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(54) Security closure

(57) A security closure for closing a door or window opening in a building is disclosed. The closure comprises a panel of sheet material having an outer face and an inner face for facing the opening to be closed. The panel carries one or more mounting means. Attached to each mounting means is a respective one or more connecting elements for anchoring to the surround or frame

of the opening. Tensioning of the anchored one or more connecting elements will pull the panel against the opening. The mounting means, via which the one or more connecting elements are attached to the panel, comprises one or more respective mounting studs mounted on and protruding inwardly from only the inner face of the panel.

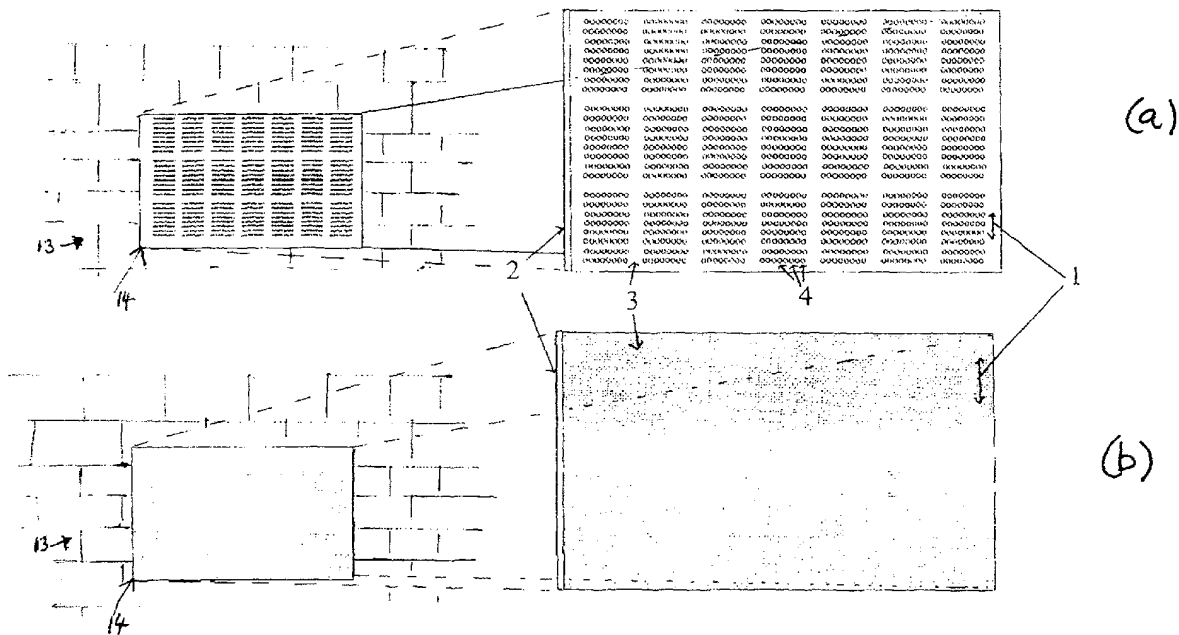


Fig. 1

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Description

[0001] This invention relates to a security closure, more particularly to a security closure for closing a door, window or like opening in unoccupied premises such as a building or portable like structure.

[0002] Commercial and residential premises that remain unoccupied for periods of time, for example during renovation or between tenancies, are prone to being broken into and thereby liable to theft and vandalism. The doors, windows and like openings are of course the easiest targets for entry and hitherto there have been many attempts to provide security closures of one kind or another to seal such openings against such unauthorised entry.

[0003] In recent years, there have been several attempts at security closures that improve on the simple use of wooden or reinforced panels, which are simply nailed or screwed in place to the frame of a door, window or other opening as a means of sealing it. For example:

[0004] GB-A-2160248 discloses a security closure comprising a panel having peripherally extending sidewalls with inwardly turned rim portions which captively retain the end portions of at least two elongate support members so as to permit lateral sliding movement of the support members in a direction parallel to the opposed sides, whilst restraining them against movement perpendicular to the plane of the panel. At least two spaced apart elongate connectors, eg. screws, are used to connect the support members to anchor means, eg. elongate bars, which have a length not substantially less than the length or width of the panel.

