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(54) Security containers

(57) Security container (2) or "cross-pavement box" for carrying bank notes has a mechanism (45) with spring actuated arms (47) supporting hollow needles (48) coupled to a marking ink drive. On wrongful opening or in response to other signals, e.g. if the box is not opened when expected, the arms emerge to the interior (7) of the box, penetrate the cash and inject marking ink over it.

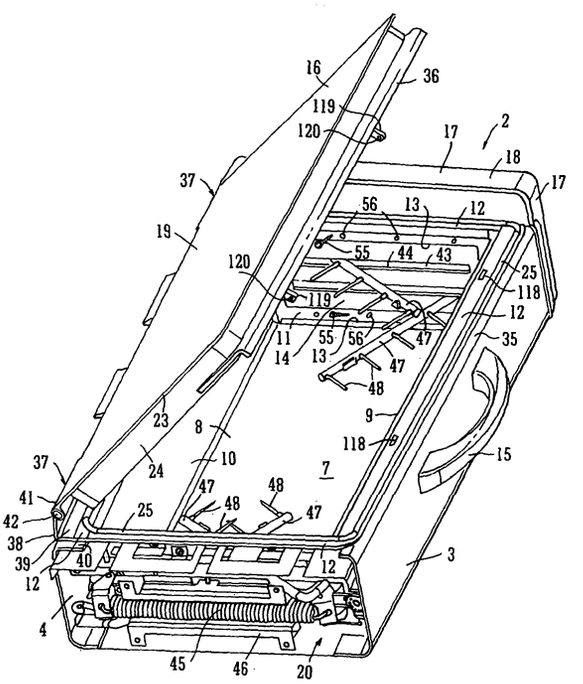

FIG. 2

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Description

[0001] This invention relates to security containers which are used to transport valuable documents, for example, bank notes.

[0002] It is often necessary to transport valuable documents, for example bank notes and to deliver the documents to a site. The documents are usually transported to or from a secure area from or to a site of use in armoured vehicles to prevent theft thereof. However, because the usual sites of use do not have specific provisions for transfer of valuable documents, the documents must be transported to or from the armoured vehicle from or to the site of use. This causes a potential security risk as often a person has to carry the valuable documents by hand between the vehicle and the site of use.

[0003] In order to mitigate the risk associated with transporting valuable documents by hand, even over relatively short distances, so-called "cross-pavement boxes" have been developed. Bundles of notes may be contained in plastics bags. The cross-pavement boxes usually have pyrotechnic devices to melt the plastics wrappers and the bank notes or other documents are stained by a dye-laden smoke which is generated or released from within the box, so rendering the documents useless.

[0004] The pyrotechnic device is relatively large to ensure that the plastics wrapping is adequately burned. Because of this, there is a potential for injury and or other collateral damage. Indeed, there have been several reports where damage has been caused to buildings or vehicles, as well as some fatalities where the pyrotechnic device has accidentally actuated and caused the box to catch fire.

[0005] Further, when such boxes are stolen, the thief will often attempt to gain entry to the box by damaging a hinge. If the pyrotechnic device is not actuated, the box (absent a complete working hinge) may be flung such that the lid opens and the, say, package of money exits the case before the pyrotechnic device can actuate or, if actuated, do serious damage to the package. Clearly, such a situation provides opportunities for the thief to obtain the money or other documents held within the box.

[0006] Accordingly, it is an object of the invention to provide a container for the transport of valuable documents which does not suffer the problems of prior art devices whilst providing adequate protection against unlawful removal and use of the contents of the container. It is a further object of the invention to provide apparatus which, once actuated, prevents or at least impedes removal of documents from a container.

[0007] In a first aspect of the invention, there is provided apparatus for marking documents contained in a, for example plastic, wrapper received in a lockable case the apparatus comprising needle means moveable to penetrate the wall of the wrapper and delivery means arranged to supply a marking fluid to the documents contained in the wrapper.

[0008] Preferably, said needle means comprises one or more hollow needles and the marking fluid is delivered from or by said delivery means via the or each hollow needle under pressure.

[0009] Advantageously, the apparatus includes actuation means arranged to actuate movement of said needle means to penetrate the wall of a wrapper upon receipt of a signal, say an improper attempt to open the case, the elapse of a pre-determined passage of time, a radio signal or the like.

[0010] A second aspect of the invention provides document spoiling apparatus for a document container, the apparatus comprising means movable between a first position and a second position and means to cause a marking material to be emitted from said movable means as said movable means moves from the first to second positions.

[0011] Said movable means may comprise one or more arms, the or each preferably being provided with a marking material input and emission ports, between which marking material may flow or pass during movement from said first to second position.

[0012] The or each arm may be movable along a linear or curved path, for example along a path describing an arc, a straight line, a zig-zag motion or a combination of one or more.

[0013] The first position is preferably a relatively retracted position and the second position is preferably a relatively extended position.

[0014] The marking material may be emitted from a nozzle, needle, spray head or the like. In a preferred embodiment, the, or each arm comprises one or more needles located along its length through which the marking material is emitted.

[0015] The apparatus may comprise, say, a pair of arms which are arranged to move in, say, an arc between said first and second positions. Preferably, a proximal end of each of the pair of arms is linked by resilient means, for example a spring.

[0016] The apparatus may comprise a reservoir for marking material.

[0017] Said marking material emission means may comprise a compressed gas source, a resiliently urged piston, plunger or the like.

[0018] In a preferred embodiment, the marking material is held in a reservoir and said marking material emission means comprises a compressed gas source arranged to urge a piston against the reservoir upon release of gas therefrom.

[0019] Preferably, the gas may be released from the compressed gas source by means of a valve which may be electrically, electronically or otherwise actuated or actuatable, say by means of a small pyrotechnic charge, to force the marking material from the reservoir and cause the marking material to be emitted from said movable means.

[0020] In another embodiment, the marking material

may be held in a sealed reservoir which has a head space of compressed gas, puncture of the reservoir causing the marking material to be emitted from said movable means.

[0021] A third aspect of the invention provides a security container for valuable documents, the container comprising document-spoiling apparatus as defined above.

[0022] A further aspect of the invention provides a security container for valuable documents, the container comprising an inner compartment for the storage of valuable documents and at least one outer compartment in which is located a security device, the security device comprising at least one arm which, upon actuation, is urged or urgeable into the inner compartment.

[0023] The arm may pass through an opening in a wall which defines, at least in part, a part of the inner compartment. The opening may be occluded or occludable by a flap, shutter or the like, the flap, shutter or the like preferably moving from its opening-occluded position upon receipt of a signal, say upon improper opening of the container.

[0024] The container may comprise an inner compartment bounded by at least two outer compartments, each having located therein at least one arm which is actuatable to be urged into the inner compartment.

[0025] Two arms may be located in the or each outer compartment.

[0026] Preferably a marking material will be emitted into the inner compartment during or after actuation of the or each arm.

[0027] The, or each arm may comprise one or more needles through which the marking material is emitted or emitable. Preferably, each arm comprises a plurality of needles, each of which terminate in a point sharp enough to penetrate a say, plastic, paper, cloth or other bag in which valuable documents may be located within the inner compartment.

[0028] Preferably, the marking material is forced from the arm by marking material forcing means which may comprise a source of pressurised gas, a plunger, piston or the like.

[0029] In a further embodiment, the or each arm may comprise means to retain the documents within the inner compartment subsequent to actuation thereof. For example, if the documents are bundled in, say, a wrapping, the or each arm may comprise needles which, upon actuation of the or each arm, are forced into the documents. The arms may be resiliently urged towards the actuated position, the, say, needles thereby being resiliently urged into the documents to prevent their removal from the compartment. Other means may be provided, such as barbs, hooks and so on. The apparatus may further comprise a conventional 'large' pyrotechnic charge and smoke generating means to stain the trapped documents, the document retention means impeding removal of the documents from the container prior to actuation of the pyrotechnic charge.

[0030] There is further provided, by a yet further aspect of the invention, a method of securely transporting paper currency or other valuable documents, the method comprising placing the currency or other valuable documents within a bag and locating the bag in an inner compartment of a security container comprising at least one outer compartment in which is located a security device, the security device comprising at least one arm which, upon improper opening of the container, is urged or urgeable into the inner compartment, and locking the container.

[0031] Preferably, the arm will comprise means to penetrate the bag. Said means may preferably comprise one or more needles mounted on the arm. In one preferred embodiment document marking material is emitted either during or subsequent to actuation of the arm.

[0032] The bag is usually fabricated from a plastics material. The at least one arm preferably comprises one or more needles through which the marking material is emitted and which can penetrate the bag subsequent to receipt of a signal say from improper opening of the container, the elapse of a pre-determined time period, a radio signal and so on.

[0033] In order that the invention may be more fully understood, it will now be described, by way of example only and with reference to the accompanying drawings, in which:

Figure 1 is a top view of a cross-pavement box incorporating at each side of the box a first embodiment of a security device;

Figure 2 is a perspective view of the Figure 1 box with the lid open and one side compartment casing removed to show parts of one of the two security devices;

Figure 3 is a perspective view of part of the security device with a shutter closed;

Figure 4 is like Figure 3 but with the shutter open;

Figures 5 and 6 correspond to Figures 3 and 4 respectively but with an actuating spring removed to show the mechanism of the security device more clearly;

Figures 7 and 8 are end views corresponding to Figures 3 and 4;

Figure 9 is a perspective view of a support chassis forming part of the security device;

Figure 10 is a perspective view of a shutter plate forming part of the security device;

Figure 11 is a perspective view of a pivotable catch member forming part of the security device;

Figure 12 is a diagrammatic view of a lid locking mechanism;

Figures 13 and 14 are two views of a wet dye delivery device, respectively before and after the device has been activated;

Figures 15 and 16 are a plan view and a perspective view respectively of a second embodiment of a security device, and

Figure 17 is a diagrammatic view of part of a hollow needle.

Figures 18 to 23 show a further embodiment of the invention.

[0034] Referring to Figures 1 and 2, the cross pavement box 1 is shaped generally like an attaché case but not necessarily of the same size and has a rectangular main body 2 with a front wall 3, rear wall 4, side walls 5, bottom wall 6, and a tray 7 with a base 8 and front, rear and side walls 9, 10 and 11 respectively. The tray 7 sits between the front and rear walls 3 and 4 of the main body of the box 1 and defines an interior space for receiving documents and/or cash (not shown). The top edges of the walls 9, 10 and 11 are flanged to form a peripheral rim 12 all round the tray 7. Each side wall 11 is formed with a rectangular opening 13 which is closed by a wall 14.

