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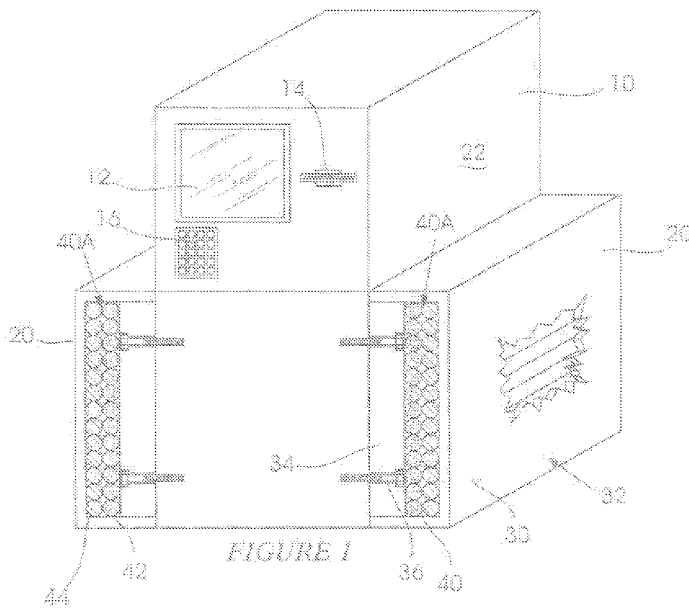
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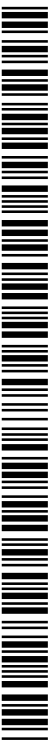
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(54) Title: PROTECTION OF A SAFE



(57) Abstract: A protective device for a safe which includes at least first and second containers in close proximity with each other, wherein the first and second containers respectively hold first and second agents which, when released from the containers and in contact with each other interact to hinder unauthorised access to the safe.



PROTECTION OF A SAFEBACKGROUND OF THE INVENTION

[0001] This invention relates to the protection of a safe against attack e.g. by a potential thief or thieves.

5 [0002] As used herein the word "safe" includes a conventional safe, a protected enclosure in an ATM (automatic teller machine), a cash box, a strong room, a cubicle, or any equivalent device used for the safeguarding of valuables.

[0003] An unfortunate consequence of today's life is that ATMs and other money dispensing machines are subject to attack by the use of increasingly aggressive
10 means. For example the use of cutting torches, angle grinders and the like is fairly standard. A further development has been the use of explosives to blast a path open into an interior of an ATM.

[0004] The protection of an ATM can be a demanding exercise. Access to the ATM must be possible, in a user-friendly manner, so that persons can legitimately use the
15 facilities of the ATM. Armouring systems and high level protection arrangements can interfere with this access. A further factor is that the ATM must be accessible by authorised personnel for service, refilling and similar operations. Also, if an ATM has already been installed, then it is desirable to be able to upgrade the security of the ATM without engaging in major construction works.

20 [0005] It is an object of the present invention to provide a protective device which addresses at least to some extent the aforementioned aspects.

SUMMARY OF INVENTION

[0006] The invention provides a protective device for a safe which includes at least first and second containers in close proximity with each other, wherein the first and second containers respectively hold first and second agents which, when released, 5 from the containers and in contact with each other, interact to hinder unauthorised access to the safe.

[0007] Preferably the first and second agents, when in contact with each other, react with each other to form an adhesive-like and fast setting composition.

[0008] Use may be made of a plurality of the first containers and a plurality of the 10 second containers and each second container may be positioned to be adjacent at least one first container.

[0009] Preferably each first container and each second container is elongate and in the form of a tube. The containers are frangible and, typically are made from a plastics material or glass. These materials are given by way of example only, and 15 are non-limiting. Other materials can be used. The material which is used should be robust enough so that inadvertent breakage or fracture does not occur during normal conditions. However the containers should break readily, to release their respective contents, when subjected to attack.

[0010] Each agent should be able to flow freely under gravity action from its 20 respective container (when broken) so that the agents are thereby automatically and unavoidably caused to contact each other.

[0011] In a preferred configuration the containers are arranged in a first assembly comprising a first plurality of the first containers each of which contains the first agent and in a second assembly comprising a second plurality of the second containers

each of which contains the second agent. Preferably the first containers are in a first vertical or horizontal stack and the second containers are in a second vertical or horizontal stack, adjacent the first vertical or horizontal stack.