[0005] GB-A-2045321 proposes a flat security panel for a window opening, there being provided around the edges of the panel clips to which are connected wires which are used to pull the panel rearwardly against the window frame and secure it there.

[0006] GB-A-2208171 discloses another system involving security panels, but in which the panel has a peripheral flange with a rim. A connector, e.g. a wire or a strip of metal, is connected to the peripheral flange, again for use in pulling the panel tightly against the outside of the window frame.

[0007] Another example of a security closure for a window or door opening in a building is shown in EP-A-0496616. Here the disclosed system involves the use of a panel having a plurality of apertures formed in the peripheral region thereof, through each of which is passed the shank of a bolt or pin whose blank head abuts the outer surface of the panel and whose inwardly extending shank is then secured in place and has attached to it a connecting member such as a flexible wire or tape, whose other end is anchored after passing through an aperture in the window or door frame or surround or an anchor bar bearing against the inside face thereof. Once the system is assembled, tensioning and anchoring of the connecting member again draws the panel securely against the outside of the window or door

frame opening.

[0008] Whilst at least some of the above known examples of panel-based security closures provide a reasonable level of security in certain circumstances, they are all somewhat expensive and time-consuming to manufacture and install. Moreover, and more importantly, the level of security they are able to provide against unauthorised or forced entry from the outside is often limited, because they all rely in some manner on essential fixtures being exposed to the outside surface of the panel, thereby leaving them vulnerable to tampering with or forced removal.

[0009] It is therefore an object of the present invention to provide a more secure and reliable form of security closure incorporating a security closure panel, which avoids or ameliorates the shortcomings of the prior art systems described above.

[0010] Accordingly, in a first aspect the invention provides a security closure for closing a door or window opening in a building, comprising a panel of sheet material having an outer face and an inner face for facing the opening to be closed, the panel carrying one or more mounting means and having attached thereto a respective one or more connecting elements for anchoring to the surround or frame of the opening, whereby tensioning of the anchored one or more connecting elements will pull the panel against the opening, wherein the mounting means *via* which the one or more connecting elements are attached to the panel comprise one or more respective mounting studs mounted on and protruding inwardly from only the inner face of the panel.

[0011] Thus, according to the invention, the means by which the one or more connecting elements are attached to the panel comprise one or more respective mounting studs which do not pass through apertures formed in the body of the panel from its outer face to its inner face, but instead are mounted merely on its inner face, leaving no part of the mounting studs protruding from or accessible from the outer face of the panel.

Moreover, the panel of such a barrier can be contained within the reveal of a door or window, rather than on the surface of a surrounding wall. This reduces the need to provide a heavily reinforced barrier structure, as is the case with most known barriers. The nature of a barrier embodying the invention is such that a barrier can be constructed on-site, shaped and sized to a particular door or window.

[0012] In other words, according to the invention, the outer face of the panel has a flush external finish and the one or more mounting studs, to which are attached the respective one or more connecting elements for securing the panel against the opening, are accessible only from the inner face of the panel, i.e. from inside the opening when the closure is in place. Thus, a significantly enhanced degree of security is afforded, since the mounting studs are inaccessible from the panel's outer face, unlike the closures of the prior art.

[0013] In a second aspect of the invention there is pro-

vided a security panel for forming a security closure of the first aspect of the invention, comprising a panel of sheet material having an outer face and an inner face, there being mounted on and protruding inwardly from only the inner face of the panel the one or more mounting studs for attachment thereto of a respective one or more connecting elements for anchorage to the surround or frame of the opening to be closed.

[0014] In a third aspect of the invention there is provided a method of closing for security purposes a door or window opening in a building, comprising providing a security panel according to the second aspect of the invention, attaching to a respective mounting stud one end of a respective connecting element, anchoring the opposite end of the respective connecting element to the surround or frame of the opening (which latter step may be either before or after the previously recited step), tensioning the one or more respective connecting elements so as to pull the panel against the opening, and locking the said connecting element in its tensioned position, whereby the opening is securely closed by the panel.