[0035] A carrying handle 15 is fixed to the front wall 3 of the box and the box has a lid 16 which is closable over the interior space within the main body 2. The walls 3, 4, 5, 6 and 7 are made of suitably sturdy sheet material, for example heavy gauge sheet metal.

[0036] The side walls 11 of the tray 7 are spaced from the respective side walls of the main body 2 of box 1 so as to bound two side compartments 20 within the box. In addition, the front and rear walls 9 and 10 of the tray are spaced from the front and rear walls 3 and 4 of the box 1 to bound front and rear compartments 21 and 22 respectively within the box 1.

[0037] Each side wall 5 comprises peripheral flanges 17 to form a casing 18 which extends right along the side of the main body 2 of the box 1 and from the bottom wall 6 to above the rim 12 of tray 7. The top surface of each casing 18 is flush with the top surface 19 of the lid 16 when the lid is closed. The casing 18 is removable to permit access to side compartments 20.

[0038] The lid 16 which, like walls 3 to 6, may comprise a heavy gauge sheet metal, is defined by top plate 23 and, beneath that, a relatively deep inwardly tapering plug portion 24 which, when the lid 16 is closed, contacts tray rim 12 around the interior space within the tray. A bead 25 of round cross-section and of resiliently deformable material is fixed to tray rim 12 around the interior space so that, when lid 16 is closed, portion 24 of the lid is closed down onto or plugs into the bead 25 to seal the interior of main body 2. A top edge portion 35 of front wall 3 is radiussed (in fact, other edges of the box walls can also be radiussed as shown) and, at the front lower edge of lid portion 24, there is an overhanging member 36. When lid 16 is closed, member 36 overhangs the radiussed edge portion 35 and covers bead 25.

[0039] The lid 16 is connected to the main body 2 by two concealed hinges 37 one at each end of the rear of the lid 16. Each hinge 37 is comprised of a respective end portion 38 of a bracket 39 of L-shaped cross-section extending along the top rear edge of the main body 2. The upper edge of the rear wall 4 of box main body 2 is radiussed over to form a flange 40 which is parallel to and has a portion lying beneath the rear portion of rim 12. The bracket 38 is fixed to the flange 40 behind the rear portion of rim 12. The end portions 38 of bracket 39 and respective end portions 41 of the rear of the top plate 23 of the lid 16 are shaped to inter-engage and to receive a hinge pin 42. The top plate portions 41 project down over the hinge pin 42 so that the hinge pin is not exposed at the rear of box. The ends of the hinge pin 42 are concealed by the casings 18.

[0040] Instead of two discrete hinges 37, there could be three or more such discrete hinges (not shown), or there could be a single continuous hinge (not shown) extending all along the rear of lid 16.

[0041] Each wall 14 has two parallel slots 43 extending one above the other in the direction from front to rear of the box 1. The slots 43 of each wall 14 are normally kept closed by a movable shutter plate 44.

[0042] Each compartment 20 holds a security device 45. Each security device 45 comprises an actuating mechanism 46 and two hollow tubular arms 47 mounted one above the other. The arms 47, each of which carries an array of hollow needles 48, are movable, upon actuation, from a first normal position where they are entirely housed within the compartment 20 to a second position where they extend into the interior of the box 1 via respective slots 43 as shown.

[0043] Referring mainly now to Figures 3 to 12, the wall 14 at each side of the box main body 2 is formed by part of a stamped sheet metal chassis 49 for supporting the respective security device. Along with the wall 14, the chassis 49 of each security device 45 comprises, at the top of wall 14, four spaced side-by-side upper flanges 50, 51, 52 and 53, and a lower flange 54 extending from the bottom edge of the wall 14. The flanges are at right angles to the wall 14. The chassis is fixed into the main body 2 by screws 55 inserted through holes 56 in the tray side wall 11 from inside the box 1 and engaged in captive nuts 65 fixed to the wall 14 at the side facing into compartment 20. Each of the centre two flanges 51 and 52 has a rectangular aperture 66 leaving an upstanding projection 67 of the wall 14. The lower flange 54 also has a rectangular aperture 66 leaving a downwardly extending projection 68 of wall 14.

[0044] The shutter plate 43 is positioned adjacent the wall 14 and is secured thereto by screws 69 engaged in

suitably threaded holes in the wall 14 and having plain shank portions (not shown) engaged with sliding fit in slotted holes 70 in the shutter. Because the holes 70 are slotted, the shutter can move up and down with respect to wall 14.

[0045] The shutter plate 43 has slots 71 like the slots 43 in wall 14 and by raising or lowering the shutter plate, the slots 71 can be brought into and out of registry with the slots 43.

[0046] In each security device 45, a proximal portion of the end of each arm 47 is connected to a respective U-shaped bracket 72 having side limbs mounted to a respective pin 73 about which the bracket 72, and hence the arm 47, can turn for the arm to move between the normal position housed in compartment 20 and the actuated position where the arm extends into the interior space in box 1. The respective base portions of the two brackets 72 are interconnected by a spring 74 which is arranged to urge the brackets 72 together, i.e. from the position shown in Figure 3 towards the position shown in Figure 4. The pins 73 are mounted on a support bracket 75 which is, in turn, fixed to wall 14 and which has portions defining a well 76 for receiving and guiding the spring 74.

[0047] Figures 5 and 6 show identical views to those of Figures 3 and 4 with the exception that spring 74 has been removed for easier understanding.

[0048] Bracket 75 may be fixed to wall 14 by screws 69 that also fix shutter plate 43 to wall 14. Thus, there could be short sleeve portions (not shown) fitted on the screws between bracket 75 and wall 14 to form a sliding fit for the shutter plate 43. Alternatively, special 'button' screws could be used. Instead of screws, rivets or other means could be used.

[0049] An electric rotary actuator 77 is mounted within each compartment 20 which, upon receipt of a suitable signal, causes the disc 78 to rotate. The disc 78 is connected to a pivotable arm 79 by an elongate linkage 80, the arm 79 being pivotable about a pin 81.

[0050] The shutter plate 44 has two spaced flanges 82a and 82b between the slots 71 and two more flanges 83 near the ends of the shutter plate at about the level of the upper slot 71. The flanges 82a, 82b and 83 extend substantially normally to the main body of the shutter plate 44. Like the chassis 49, the shutter plate 44 is formed by a stamping operation from sheet metal material, for example sheet steel.

[0051] Two upper and two lower ones of the slotted holes 70 are located in respective projecting portions 84 of the shutter plate 43 and these portions are located within the apertures 66 formed in the chassis 49. The flanges 82a and 82b are able to move up and down with the plate 43 by being able to move through corresponding cut-outs or apertures 85 in the support bracket 75.

[0052] Meanwhile, fixed to flanges 83 are respective upstanding pegs 95 with respective springs 96 located thereon. The springs 96 are compression springs and they abut the undersides of the flanges 50 and 53 so as to urge the plate 43 downwards with respect to the chassis 49.

[0053] Mounted to the support 75 is a pivotable catch plate 97 which, as is best seen in Figure 11 is of general rhomboidal form but with two generally triangular flanges 98 and 99 that extend from diammetrically opposed edges of the plate. One flange (the uppermost one, 98, as shown) does not extend to the apex of the plate. The apex of each flange 98, 99 terminates in a pair of orthogonally arranged upstands 100 and 101 and 102 and 103 respectively. The pivotable catch plate 97 is further provided with a central hole 104 engaged by a spigot or screw 105 through which it is secured to the support bracket 75 and about which it is pivotable. Below the upper flange 98, the plate 97 is provided with a further flange 106.

[0054] A torsion spring 107 is engaged around the pivot axis of catch plate 97 and has one arm engaging the catch plate and the other in engagement with bracket 75 so as to bias the catch plate 97 to turn to the position it has when the mechanism is not activated.

[0055] In this regular, non actuated, condition of the mechanism, as shown in Figures 3 and 5, the slots 43 and 71 are not aligned, slots 43 being above slots 71. A surface of the arm 79 bears against the adjacent flange 82a of shutter plate 49, resisting the urging of springs 96. The catch plate 97 is arranged such that the upstands 100, 101 and 102, 103 extend through apertures formed in flanges of the support 75 and abut a portion of each arm 47, thereby resisting the spring 74 which is urging the arms 47 to pivot about the pins 73.

[0056] Therefore, the arms 47 are held in their retracted position by the upstands 100 to 103 and the apertures 43 are not aligned so there is nowhere for the arms to go, even if the upstands were to 'fail'.

[0057] As will be seen from Figures 4 and 6, when the actuator 77 receives a suitable signal, the disc 78 rotates anti-clockwise which causes the linkage 80 to push and then pull the arm 79. As the disc 78 is rotated through, say, 180° the linkage 80 causes the arm to pivot clockwise about the pin 81 eventually pulling the surface of the arm 79 out of engagement with the adjacent flange 82.

[0058] As the arm disengages from this flange 82a the springs 96 urge plate 44 downwardly bringing the apertures 43 and 71 into alignment, thereby providing passage for the arms 47 to enter the interior of the box 1.

[0059] Further, as plate 44 is urged downwardly, the other flange 82b engages flange 105 on the pivotable catch plate 97, forcing that side of the member 97 downwardly and the other side upwardly. Such movement disengages the upstands 100 to 103 from the arms 47. Once the arms 47 are freed from the upstands 100 to 103, the arms 47 are driven by spring 74 through the slots 43 and 71.

[0060] It will be noted that the flange 82b, in the non-actuated state of the apparatus (i.e. as shown In Figure 3), is not in contact with the flange 105 of the pivotable

catch plate 97. Therefore, movement of the plate 44 slightly precedes release of the arms 47. This ensures that the slots 43 and 71 are in alignment when the arms 47 start to go through. The plate 44 is prevented from continuing its downward movement, once actuated, because, as stated above, the flanges 82a and 82b move within cut-outs or apertures 85 formed in the support bracket 75, the lower edge of the apertures 85 forming a stop. When the flanges 82a and 82b abut the respective stops, plates 44 and 71 are aligned.

[0061] The spring 74 is sufficiently strong to produce a force which embeds needles 48 into cash and documents held within the box 1.

[0062] It will be appreciated that the security device at either side of the box 1 are actuated in identical fashion.