[0012] Other configurations of the containers and agents are possible. It is important in this respect to position the containers so that when a container containing a first agent is broken it is inevitable that a container containing a second agent will also be broken so that the first and second agents will thereby, unavoidably, be mixed or come into contact with each other.

[0013] In a preferred arrangement the protective device includes an enclosure in which the first and second containers are located and which is attachable to the safe.

[0014] The enclosure may have an inner side which is attachable to a wall or to a door of the safe and an outer side which is exposed. Use may be made of a fastening arrangement which is engageable with the enclosure and with the safe.

[0015] The protective device may include at least one armoured panel. The first and second containers may be positioned between the armoured panel and a surface of the safe.

[0016] Preferably the protective device includes a material which is applied in a fluent form to at least some of the first and second containers, inside the enclosure, and which is then allowed to set, thereby to bind the first and second containers together in position in the enclosure.

[0017] In one arrangement the protective device is attached to a door of the safe and is formed with a passage which extends between the containers and within which is located at least part of a mechanism, actuatable by a user, for locking the door.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] The invention is further described by way of examples with reference to the accompanying drawings in which:

Figure 1 schematically represents an ATM safe, to which is mounted a protective device according to the invention;

Figure 2 shows another type of protective device;

Figure 3 is a perspective view of a safe in an automatic teller machine to which is attached a protective device according to a variation of the invention;

Figure 4 is an exploded perspective view illustrating one way of making the protective device of Figure 3;

Figure 5 is a side view in cross-section of the protective device of Figure 3, detached from a safe door; and

Figure 6 schematically shows further possible variations of the invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

[0019] Figure 1 of the accompanying drawings illustrates components or parts of an ATM 10 which is of conventional construction. The ATM has a screen 12, a port 14 for a card reader and an outlet 16 for printed material. These aspects are known.

[0020] Protective devices 20 are secured to outer surfaces 22 of external walls of the ATM. Only two devices 20 are shown in Figure 1. This is exemplary only and non-limiting. In general terms the number of devices and the shape and configuration of each device can be varied to ensure that all vulnerable parts of the outer surfaces 22, which could be targeted in an attack on the ATM, are covered by the devices. It is important, however, to position the devices so that the facilities which provide for a user interaction and interface (the screen, card reader port and printer outlet) are not impaired and remain easily accessible.

[0021] Each device 20 includes an enclosure 30 with an outer wall 32 and an armoured inner wall 34. The inner wall 34 is preferably made from or otherwise includes an armoured panel 34 of an appropriate thickness, say from 10mm to 20mm. Fasteners 36 in the form of elongate bolts extend through holes in the inner wall 34 and through registering holes in a corresponding wall of the ATM to secure the plate 34 to the ATM.

[0022] The outer wall 32 is spaced from the inner wall 34 and a gap 40 is defined between opposing surfaces of the inner and outer walls.

[0023] The outer wall could also include an armoured panel or it could be made from any other appropriate tough and protective material. The invention is not limited in this regard.

[0024] The size of the gap 40 partly determines the volume of an enclosure 40A, between opposing surfaces of the outer and inner walls, which is occupied by a plurality of elongate tubular containers of a first kind 42 and of a second kind 44. Although the containers may be identical in appearance they are filled with different reactive agents. Thus each container 42 is filled with a type A agent or a first constituent of a foam material and each container 44 is filled with a type B agent or a second constituent of a foam material. Foam materials which are known in the art are chosen with properties which ensure that if the materials contact each other they mix and then react almost immediately to form an expanding foam composition which has considerable adhesive-like properties and which sets to form a hard composition in a few seconds.

[0025] The containers 42 and 44 are made from a suitable material, e.g. a plastics material such as PVC, or glass, which has adequate strength to ensure that each container holds its contents securely under normal conditions, but which, on the

other hand, is readily broken or fractured when subjected to a reasonable degree of pressure or shock.