[0015] In preferred embodiments of the present invention, the panel is preferably of sheet metal, e.g. steel. It may be in the form a continuous solid sheet or alternatively it may be formed with one or more arrays of perforations (e.g. polygonal or circular) extending through its structure from its outer face to its inner face. Such array(s) of perforations may usefully serve to allow light into the building or other space into whose window, door or other opening the closure is mounted, provided they do not detract to any significant extent from the structural integrity and strength of the panel itself.

[0016] The mounting studs on the inner face of the panel may take any of a variety of forms. Depending on the form of the mounting studs in any particular example, the connecting elements may likewise take a variety of forms.

[0017] Taking firstly the one or more mounting studs, these may each preferably be selected from: (i) a straight-sided cylindrical bolt or pin having a transverse aperture, (ii) a bolt or pin having a cylindrical externally threaded shank, or (iii) a cylindrical collar or nut having an internally threaded bore.

[0018] Corresponding to each of the above possibilities for the mounting studs, the connecting elements for attachment to the mounting studs may preferably be selected from, respectively: (i) a flexible wire, cable, tape or strap (e.g. a galvanized steel multi-strand wire, cable, tape or strap) for insertion into and optionally clamping by the transverse aperture in the mounting stud, (ii) a rigid or semi-rigid bar, pin or hook for insertion into the transverse aperture as in (i) above, (iii) a connecting rod or bar having an internally threaded end collar or nut for screw connection onto the externally threaded shank of the bolt or pin, or (iv) a rod or bar having at least an end portion which is externally threaded for screw connection into the internally threaded bore of the collar or nut

of the mounting stud.

[0019] Thus, various permutations of mounting stud type and connecting element type are possible in various preferred embodiments according to the invention.

[0020] Very important to the present invention is the fact that the one or more mounting studs are mounted on just the inner face of the panel; extending inwardly from it without substantially extending into the main structure of the panel towards its outer face. In practical embodiments of the invention the one more mounting studs are mounted on the panel at the appropriate desired locations by means of welding, e.g. capacitor discharge welding or bonding. This technology is well known and the materials and equipment for performing it are readily available commercially. The mounting studs are thus preferably of a material which is compatible with the material of the panel itself to allow their attachment thereto by the preferred welding technique.

[0021] In practical examples of the security closure of the invention the number and positioning of the mounting studs will be selected appropriately to provide optimum strength and security to the space to be secured, depending for example on its size, shape and position in the building in question. At the same time, where the connecting elements are to pass through holes made directly in the surround or frame of the window or door or other opening to be sealed, the positioning of those holes and the corresponding mounting studs on the panel will be matched accordingly.

[0022] In practical embodiments of the invention each connecting element is anchored to the interior of the window, door or other opening using any of a variety of anchoring means which also preferably serve as tensioning means to enable the connecting element to be tightened up to draw the panel against the exterior of the window or door frame.

[0023] In the case of a wire, cable, tape or strap as the or each connecting element, it preferably passes through an aperture drilled through the window or door frame or surround, and its anchoring means preferably comprises a ratchet or other tensioning device. Examples of suitable ratchet-operated mechanisms for the tightening of such wires or straps are widely known.

[0024] In contrast, in the case of a threaded rod for example as the connecting element, a simple locking nut, with or without an associated locking washer, may be used to the same effect.

[0025] As an alternative to the connecting element(s) being anchored directly against the window or door frame, it may be more preferable for there to be provided between the anchoring means and the window or door frame one or more anchor bars, of a length not substantially less than the height or width of the panel, and which, when the closure is in place, bear against the wall of the building adjacent the window or door frame. The respective anchor bars therefore preferably have one or more respective appropriately positioned apertures therein through which pass the respective connecting

elements. In a typical practical example there may be provided two such anchor bars located on opposite sides of the opening to be sealed.

[0026] Various preferred embodiments of the present invention will now be described in detail, by way of example only, with reference to the accompanying drawings, in which:

Figures 1(a) and 1(b) are exploded external views of a security closure according to any of the preferred exemplary embodiments fitted into a window opening of a building, as seen from the exterior thereof, the two Figures 1 (a) and 1 (b) showing two alternative forms of the security panel;

Figure 2 is a schematic exploded sectional/perspective view of a first exemplary embodiment of security device according to the invention, showing a first combination of connecting elements and anchoring means by which the panel is secured in place against the window opening;

Figures 3 (a) - (f) are side views of a variety of different mounting studs suitable for use in the closure system of the invention;

Figure 4 corresponds to Figure 2, showing a similar but second exemplary embodiment of security device according to the invention, utilising a slightly different combination of connecting elements and anchoring means from that shown in Figure 2, by which the panel is secured in place against the window opening; and

Figure 5 corresponds to Figure 2, but shows a third exemplary embodiment of security device according to the invention, utilising a third combination of connecting elements and anchoring means by which the panel is secured in place against the window opening.