[0063] It will further be appreciated that security devices 45, as discussed above, may be present in the rear compartment 22, or indeed in the front compartment 21. Alternatively, or in addition, the front compartment 21 could house a lid locking mechanism 115. One such lid locking mechanism, shown in Figure 12, comprises two spaced metal blocks 116 fixed within the compartment 22 and each having an upwardly facing slot 117. The slots 117 are able to receive via respective apertures 118 in the front of tray rim 12, respective metal fingers 119 that project from the underside of portion 24 of the lid 16. Each finger 119 has a hole 120 through it with its axis extending in the direction between the sides of the box. A corresponding hole 121 extends through each block 116. When the lid is closed, the holes 120 register with the holes 121 and locked therein by respective ones of two sliding pins 122. The pins 122 are connected by respective wire links 123 to an electric actuator 124. When the electric actuator is operated, the pins 122 are withdrawn to release fingers 119.

[0064] If desired, the actuator 124 could be connected by a further wire link 125 to an interlock member 126 that, when the lid has been unlocked intentionally, engages a suitable portion of the security device 45 and positively prevents it from being released.

[0065] As shown in Figures 13 and 14, the device 200 in compartment 21 comprises a cylinder 201 which has a plug 202 inserted in its open end. Located within the cylinder 201 is a reservoir of marking material 203, for example a sealed plastics bag filled with marking material, a drive piston 204 and a compressed gas generator 208. An output 206 from the cylinder 201 is also provided which connects to a fluid distribution manifold 207. The device 200 is installed in the compartment 22 in the condition shown in Figure 12.

[0066] Upon receipt of a suitable signal, which will be similar or identical to that to which the actuator 77 responds, the gas generator 205 will commence generating gas. The so-generated gas forces the piston 204 along the cylinder 201, causing the reservoir 202 to compress and the plastics bag in which the marking material is held to burst, forcing the marking material through tube 206 to distribution manifold 207.

[0067] From manifold 207, the marking material flows along fluid distribution hoses 208 connected to hose connection nipples 209 at the proximal ends of hollow arms 47 and thence through the arms 47 into the hollow needles 48. Still driven by the pressure of the compressed gas from the gas generator 205, the marking material is forcibly injected into, over and between the documents, thereby staining them.

[0068] The gas generator 205 may generate gas pyrotechnically or by chemical reaction. Alternatively, the generator 205 could be replaced by a previously-filled container holding compressed gas and having a controllable valve which is opened subsequent to receipt of a signal. The valve may be electrically, electronically, mechanically or chemically actuated. Chemical actuation may be by way of a small pyrotechnic charge. Examples of generators which may be used are quick response gas generators, such as those used in air-bag systems on vehicles to reduce injury to passengers during a crash.

[0069] If considered necessary, a small blade or other piercing or cutting device may be placed adjacent to the output 206 of the cylinder 201 to ensure that the reservoir 203 bursts upon compression by the piston 204.

[0070] In use, documents, such as paper currency is located in plastic bags and placed in the interior of the box 1 which is locked using a specific key. The box 1 (or several such boxes) is loaded onto a vehicle which transports the box 1 to the business or bank. A member of staff then carries the box 1 across a pavement to the intended delivery point.

[0071] The security device 45 will operate if, for example, there is an unauthorised attempt to open the container 1 improperly, that is without using the intended key or in the absence of a wireless signal commanding the lid to unlock. Other signals which may cause actuation of the security device 45 may be due to a time-out, the geographical location of the case, a remote control signal generated by an intended bag-carrier. Time-outs lead to a signal being sent to the case to actuate when a pre-determined time period for a 'drop' has been exceeded. For example, if a case 1 is to be taken from the vehicle to the bank, which should take 2 minutes, the security device 45 may actuate if the case is not properly opened within 5 minutes. Some cases may have beacons installed therein, so that the geographical location of the case 1 can be determined at all times. If the case 1 deviates from its intended route, the security device 45 can be actuated. If, say, a bag carrier is robbed of the case 1, he may be able to send a remote control signal to the security device 45 to actuate it. Other known signal generating or signal sending methods are known for this purpose and all are intended to be within the scope of this invention. One case may be actuatable by any one of a plurality of signals generated in response to different conditions.

[0072] Whilst the box illustrated was provided with

arms 47 of which the main part (that extended into the interior of the box) is straight, Figures 15 and 16 show a security device 250 which has arms 251 that are bent so they curve towards one another. Also, the arms 251 each have an array of needles 252 that decrease in length towards the ends of the arms. All other components in Figures 15 and 16 are the same as in Figures 3 to 12 and are referenced accordingly.

[0073] This particular arrangement of arms 251 and needles 252 ensures that the maximum coverage of documents is obtained. For example, if a bundle (as described above) of currency is placed within a box with a 'straight arm' security device, there is a possibility that, as the arm moves through an arc, only the needles toward the end of the arm will penetrate the bundle. In the embodiment shown in Figures 15 and 16, there is a greater chance that more of the needles, i.e. longer ones as well as shorter, will penetrate the bundle at the same time.

[0074] It will be appreciated that there is a finite supply of both gas and marking material available. Accordingly, if a bundle (as described above) is placed within the box 1 it is imperative that marking material marks the notes. With both straight arms and bent arms, it may be that not all of the needles will penetrate the plastics wrapping. Normally, if the needles do not penetrate the wrapping, marking material will be lost through those needles and will not be available to mark the notes.

[0075] Referring now to Figure 17, there is shown a detail of a needle 300 which is provided with a sheath 315. The sheath 315 may be formed from a plastics or rubber material, such as latex and is adhered to the end of the needle.

[0076] If, in use, the needle 300 hits a body, say a bundle of notes, the sheath 315 will deform upon contact and will be punctured by the needle 300, thereby allowing marking fluid to flow from the end of the needle and mark the notes. On the other hand, should the needle not contact a body subsequent to actuation, the sheath 315 will remain intact and will prevent the flow of marking fluid from that needle. By preventing flow from needles with intact sheaths, more ink is available for those needles which have penetrated the notes. Such preferential delivery from what may be termed 'effective needles' ensures no waste of marking material. A further benefit, is that once the case has been actuated and needles have emitted marking material, the interior of the case 1 is cleaner than would otherwise have been the case, speeding renovation time.

[0077] Plastics sheaths 315 are not the only means which may be used. For example a frangible covering may be applied or a wax cap for example.

[0078] It is known that when certain documents, such as currency, are carried in cross-pavement boxes 1, they may be wrapped in a particular fashion. In one such wrapping technique, stacks of notes are wrapped in plastics materials, the stacks are then formed into a 'brick' which is wrapped in plastics material to form a double wrapped bundle. The bundle will then sometimes be placed into a loose plastics bag which is sealed. In conventional boxes upon improper opening of the box a pyrotechnic will burn the plastics and a marking material, such as a generated smoke, will be applied to the exposed notes. As explained above, it is possible to circumvent such security measures. With the security device of the current invention, upon actuation of the arms 47, the needles 48 puncture the plastics wrapping and embed themselves between the notes, thereby securely retaining the bundle of documents. Thus, the arms 47 and needles 48 will impede a thief from removing the bundle from the box 1 even if the dye injecting means of Figures 13 and 14, or any other dye injecting pyrotechnic or smoke generating apparatus is installed. Thus, a modified embodiment of the invention in which no dye injecting means is provided will still be useful and is included in the scope of this invention. Similarly, embodiments with the dye injecting means replaced by a pyrotechnic and smoke generating apparatus is also included - here, the movable arms 47 and the needles 48 will ensure that the bundle is securely retained within the box whilst the pyrotechnic burns the wrapping and the smoke marks the notes. Of course, then the arms 47 and needles 48 need not be hollow. In fact, the needles 48 may be replaced by barbs, hooks or other devices which retain the bundle in place or otherwise impede the removal thereof from the container 1.

[0079] Thus, it will be appreciated that the security device 45 may comprise arms which are caused to move from retracted to extended positions. The security device may comprise a conventional pyrotechnic charge and smoke generating device or may comprise a marking material delivery device with reference to Figures 13 and 14 as described above.

[0080] Other marking material delivery devices fall within the scope of the invention. For example, a container having marking material and a headspace of compressed gas may be used. Upon puncturing or opening the container the gas would force the marking material out and into the marking material delivery tubes.

[0081] Further, the needles may be replaced by hollow blades for example, or other devices which can puncture wrapping materials.

[0082] In a modification of the illustrated embodiments, the springs 74 that urge the arms 47 or 251 to move from the retracted to the extended positions, are replaced by a hydraulic cylinder actuator, for example a small (50 cc) actuator, coupled via flexible members and a pulley arrangement to the arms so that these arms are pulled in the extended position by the hydraulic actuator. Meanwhile, the actuator is driven by a pressurised fluid supply device. Preferably, this fluid supply device is the wet dye delivery device of Figures 13 and 14. Thus, the output tube 206 from cylinder 201 may be bifurcated to form an auxiliary pressurised ink supply. This is connected to the hydraulic cylinder actuator. Ideally, an obstruction, e.g. an orifice plate, is fitted in the supply to the arm

manifold so that the pressurised supply gives preference to the hydraulic actuator. Ink emission from the needles is then delayed until the hydraulic actuator stalls, i.e. when the arms are as fully extended as the contents of the box permit (with the needles engaged in the cash etc). The shutter plate 44 is still electrically actuated (by actuator 77) as with the illustrated embodiments.

[0083] Figures 18 to illustrate another embodiment of a cross-pavement box. This box 501 comprises a rectangular main body 502 with front and rear walls 503 and 504, and side walls 505. Within the box there is a metal tray 507 having front and rear walls 509 and 510 and sidewalls 511. A handle 515 is fixed to the front wall 503 of the box. Front and rear walls 503 and 504 become the top and bottom of the box when it is being carried by the handle 515in the manner of attaché case. A display unit 600 is mounted on the front wall 503 such that information displayed by the display unit 600 can be seen by an operator when holding the box by handle 515 or when lifting the box up and mounting it vertically (with the side walls 505 at the top and bottom of the box) in a rack in security vehicle or the like (not shown).

[0084] The box 501 has a lid 516 hinged along the top of the rear wall 504 and connected to the peripheral rim 512 of the tray 507 by stays 601. The stays 601 hold the lid 516 open when required. A metal cover plate 602 is hinged to the rear of the rim 512 or is fixed to the lid 516, in either case so as to close down onto the top of the tray 507 when the box is closed.

[0085] As shown in figure 19, the box 501 has compartments 605, 606, 607 and 608 defined by the front, rear and side walls 509, 510 and 511 of the tray 507 and the front, rear and side walls 503, 504 and 505 of the box.