[0026] In respect of each protective device 20 the interior 40A of the respective enclosure is filled with the containers. In Figure 1 the containers 42 are shown
5 arranged in a first array which extends vertically with one container 42 being positioned over another. These containers 42 lie side by side with the containers 44 which are similarly stacked. This is exemplary only and non-limiting e.g. the containers could be arranged in adjacent horizontally extending stacks. An objective in this regard is to ensure that the containers with the different agents are positioned
10 close to each other so that if one container which contains a first foam agent is fractured, during an attack, it is substantially unavoidable to prevent a second container which contains a second agent from being broken at more or less the same time.

[0027] The containers may also be arranged in an alternating configuration (not
15 shown) wherein the first containers containing the first agent, and the second containers containing the second agent, are staggered.

[0028] Typically an attack on an ATM is done using a drill, an angle grinder or a cutting torch. The outer wall 32 may provide substantial resistance to the attack but, if the wall is penetrated, as shown in Figure 1, the containers are immediately
20 exposed and are therefore vulnerable to fracture. If this occurs the type A constituent and type B constituent of the foam material mix and react with each other, and set in approximately two to three seconds. The mixed composition becomes rock hard in about ten or eleven seconds.

[0029] The mixed composition, prior to setting, has strong adhesive properties. Thus
25 the mixed foam will stick to whatever implement is being used to attack the enclosure

and will substantially hinder or even prevent operation of an implement such as a drill or angle grinder which is being used in an attack. The agents are partly combusted when exposed to a cutting torch but, nonetheless, react with each other and set, in the manner described.

5 [0030] The armoured panel 34, which inevitably will be covered with the set foam composition, presents a second line of defence to a physical attack on the ATM.

[0031] If an explosive were to be used to attack the protective device the foam composition would, again, be generated and substantially impede access to the interior of the ATM.

10 [0032] Other configurations of the protective device are possible. For example Figure 2 shows a protective device 20A which has an inner wall 34 made from armoured steel and an outer wall 32 which is similar to what has been described with reference to Figure 1. Within a space 40A between opposing surfaces of the walls 32 and 34, a plurality of plastic containers 52 are mounted. Each container includes a
15 compound arrangement 54 and 56. The arrangement 54 contains a type A constituent of a foam composition while the arrangement 56 contains a type B constituent of a foam composition. The containers are arranged in an alternating configuration.

[0033] A plate 60 abuts an inner surface of the outer wall 32. The plate has a
20 number of protrusions or spikes 62. If a physical attack is launched on the enclosure which results in force being applied to the plate 60 then if the plate is urged sufficiently towards the inner wall 34, the spike formations 62 penetrate the walls of the adjacent containers. In this way the type A and type B constituents of the foam composition are released from a plurality of the arrangements 54, 56 substantially
25 simultaneously and act, in unison, to impede the attack.

[0034] The formations 62 then facilitate fracturing of the containers.

[0035] Figure 3 is a perspective view of a safe 70 which includes a body 72 and a door 74. The safe may be installed in or form part of a housing in an ATM. Attached to the door is an enclosure 76 which is part of a protective device 78 according to a
5 different form of the invention. The protective device 78 has an outer surface 80 and, arranged on the outer face, are an escutcheon 82 which can accommodate a key, for the safe, in a conventional manner, a handle 84 used for opening or closing the safe door, as is known in the art, and a knob 86 for operating a combination lock, again as known in the art.

10 [0036] Aspects of the working of the safe which are conventional are not described herein. As stated an object of the present invention is to provide a mechanism for enhancing the security effectiveness of a safe i.e. to increase the ability of an ATM safe to withstand physical attack. As far as is possible, the safe is not physically altered.

15 [0037] Figure 4 illustrates, in an exploded perspective view, the construction of the protective device 78. The door 74 is shown uppermost in dotted outline. The construction of the door and its manner of working are not affected by the inventive principles described herein. The door is attached to the body 72 of the safe using appropriate hinges 88. In order to secure the protective device 78 to the door it is
20 preferred to remove the door 74 from the body 72 and then to construct the protective device, ideally under factory conditions.

[0038] The device 78 includes an enclosure 90 which is shaped with a base 92 and a wall 94, to correspond with the outline of the door.