[0027] Referring firstly to Figure 1, here there is shown a wall 13 of a building having a window opening 14 therein, which is closed and sealed by a security panel 1 within the window reveal, in accordance with the invention. The panel 1 is dimensioned such as to substantially completely fill the window opening 14. The panel 1 has rear and front faces 2,3 (respectively), with the front face 3, in accordance with the main object of the invention, having no exposed parts of the components by which the closure is mounted and secured in the window opening 14.

[0028] The panel 1 itself may either be a continuous, unperforated solid panel of sheet steel, as shown in Figure 1(b), or alternatively, as shown in Figure 1(a), it may have formed therein an array of through-holes or apertures 4 extending between its front and rear faces, which, whilst not compromising the structural rigidity

and strength of the panel, allow light and air ventilation into the building via the window opening 14 which is nevertheless closed and sealed by the panel.

[0029] Figure 2 shows one example of the connecting elements and associated anchoring/tensioning means which can be used in the system of Figure 1. Using known capacitor discharge welding technology, there are welded to the inside face 2 of the panel 1 a series of mounting studs 9, so that these studs are mounted on, and only extend inwardly from, the inner face 2 of the panel 1, leaving the outer face 3 of the panel flat within the window reveal and without any exposed parts of the closure means which could be liable for tampering with or vandalism.

[0030] Each mounting stud 9 is formed with a transverse aperture 9a, through which is threaded a respective connecting element in the form of an elongate, flexible galvanised steel wire or tape 5. The wires or tapes 5 pass through respective apertures 18 pre-drilled in the frame or surround 13 of the window, avoiding the glass and thus allowing the holes 18 to be plugged upon removal of the closure device, thereby leaving the window structure "as good as new". In alternative embodiments, a rigid or semi-rigid hooks or pins may be provided to pass through the apertures 18 as an alternative to the wires or tapes 5.

[0031] For the purpose of anchoring and tensioning the connecting wires or tapes 5 on the interior side of the window opening 14, there are provided respective ratchet tensioning devices 28 associated with each wire or tape 5. For this example, there are further provided intermediate the window opening 14 and the ratchet tensioning devices 28 a pair of lateral anchor beams, e.g. of a U-shaped cross-section metal formation, one to each side of the window opening 14, through respective apertures 27a in which pass the respective wires or tapes 5. The upper and lower end portions of the anchor beams 15 abut the wall portions 16 immediately above and below the window opening itself when the closure is finally mounted in position.

[0032] Thus, with the assembly complete as shown in Figure 2, as the ratchet tensioning devices 28 are operated to tighten the connecting wires or tapes 5, the panel 1 is drawn towards the window opening 14 and into secure abutment therein/thereagainst, with the ratchet tensioning devices 28 locking the arrangement in the resulting locked and secure condition.

[0033] Figures 3 (a) - (f) show a variety of different exemplary forms of mounting studs for use in embodiments of the invention. Figure 3(a) shows a mounting stud in the form of an externally threaded bolt or pin 10, for use particularly with a connecting element having an internally threaded end sleeve or collar portion. Figures 3(c) and (d) are variants of this, illustrating different head formations via which the studs are welded to the inner face 2 of the panel 1. Figure 3(b) shows a different type of stud, for use particularly with a connecting element in the form of a flexible wire or tape, which has a transverse

hole 9a formed in the shank thereof, through which can be threaded and secured an end of the wire or tape element. If necessary, the wire or tape 5 may be provided with a crimped or enlarged end portion for preventing its release from the aperture 9a when secured therein. Figure 3(f) shows an alternative but corresponding stud to that of Figure 3(b). Figure 3(e) shows yet another form of stud, this one 11 comprising an internally threaded central bore 26 for cooperative attachment to the threaded end of a rod or bar forming the connecting element of the closure system.