[0086] The compartments 607 and 608 next to respective ones of the side walls 511 of the tray contain respective actuation mechanisms 546 coupled to movable arms 547. In addition, the compartment 606 between the rear wall 509 of the tray and box rear wall 504 also contains an actuating mechanism 620 and two hollow tubular arms 622 mounted one above the other. When required, the arms 547 and 622 are able to emerge from compartments 606, 607 and 608 into the interior of the tray 507 via slots 543 in the side walls of the tray and slots 625 in the rear wall.

[0087] The compartment 608 also contains a marking liquid delivery device 700. As shown best in figure 20, the device 700 comprises a tubular metal container 701 mounted between two cast port blocks 702 and 703. Inside the container 701 there is a plastic bag full of marking liquid (not shown).

[0088] Next to container 701 and coupled thereto via ports in block 702 is another but somewhat smaller tubular metal member 704 at one end of which there is fixed a small pyrotechnic gas generator 705. Generator 705 may be of the kind sometimes used in the automotive field for operating airbags and seat belt tensioners. The other end of the member 704 leads via a fine orifice 706 to a port 707 within block 702 that leads via a thin plastics disc 708, for example of polythene. Over the disc 708, there is a thicker plastic member 709, that defines an aperture 710, matching the end of port 707. At the other end of container 701, there is a collar 711 between which and the inner surface of container 701 there is held the open end of the plastic bag containing the marking ink, the material of the bag, around its periphery, being clamped (or fixed by adhesive perhaps). A further member 712 like member 709 and a polythene disc 713 like disc 708 is secured over the collar 711.

[0089] When the pyrotechnic gas generator 705 is operated, gas pressure builds up in tubular member 704 and then builds in port 707 eventually bursting disc 708 and through to reach the container 701. This compresses the plastic bag of marking ink whereupon the ink bursts through the disc 713 and via port 714 in block 703 to three hose connectors 715. Respective hoses (not shown) coupled to connectors 715 lead to the proximal ends of the arms 547 and 622.

[0090] Each actuation assembly of the further embodiment is generally similar to that described earlier with exceptions shown in the attached drawings and as described below.

[0091] It has been mentioned that the arms could be straight as shown in figure 2 or curved as shown in figures 15 and 16. In the present embodiment, straight arms are provided in the side compartments and curved arms in the rear compartment. This is because the rear compartment is at the bottom of the box when being carried so the cash or documents tend to drop down against the rear compartment. Meanwhile, curved arms are more likely to penetrate cash etc when so lying down against the compartment.

[0092] In the previous embodiment as shown in figures 3 to 6 for example, the shutter plate 44 is engaged by compression springs 96. When the actuator 77 pushes and then pulls arm 79, the arm is pulled out of engagement with flange 82. Springs 96 then urge plate 44 downward bringing apertures 43 and 71 into alignment.

[0093] In the further embodiment, springs 96 are deleted. Instead, the actuator 77 releases the plate. It does this by first driving camming plate 800 to the right. This cause pegs 801 in shutter plate 44, which are initially held to prevent looseness of the mechanism by clips 802, to drop down along camming slot 803. The pegs are then driven to the right along camming slot 804 so becoming locked within that slot. This causes the shutter plate to align with the slots in the sides of the tray 507.

[0094] Meanwhile, a peg 804 in camming plate 800 causes catch plate 97 to move within generally triangular aperture 810. This releases the arms for movement somewhat as with the previous embodiment. Note that peg 804 although shown in figure 20 is behind spring plate 812.

[0095] The locking assembly at the front of the box comprises locking pins 1000 which engage plungers

1001 engaged with the lock actuating rods 1002. The rods 1002 are coupled to a solenoid 1003 as before. When the lid of the box is open, the rods 1002 engage the shutter plates to prevent them from becoming released.

Claims

1. Apparatus for marking an item in a security container, the apparatus comprising penetration means moveable to penetrate the item and delivery means arranged to supply a marking fluid to the documents contained in the wrapper.

2. Apparatus according to claim 1, wherein said penetration means comprises one or more hollow needles and the marking fluid is delivered from or by said delivery means via the or each hollow needle under pressure.

3. Apparatus according to claim 1 or 2, including actuation means arranged to actuate movement of said penetration means to penetrate said item upon receipt of a signal, for example a signal indicative of an improper attempt to open the case, the elapse of a pre-determined passage of time, a radio signal or the like.

4. Apparatus according to claim 1, 2 or 3, wherein said actuation means comprises spring means coupled to the penetration means.

5. Document spoiling apparatus for a document container, the apparatus comprising means movable between a first position and a second position and means to cause a marking material to be emitted from said movable means as said movable means moves from the first to second positions.

6. Apparatus according to claim 5, wherein said movable means comprises one or more arms, the or each arm preferably being provided with a marking material input and emission ports, between which marking material may flow or pass during movement from said first to second position.

7. Apparatus according to claim 6, wherein the or each arm is movable along a linear or curved path, for example along a path describing an arc, a straight line, a zig-zag or a combination of one or more such paths.

8. Apparatus according to claim 5, 6 or 7, wherein the first position is a relatively retracted position and the second position is a relatively extended position.

9. Apparatus according to claim 5, 6, 7 or 8, wherein the marking material is emitted from a nozzle, needle, spray head or the like.

10. Apparatus according to claim 6, wherein the or each arm comprises one or more needles located along its length through which the marking material is emitted.

11. A security container for documents, the container comprising an inner compartment for the storage of said valuable documents and at least one outer compartment in which is located a security device, the security device comprising at least one arm which, upon actuation, is urged or urgeable into the inner compartment.

12. A container according to claim 11, comprising an inner compartment, one or more outer compartments, each located adjacent said inner compartment and each having located therein at least one arm which is actuatable to be urged into the inner compartment, each arm having portions for penetrating an item contained in the inner compartment, and means for forcing marking fluid into said inner compartment.

13. Apparatus according to claim 12, wherein said penetrating portions comprise needles through which the marking material is emitted or emitable.

14. Apparatus according to claim 12 or 13, wherein said means for forcing marking fluid into said inner compartment comprises a source of pressurised gas, a plunger or piston.

15. A method of securely transporting paper currency or other valuable documents, the method comprising placing the currency or other valuable documents within a bag or wrapper and locating them in an inner compartment of a security container comprising at least one outer compartment in which is located a security device, the security device comprising penetrating means which, upon improper opening of the container, is urged or urgeable into the inner compartment, and penetrates said bag or wrapper.

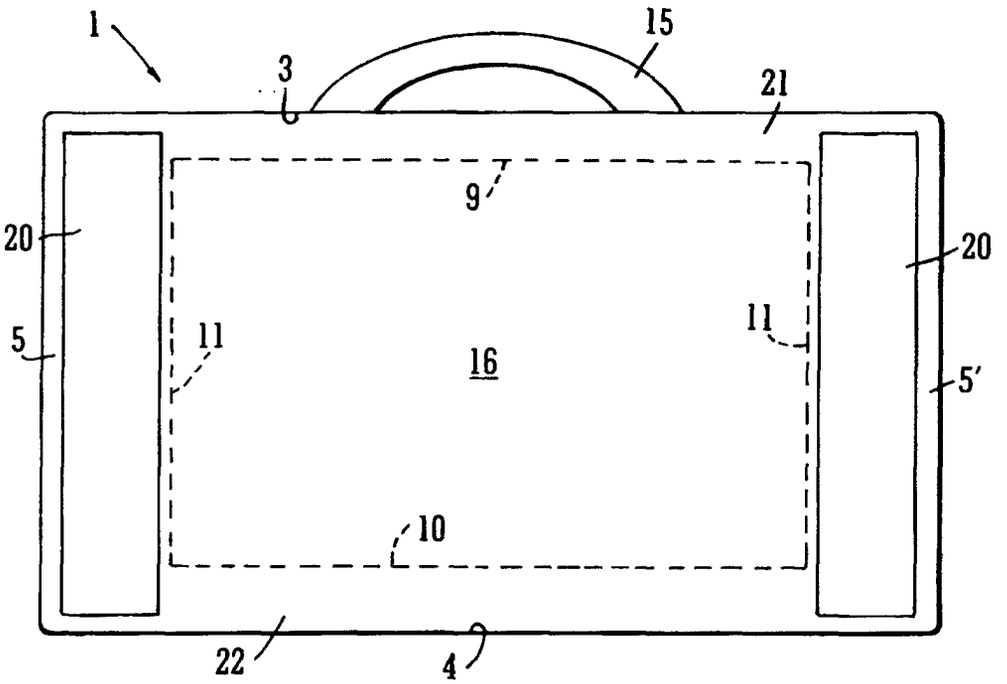

FIG. 1

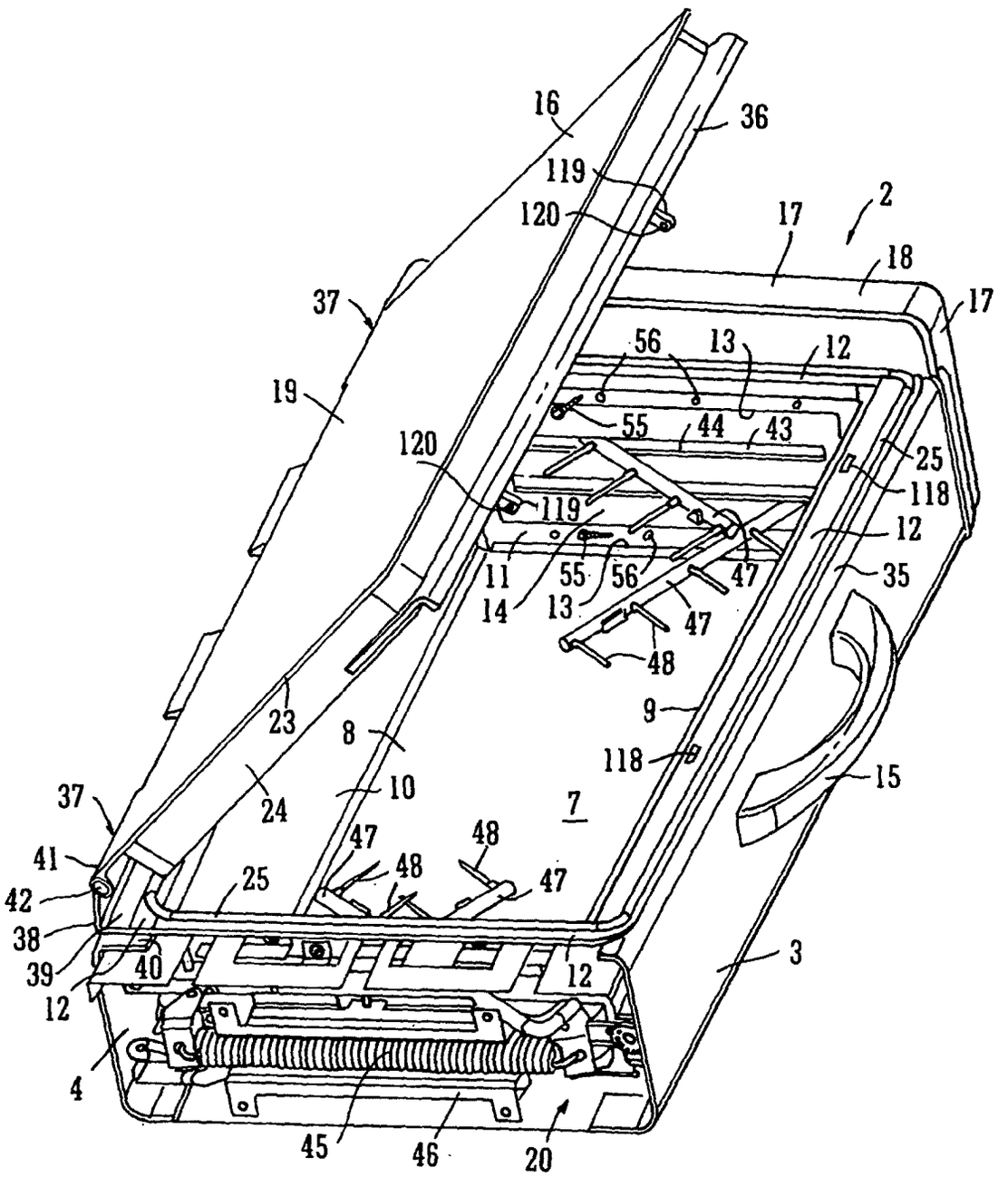
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FIG. 2