[0039] An armoured panel 96 of a suitable thickness, eg. 10mm, and of a suitable grade, is placed snugly inside the wall 94 resting on the base 92. The armoured panel has a locating member 98 secured to it at a predetermined location. Three holes 100, 102 and 104 respectively extend through the locating member and the plate. Two locating tubes 106 and 108 respectively project upwardly from the locating member. These tubes are positioned overlying holes (not visible in Figure 4) which pass through the locating member and registering holes which are in the armoured plate.

[0040] A plurality of containers 110 and 112 are packed in a suitable configuration into the enclosure on top of the armoured plate. The possible configurations of the containers are, however, not limited to what has been described. The containers are similar to the containers 42 and 44 and hold agents, preferably foaming adhesive agents, as described.

[0041] The use of foaming agents is desirable for these materials are cost effective, readily available and produce reliable and predictable results. Other materials can however be used provided, of course, that when released from their containers, they interact to produce a composition which impedes further attack.

[0042] The containers 110 and 112, each with a different agent, are located so that if one container is broken it is more than likely that an adjacent container, holding a different agent, will practically simultaneously be broken as well.

[0043] Once the containers have been packed correctly into the enclosure 90 a settable material 114 is prepared and poured over an upper surface 116 of the packed containers. The settable medium may, for example, be a light cementitious screed, a lightweight foam or the like. The invention is not limited in this respect.

When the material has set it bonds to the containers 110 and 112 and ensures that the containers are held securely in position inside the enclosure 90.

[0044] Thereafter a cover plate 118 is placed over a smoothed outer surface 120 of the material 114. This plate has holes 122 and 124 which are respectively brought
5 into register with the locating tubes 106 and 108.

[0045] In Figure 4 the door 74 presents a surface 126 which, in use, is an inner surface of the door. An outer surface 128 of the door, not visible in Figure 4, faces downwardly. Welded to the outer surface 128 are two robust studs 130 and 132. The studs are more clearly shown in Figure 5.

10 [0046] The cover plate 118 is placed over the upper surface of the material 114 and the locating tubes 106 and 108 are passed through the holes 122 and 124. The cover plate is lightly welded to the wall 94 of the enclosure. The assembly is then positioned over the studs 130 and 132 which pass through the locating tubes 106 and 108 respectively and which then project slightly on the outer surface 80 of the
15 enclosure.

[0047] As is shown in Figure 5 the studs 130, 132 are then securely welded (134) to the armoured panel 96 at the outer surface 80. Subsequently, the welding on the outer surface is smoothed with a grinding machine. The enclosure is welded at its periphery (136) to the door 74.

20 [0048] The door can then be re-engaged with the body 72. A key for locking the door to the body of the safe can be passed through the escutcheon plate 82 and a registering passageway 82A. The handle 84 has a shaft 84A which extends through the assembly to the door. The knob 86 for the combination lock has a shaft 86A which, similarly, passes through the assembly to the door.

[0049] The protective device 78 effectively "thickens" the door 74. Thus the key which is passed through the escutcheon must be lengthened. The shafts 84A and 86A are also lengthened shafts so that the controls 84 and 86 are positioned on the outer surface of the protective device.

5 [0050] If a physical attack is launched on the door, typically, an angle grinder would be used. If the panel 96 is breached, it is unavoidable that the two different agents would be released and flow under gravity action from their respective containers. These agents, contacting each other, start foaming and then produce a highly adhesive mixture which adheres to a blade of an angle grinder and effectively
10 prevents its working. If an oxyacetylene torch is used to attack the door the respective agents which are released partly ignite and partly bond together. In each case a significant deterrent effect is achieved.

[0051] Figure 6 depicts an interior of a safe 198 and shows, schematically, that a plurality of protective devices 200A to 200N (depicted in dotted outline), each
15 generally of the kind described herein, could be positioned on inner and outer surfaces (202, 204) of walls 206, on a roof (208), or on a base (210) of the safe, to provide comprehensive protection for the safe.

[0052] One benefit of the approach described herein is that an existing door of a safe, e.g. of an ATM or similar enclosure, can be upgraded to be more resistant to
20 attack.