[0034] Figure 4 shows a modified arrangement very similar to that shown in Figure 2, in which a window frame 23 has a hole 18 bored through it on either side thereof, but in which arrangement there is only a single wire, tape or strap 24 attached to a given mounting stud 9 on either side of the panel 1. As in Figure 2, the top and bottom ends of an anchor bar 27 on each side of the window or door opening 17 abut the upper and lower wall sections 23 adjacent the window or door opening 17, the anchor bar being formed with an aperture 27a for accommodating the wire, tape or strap 24 which passes therethrough before engaged by tensioning device 28 and intermediate washer 20. In this example, the end 25 of the wire, tape or strap 24 may additionally be formed with a crimped end portion or sleeve to assist its retention in the aperture 9a of the mounting stud 9.

[0035] Figure 5 shows a further variation on the basic idea, this time using a different combination of mounting stud and connecting device, although the functional principle remains the same. Here each mounting stud is in the form of an internally threaded sleeve 11 (Figure 3(e)) with each connecting element being in the form of an elongate externally threaded rod 22. The rod 22 again passes through a hole 18 drilled in the frame or surround 23 of the window or door opening 13, and as in the previous examples, on each side of the opening there is provided an anchor bar 27 for securing the closure in position in the opening. In this example the mounting studs 11 are again mounted as and when required at the correct desired locations on the panel 1 by capacitor discharge welding, and the respective threaded connecting rods 22 are then attached thereto. (As shown for illustration only in Figure 5, in the case where the mounting stud were for instance to be an externally threaded bolt or pin, and the end portion of the rod an internally threaded sleeve, an optional locking washer 21 (e.g. of plastics material or metal) could be used to assure a tight connection between the two.)

[0036] Having been passed through the apertures 27a in the respective anchor bars 27, the connecting rods 22 are anchored in place and tensioned by means of a simple nut 19, with associated locking washer 20 (e.g. of plastics material). Tightening of these assembled components thus draws the panel 1 into engagement with the window or door opening 17, as already described.

[0037] It can be seen that the closure exemplified by

the above described illustrative examples is very simple to manufacture and use and can be made relatively inexpensively. The closure system of the invention has great flexibility and can secure windows of any width, in practice up to about 1m or more for example, in a wall of any thickness. The components can be made to be all re-usable many times over and can be replaced individually in any given set-up.

[0038] It is to be understood that the above description of preferred embodiments of the invention, in particular the component parts of the closure system, has been by way of a non-limiting example only, and various modifications may be made from what has been specifically described and illustrated whilst remaining within the scope of the invention as claimed.

Claims

1. A security closure for closing a door or window opening in a building, comprising a panel of sheet material having an outer face and an inner face for facing the opening to be closed, the panel carrying one or more mounting means and having attached thereto a respective one or more connecting elements for anchoring to the surround or frame of the opening, whereby tensioning of the anchored one or more connecting elements will pull the panel against the opening, wherein the mounting means *via* which the one or more connecting elements are attached to the panel comprise one or more respective mounting studs mounted on and protruding inwardly from only the inner face of the panel.
2. A security closure according to claim 1 in which each connecting element is anchored to the interior of the window, door or other opening using any of a variety of anchoring means.
3. A security closure according to claim 2 in which each anchoring means also serves as a tensioning means to enable the connecting element to be tightened up to draw the panel against the exterior of the window or door frame.
4. A security closure according to claim 2 or claim 3, in which a connecting element is one of a wire, cable, tape or strap, the connecting element passes through an aperture drilled through the window or door frame or surround.
5. A security closure according to claim 4 in which the anchoring means comprises a ratchet or other tensioning device.
6. A security closure according to claim 2 or claim 3, in which a connecting element is a threaded rod, a locking nut, with or without an associated locking

washer, may be used to as the anchoring means.