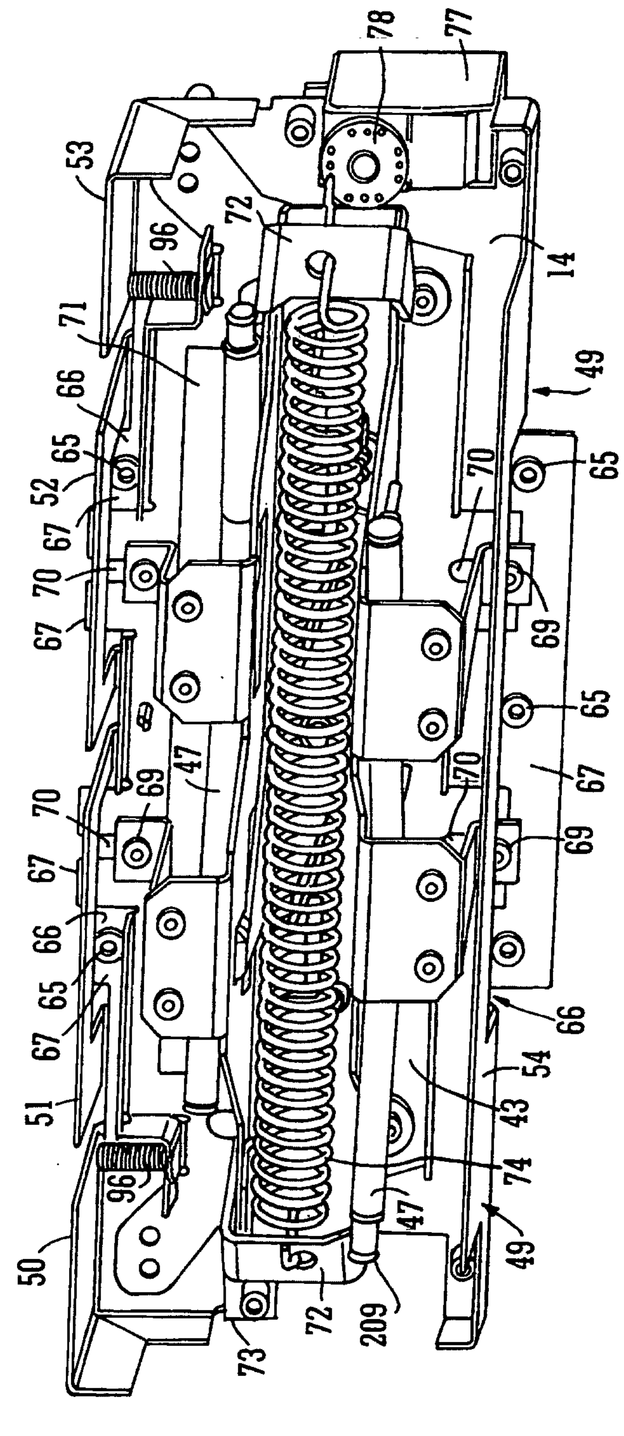
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FIG. 3

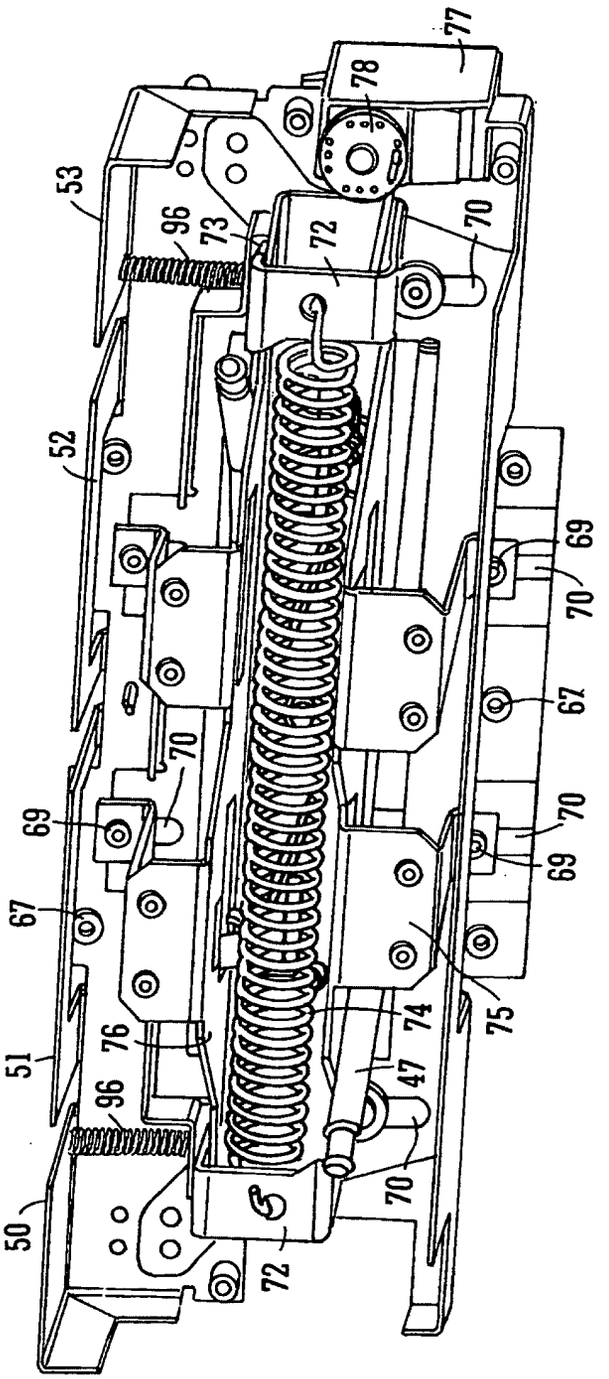
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FIG. 4

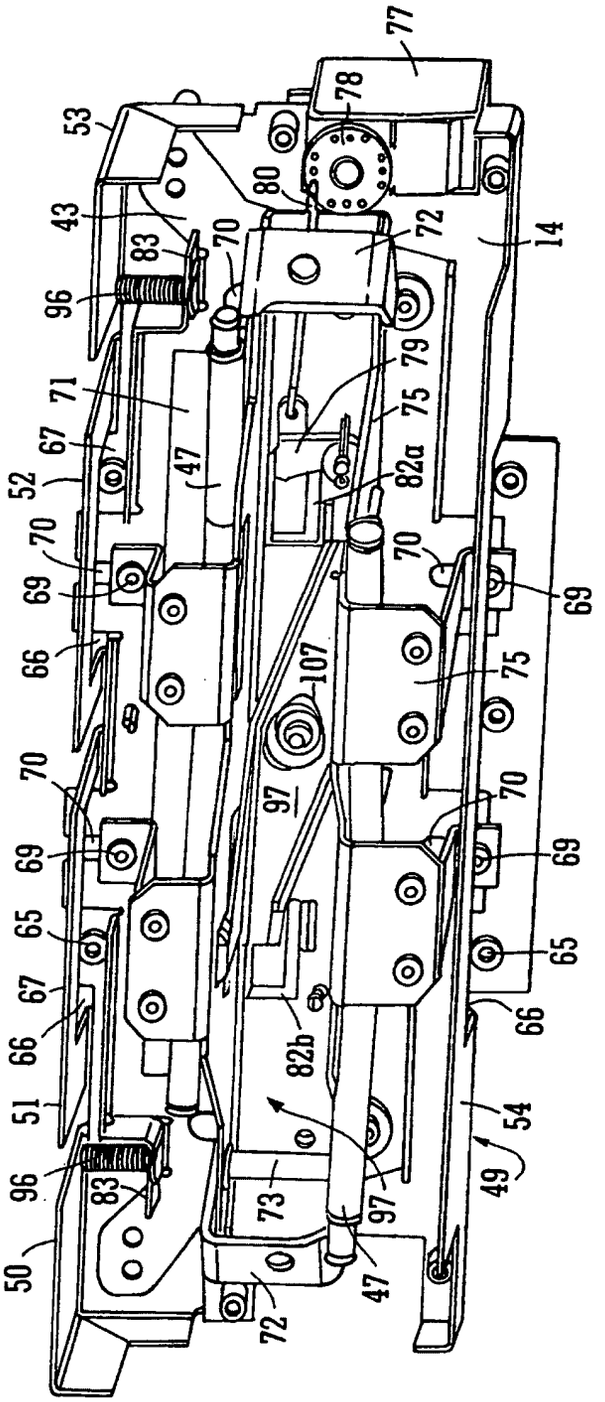
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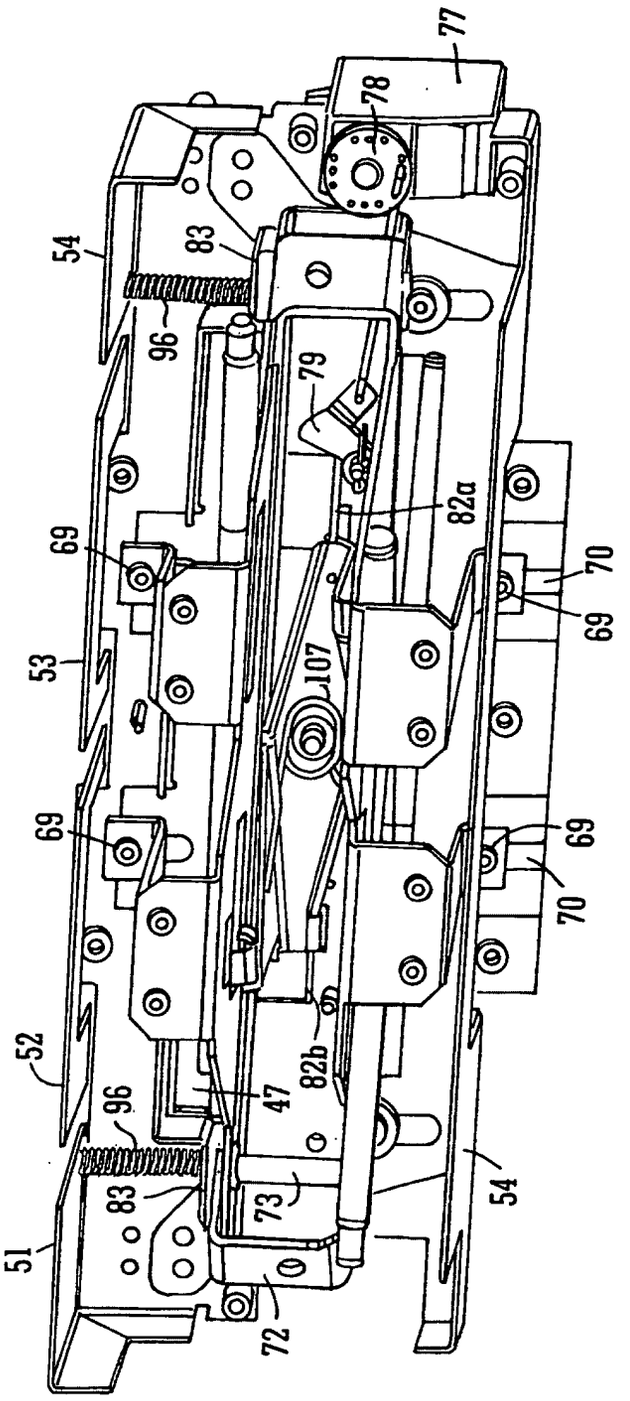
FIG. 5