CLAIMS

1. A protective device for a safe which includes at least first and second containers in close proximity with each other, wherein the first and second containers respectively hold first and second agents which, when released
5 from the containers and in contact with each other, interact to hinder unauthorised access to the safe.
2. A protective device according to claim 1 wherein the first and second agents, when in contact with each other, react with each other to form an adhesive-like and fast setting composition.
- 10 3. A protective device according to claim 1 or 2 which includes a plurality of the first containers and a plurality of the second containers and wherein each second container is positioned to be adjacent at least one first container.
4. A protective device according to any one of claims 1 to 3 wherein each first container and each second container is elongate and in the form of a tube.
- 15 5. A protective device according to any one of claims 1 to 4 wherein the containers are arranged in a first assembly comprising a first plurality of the first containers each of which contains the first agent and in a second assembly comprising a second plurality of the second containers each of which contains the second agent.
- 20 6. A protective device according to claim 5 wherein the first containers are in a first vertical or horizontal stack and the second containers are in a second vertical or horizontal stack, adjacent the first vertical or horizontal stack.

7. A protective device according to any one of claims 1 to 6 which includes an enclosure in which the first and second containers are located and which is attachable to the safe.
8. A protective device according to claim 7 wherein the enclosure is attachable to an inner or outer surface of the safe.
9. A protective device according to claim 7 or 8 wherein the enclosure has an inner side which is attachable to a wall or to a door of a safe and an outer side which is exposed.
10. A protective device according to any one of claims 7 to 9 which includes a fastening arrangement which is engageable with the enclosure and with the safe.
11. A protective device according to any one of claims 7 to 10 wherein the enclosure includes at least one armoured panel.
12. A protective device according to claim 11 wherein the first and second containers are positioned between the armoured panel and a surface of the safe.
13. A protective device according to any one of claims 7 to 12 wherein a passage extends between the containers and a part of a mechanism, actuable by a user for locking a door of the safe, is locatable in the passage.
14. A protective device according to any one of claims 7 to 13 which includes a material which is applied in a fluent form to at least some of the first and second containers, inside the enclosure, and which is then allowed to set, thereby to bind the first and second containers together.

15. A safe which includes at least one protective device according to any one of claims 1 to 14 attached to a wall or to a door of the safe.

16. A method of protecting a safe which includes the steps of securing to a surface of the safe a first plurality of first containers each of which contains a first agent and a second plurality of second containers each of which contains a second agent, the agents being selected so that when released from the containers and in contact with each other they react to form an adhesive-like and fast setting composition which hinders access to the safe.

