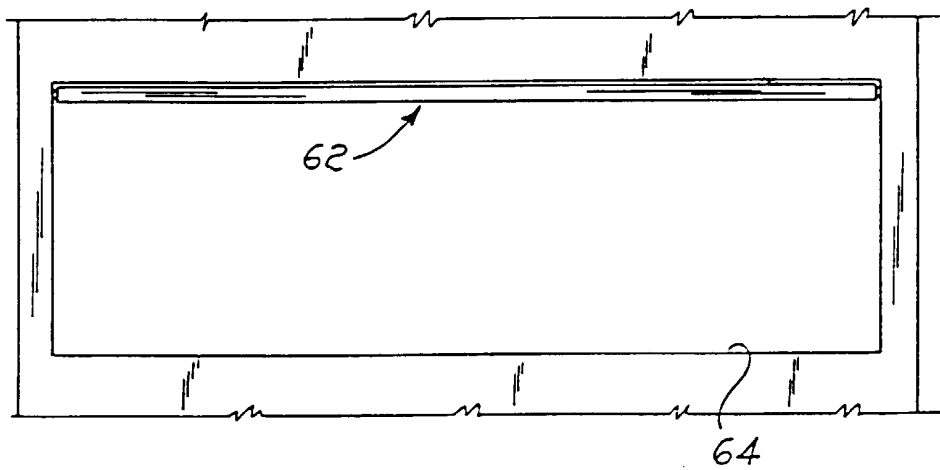


Fig.12