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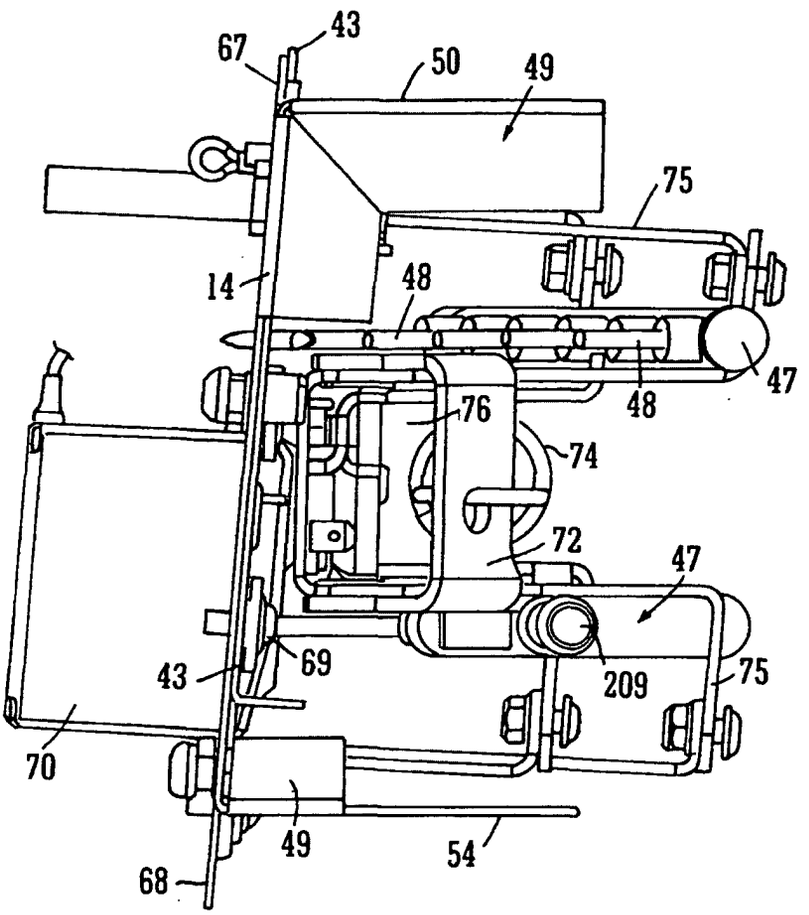