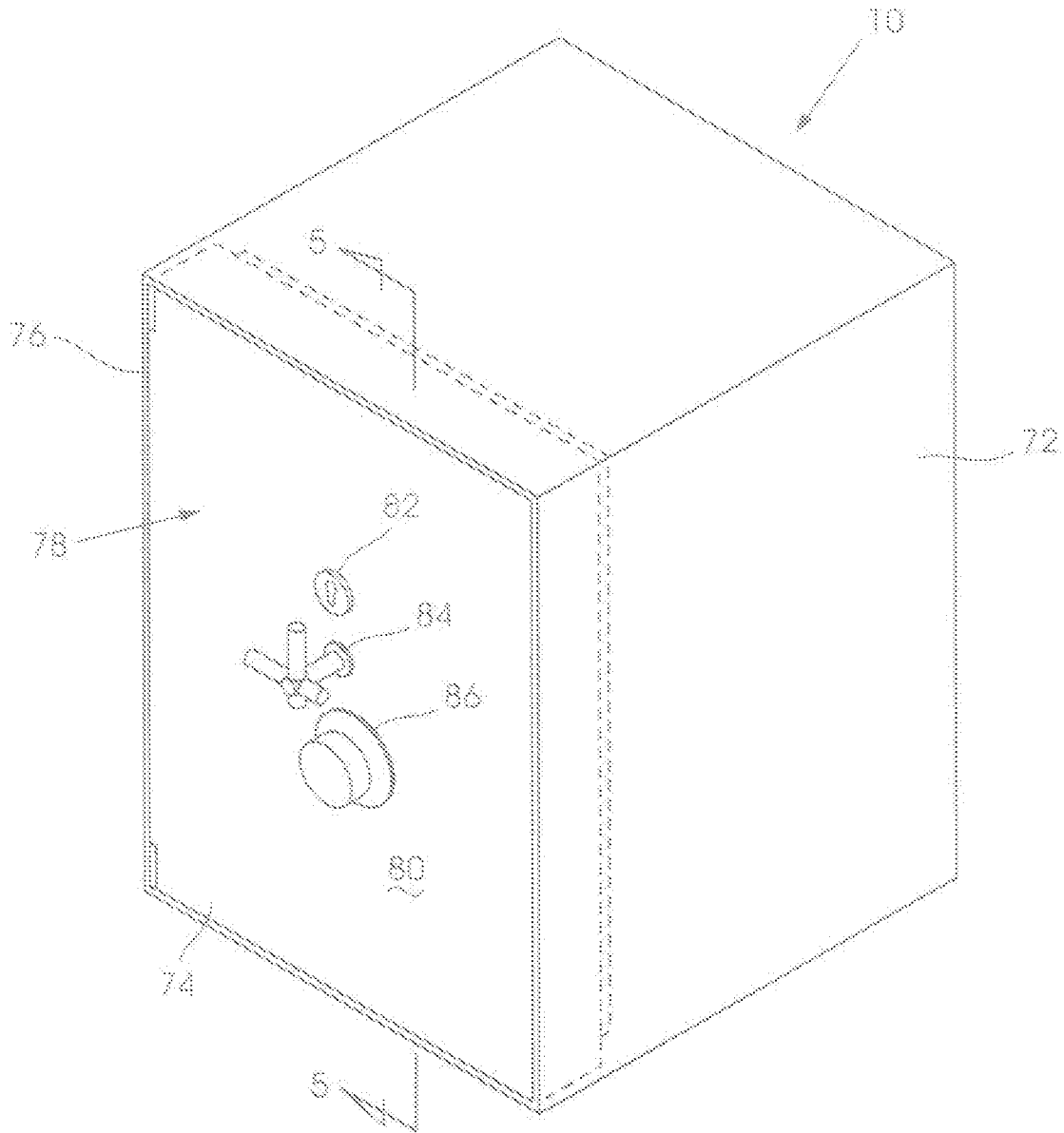


FIGURE 3