7. A security closure according to any preceding claim having a connecting element anchored directly against the window or door frame. 5
8. A security closure according to any preceding claim having one or more anchor bars provided between the anchoring means and the window or door frame, of a length not substantially less than the height or width of the panel, and which, when the closure is in place, bears against the wall of the building adjacent the window or door frame. 10
9. A security closure according to claim 8 in which the respective anchor bars have one or more respective appropriately positioned apertures therein through which pass the respective connecting elements. 15
10. A security closure according to claim 8 or claim 9 having two such anchor bars located on opposite sides of the opening to be sealed. 20
11. A security panel for forming a security closure according to any preceding claim comprising a panel of sheet material having an outer face and an inner face, there being mounted on and protruding inwardly from only the inner face of the panel the one or more mounting studs for attachment thereto of a respective one or more connecting elements for anchorage to the surround or frame of the opening to be closed. 25
12. A security panel according to claim 11 being of sheet metal. 30
13. A security panel according to claim 12 in which the sheer is: 35
- a. in the form of a continuous solid sheet; or
 - b. formed with one or more arrays of perforations extending through its structure from its outer face to its inner face. 40
14. A security panel according to any one of claims 11 to 13 in which the one or more mounting studs, these may each preferably be selected from: 45
- a. a straight-sided cylindrical bolt or pin having a transverse aperture, 50
 - b. a bolt or pin having a cylindrical externally threaded shank, or 55
 - c. a cylindrical collar or nut having an internally threaded bore.
15. A security panel according to claim 14, corresponding to each of the defined configuration for the mounting studs, the connecting elements for attachment to the mounting studs are respectively:
- a. a flexible wire, cable, tape or strap, a rigid or semi-rigid bar, pin or hook for insertion into and optionally clamping by the transverse aperture in the mounting stud,
 - b. a connecting rod or bar having an internally threaded end collar or nut for screw connection onto the externally threaded shank of the bolt or pin, or
 - c. a rod or bar having at least an end portion which is externally threaded for screw connection into the internally threaded bore of the collar or nut of the mounting stud.
16. A security panel according to any one of claims 11 to 15 in which one or more mounting studs are mounted on just the inner face of the panel, extending inwardly from it without substantially extending into the main structure of the panel towards its outer face.
17. A security panel according to any one of claims 11 to 16 in which one more mounting studs are mounted on the panel at the appropriate desired locations by means of welding.
18. A method of closing for security purposes a door or window opening in a building, comprising providing a security panel according to the second aspect of the invention, attaching to a respective mounting stud one end of a respective connecting element, anchoring the opposite end of the respective connecting element to the surround or frame of the opening (which latter step may be either before or after the previously recited step), tensioning the one or more respective connecting elements so as to pull the panel against the opening, and locking the said connecting element in its tensioned position, whereby the opening is securely closed by the panel.