FIG. 7

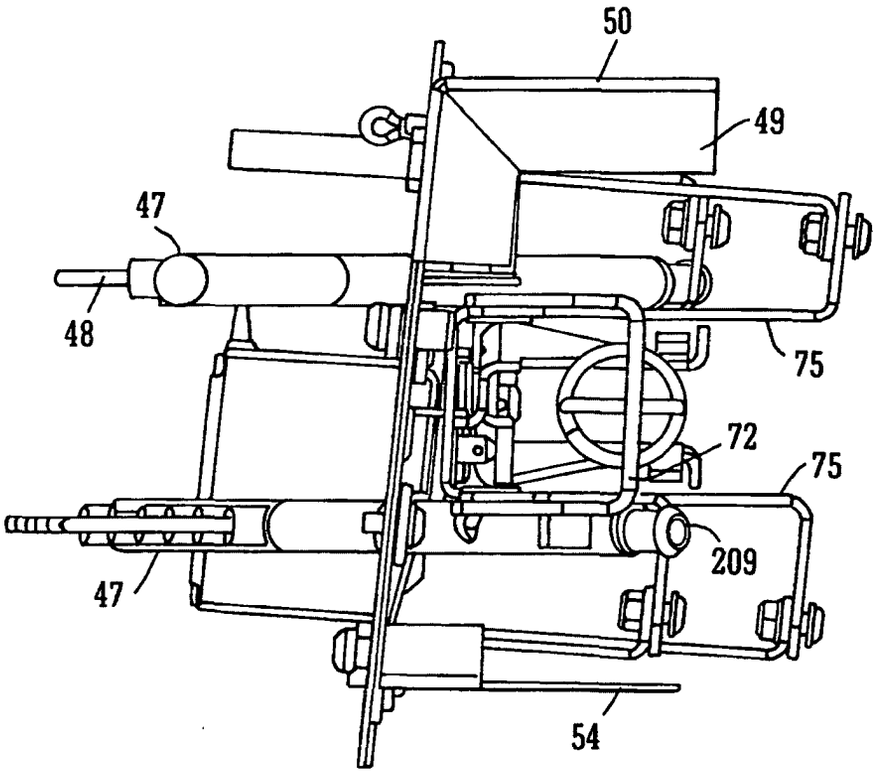

FIG. 8

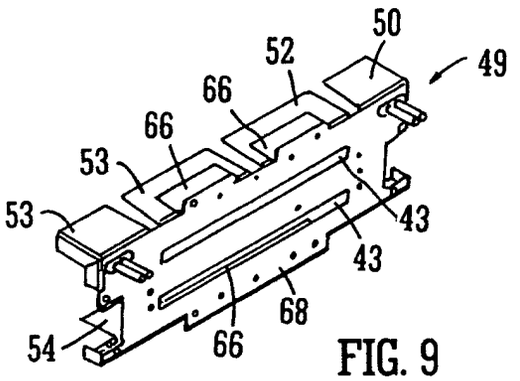

FIG. 9

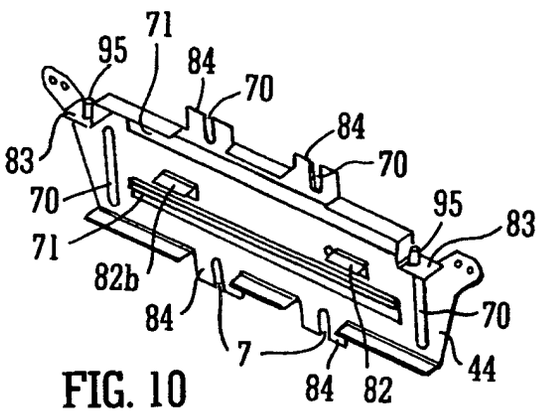

FIG. 10

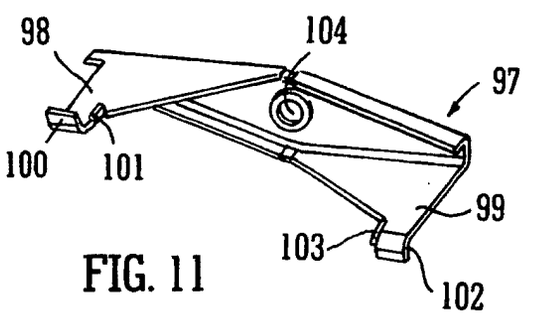

FIG. 11

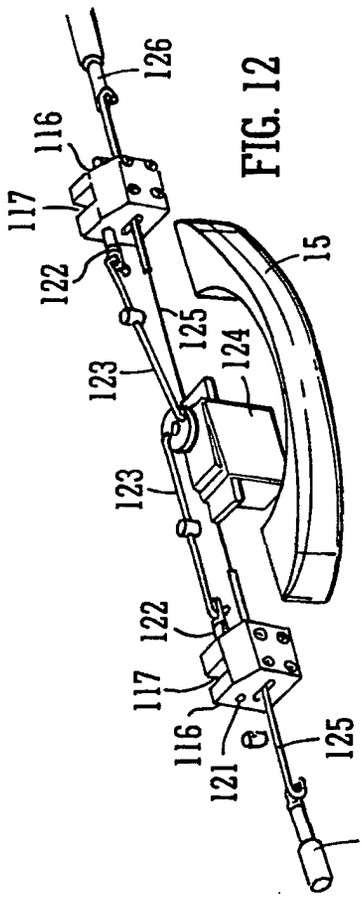

FIG. 12

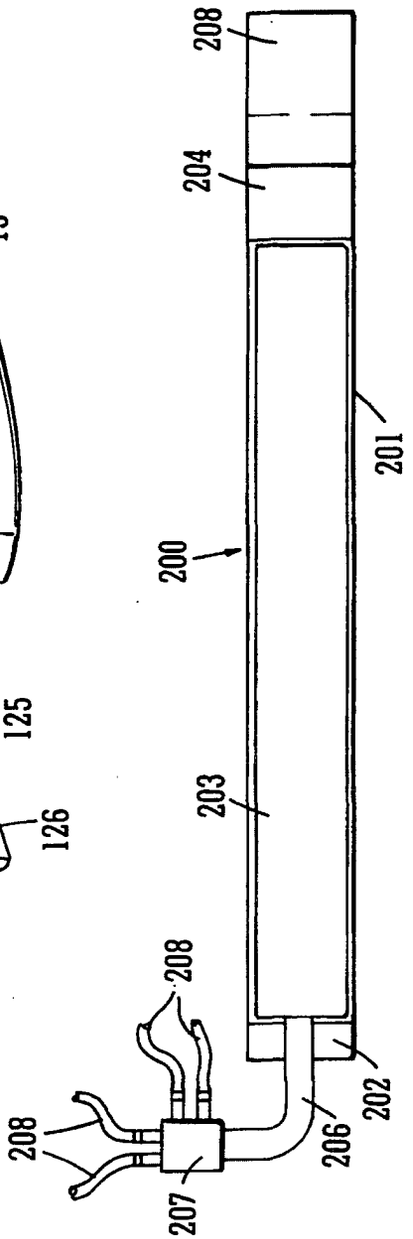

FIG. 13

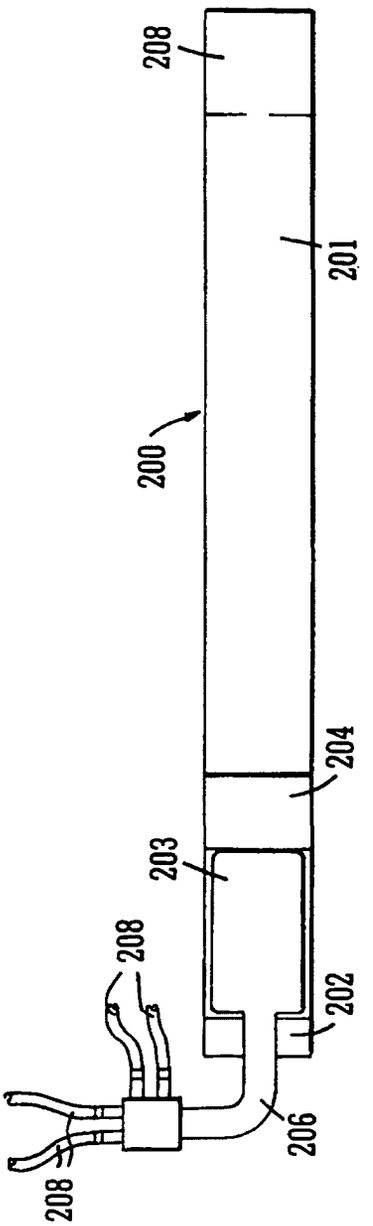

FIG. 14

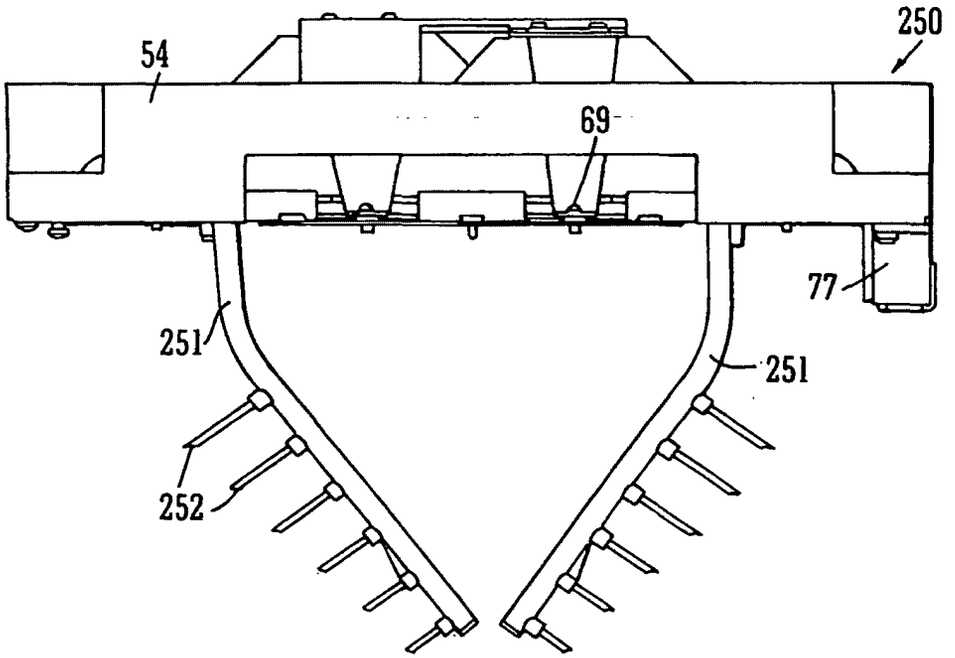

FIG. 15

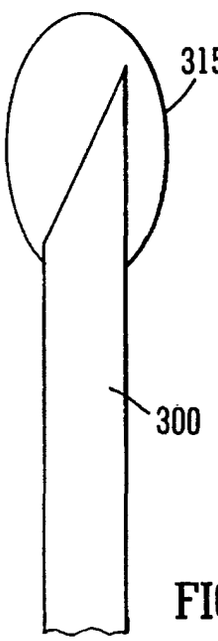

FIG. 17

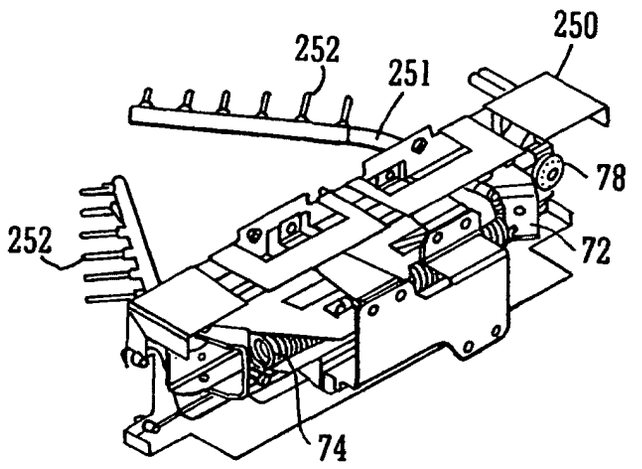

FIG. 16

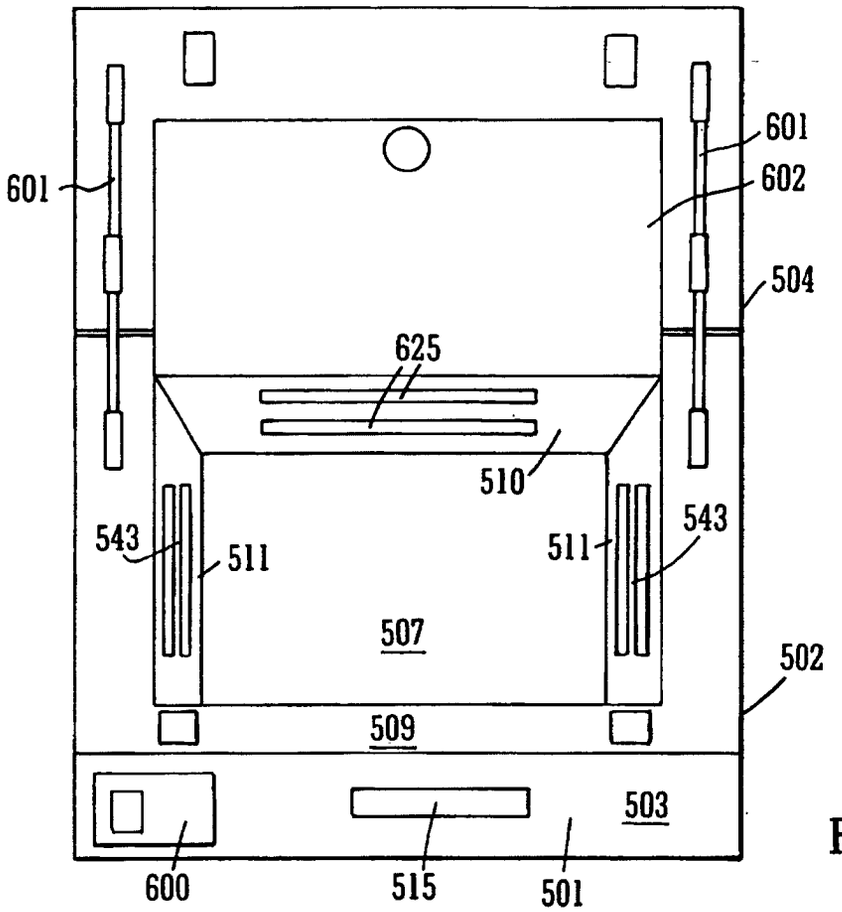
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FIG. 18

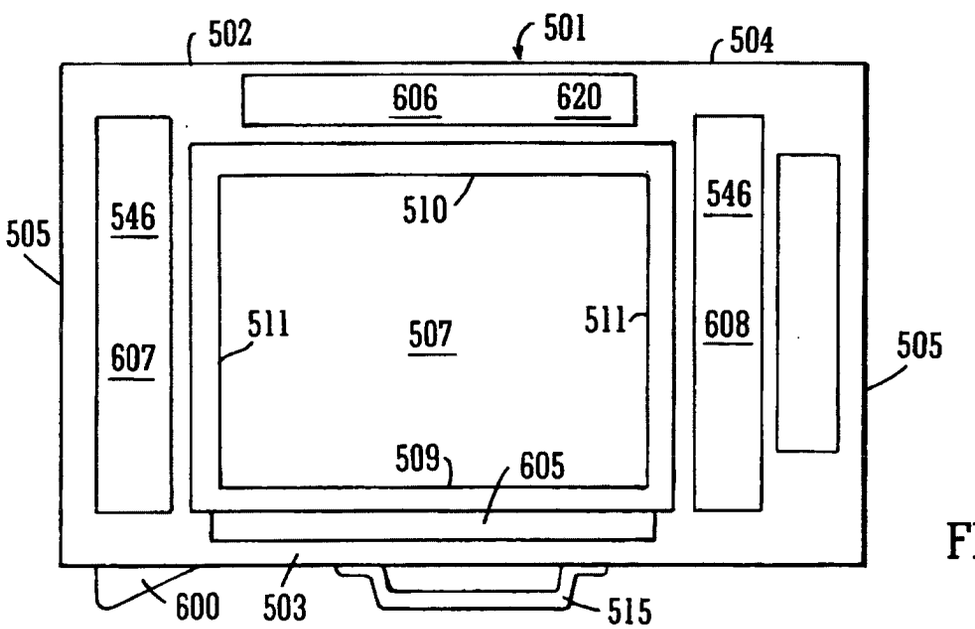
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FIG. 19