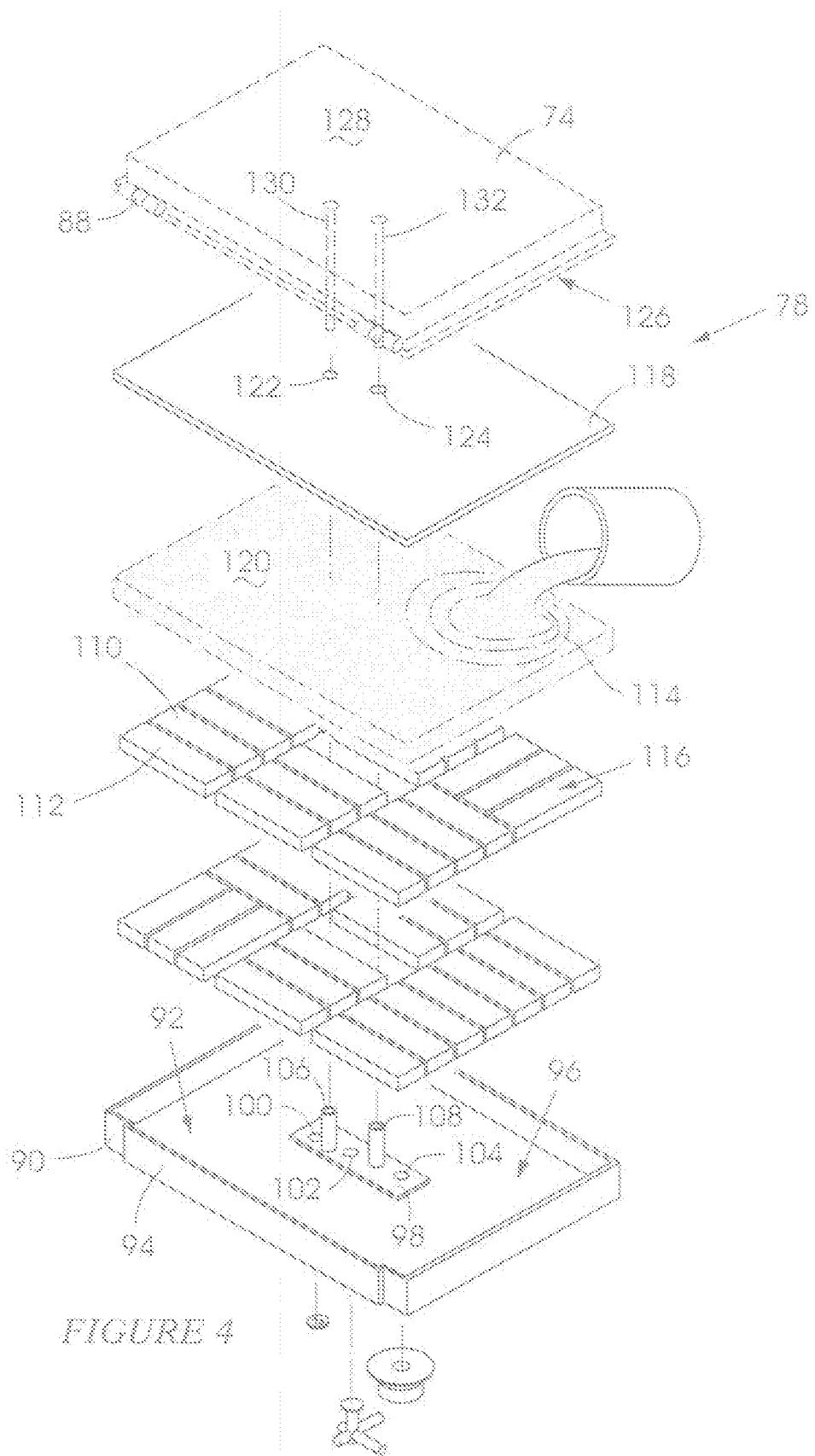


FIGURE 4

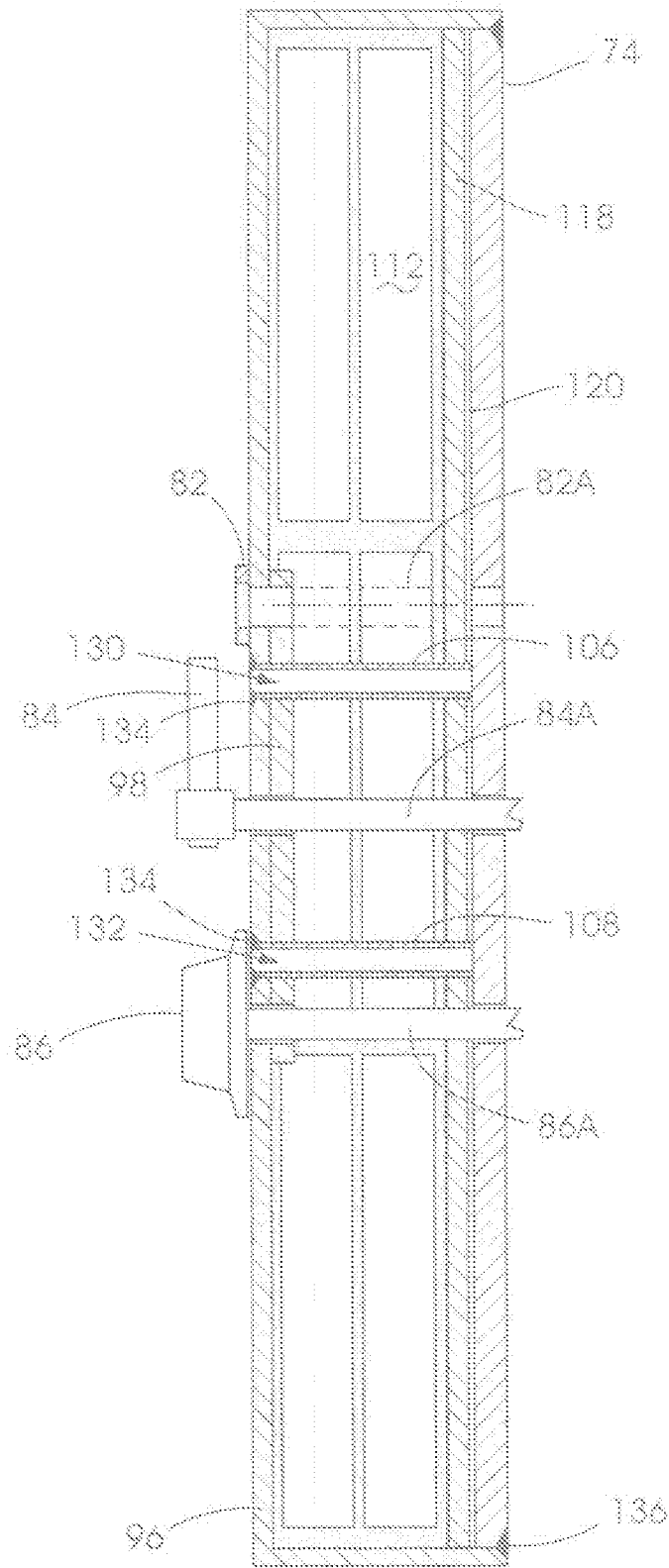