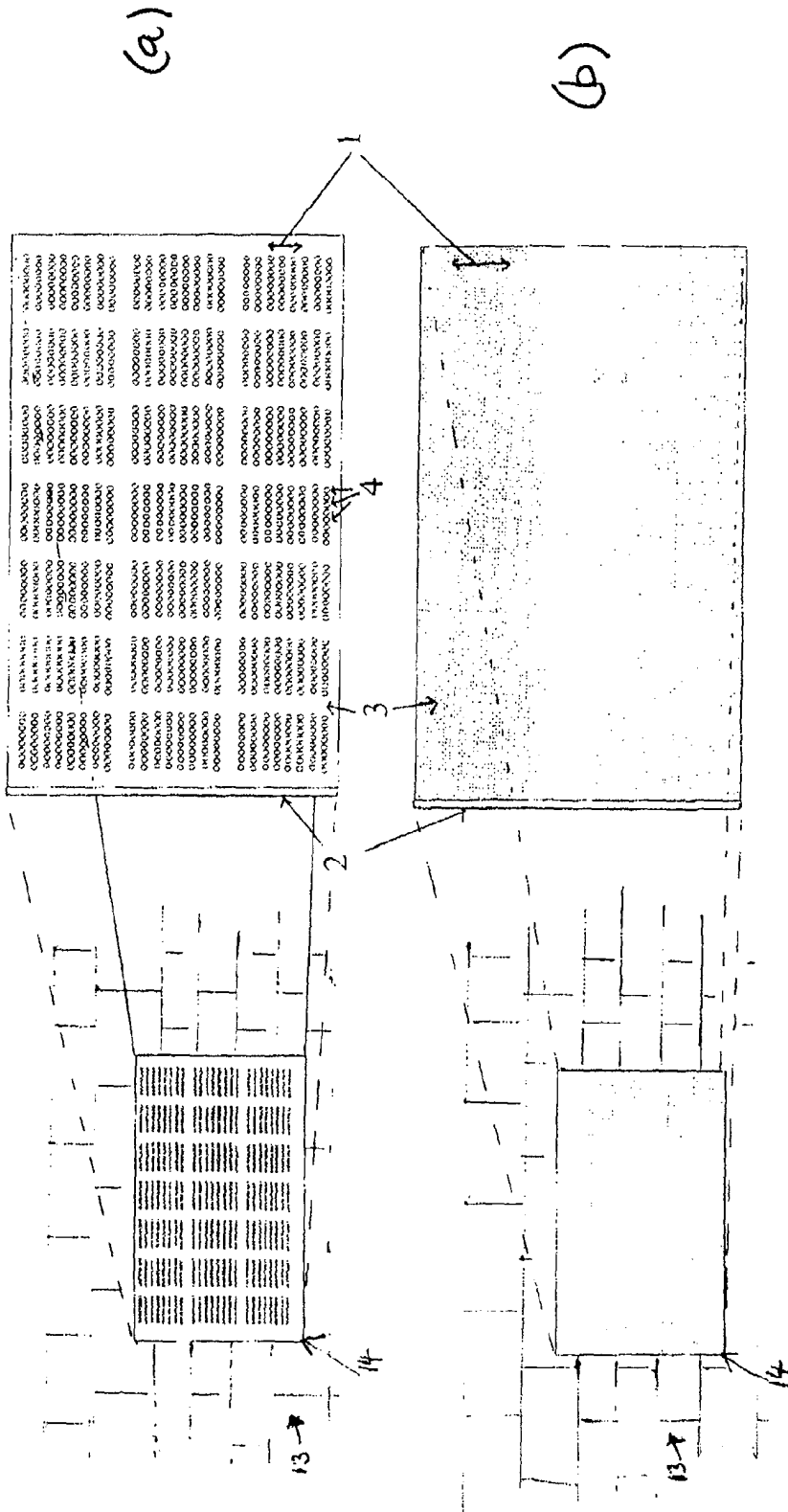


Fig. 1

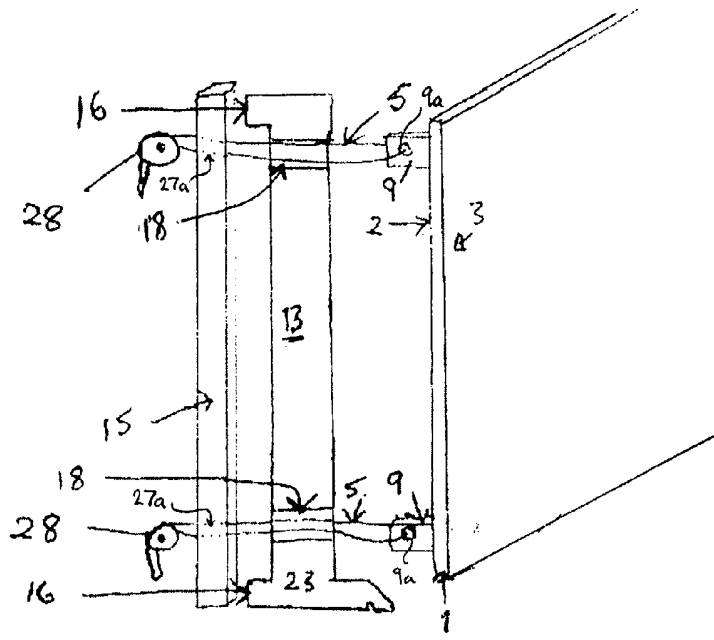


Fig. 2