FIGURE 5

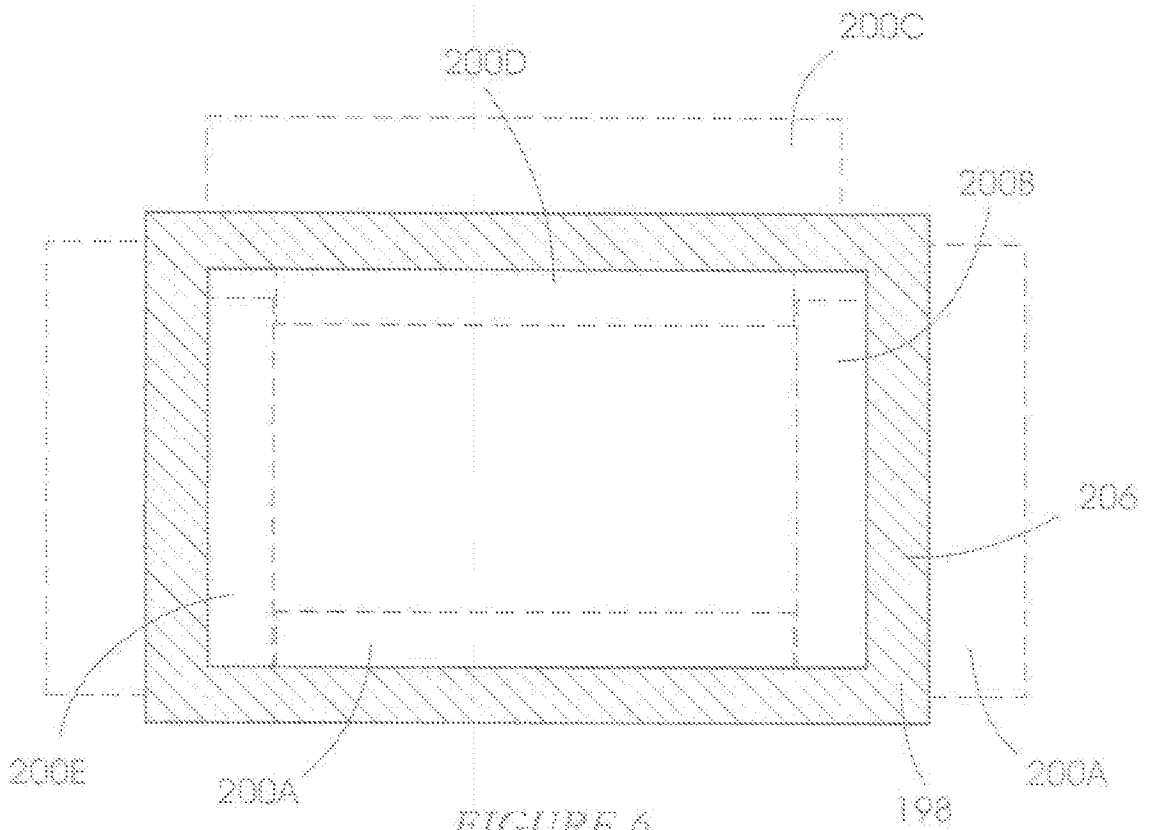


FIGURE 6