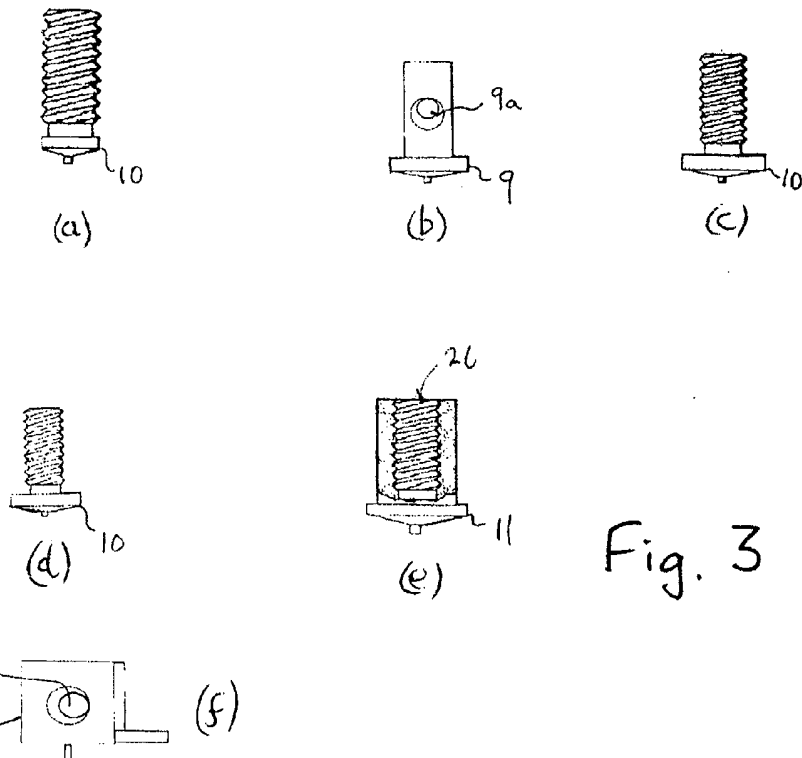


Fig. 3

Fig. 5

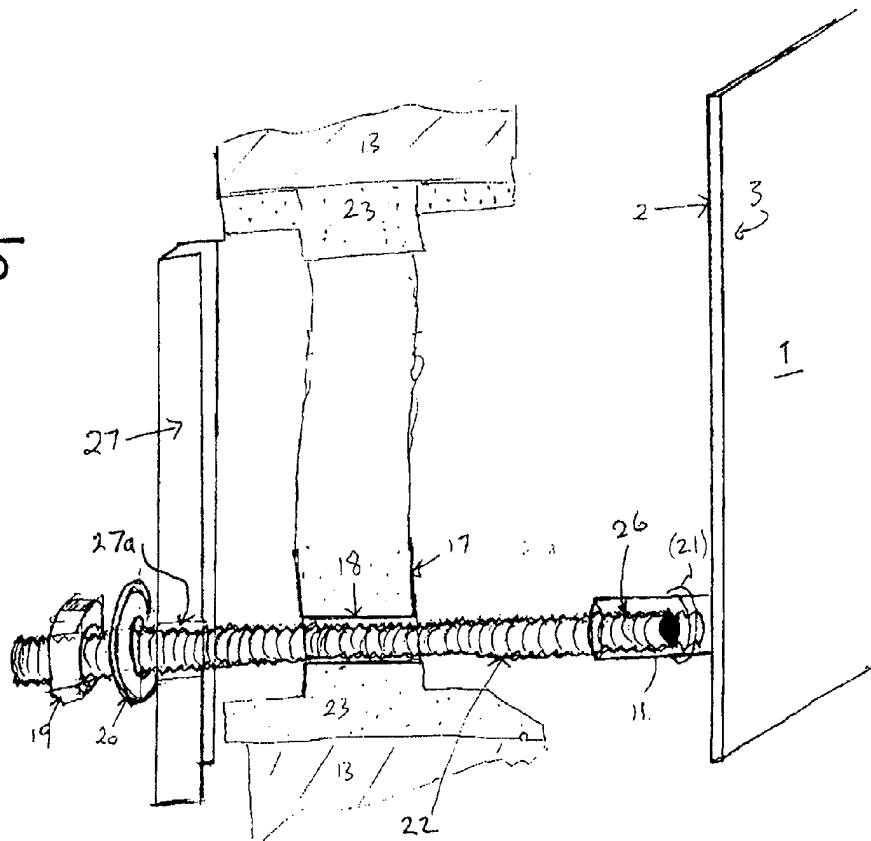


Fig. 4