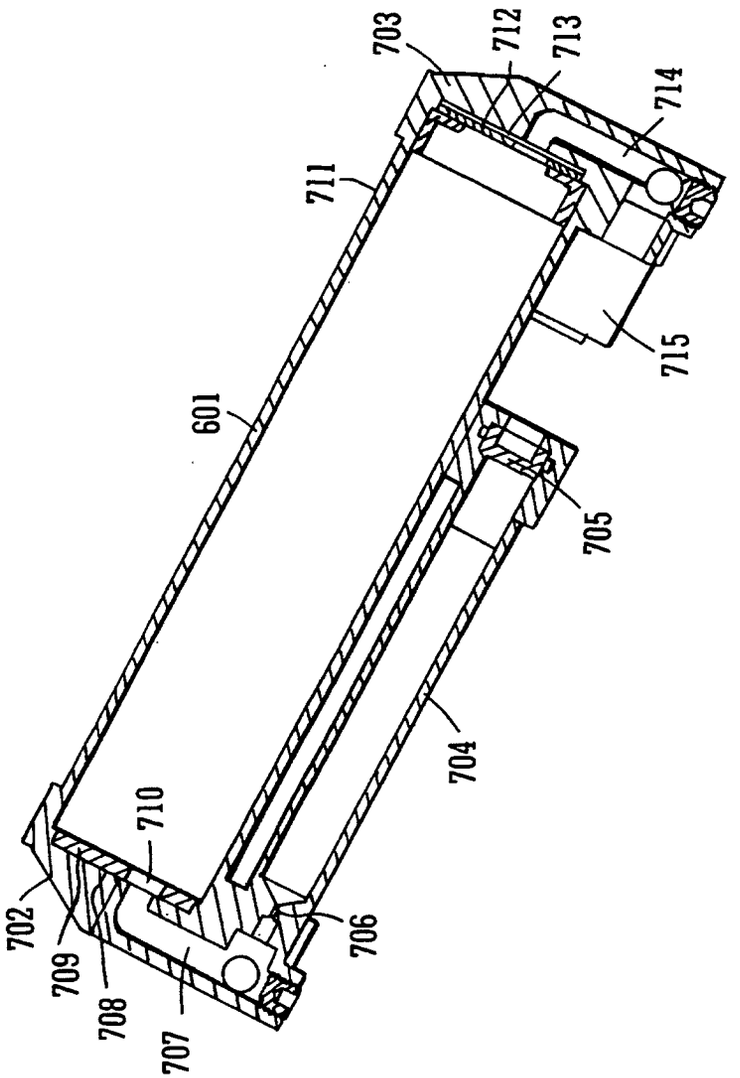

FIG. 20

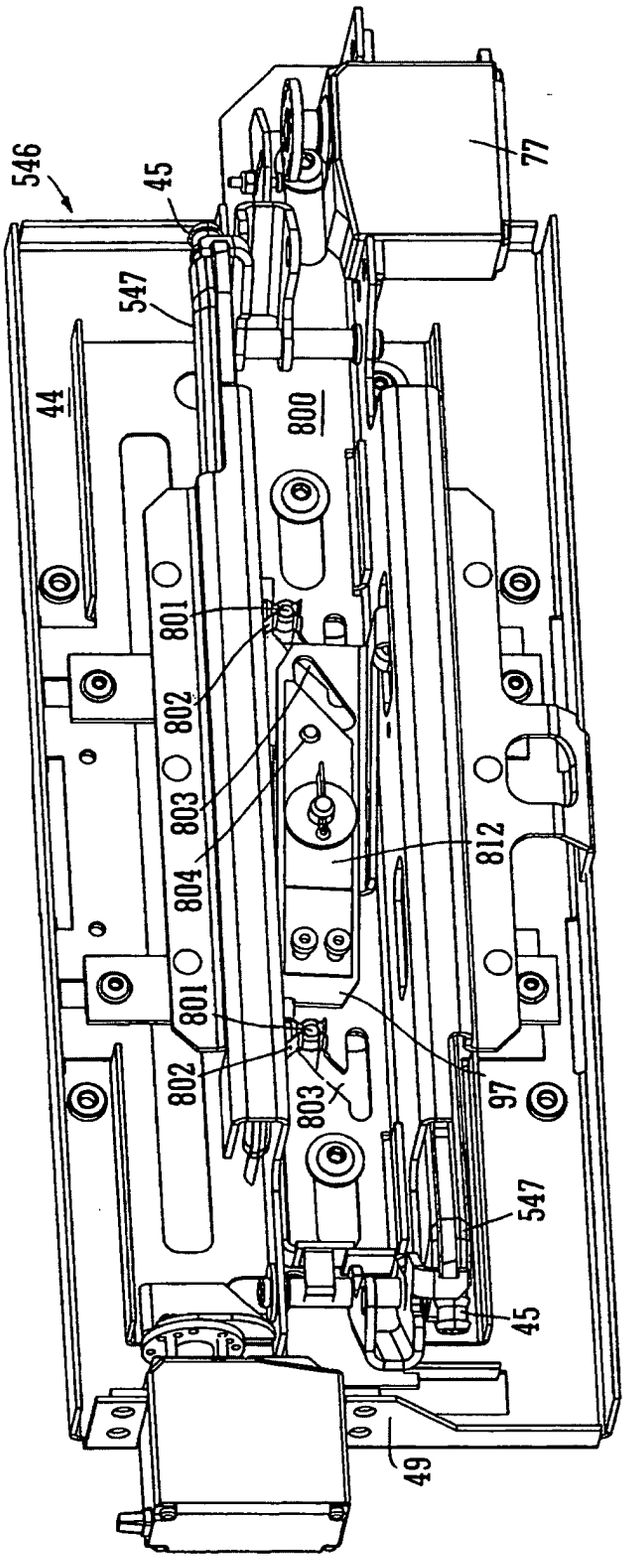

FIG. 21

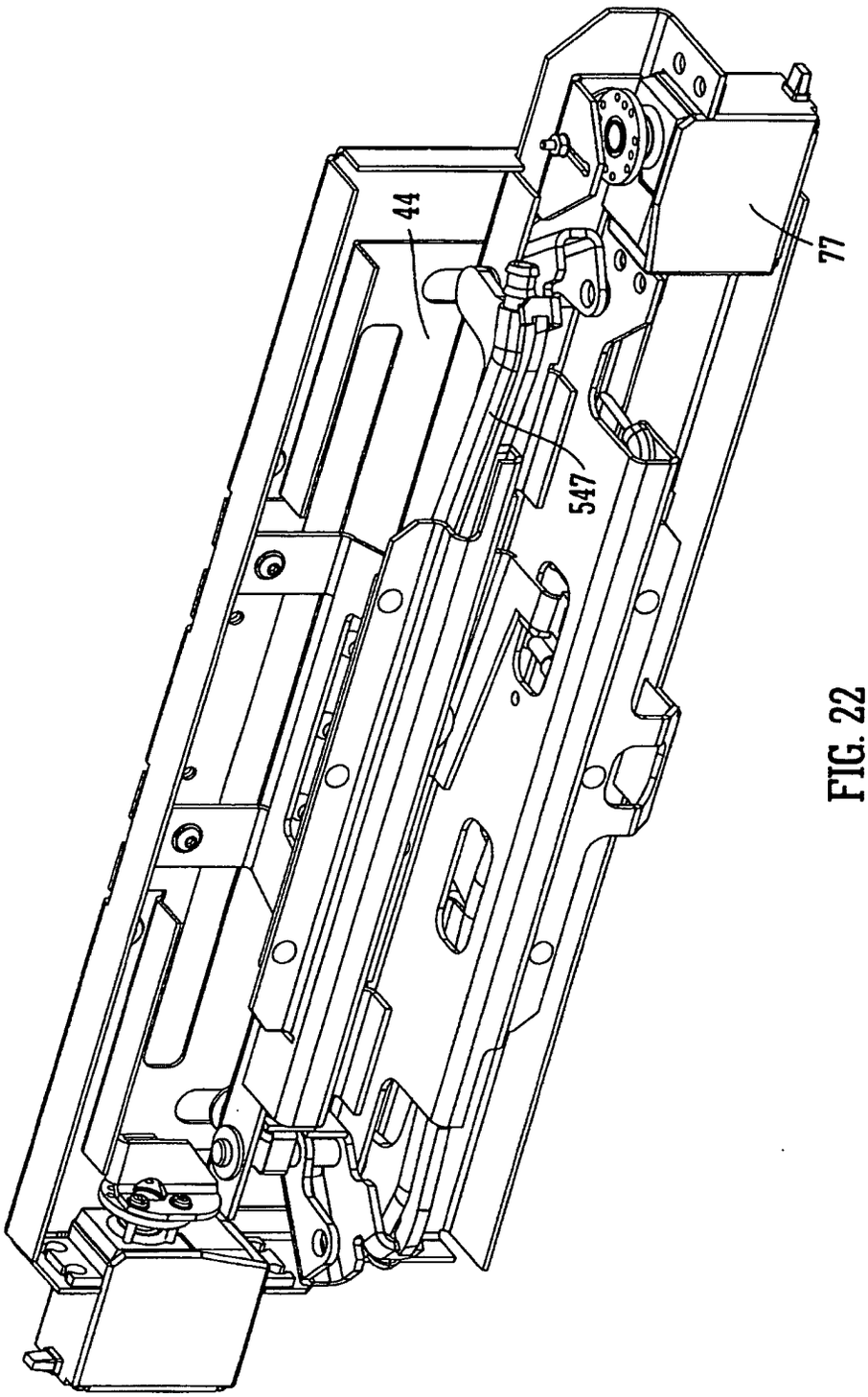

FIG. 22

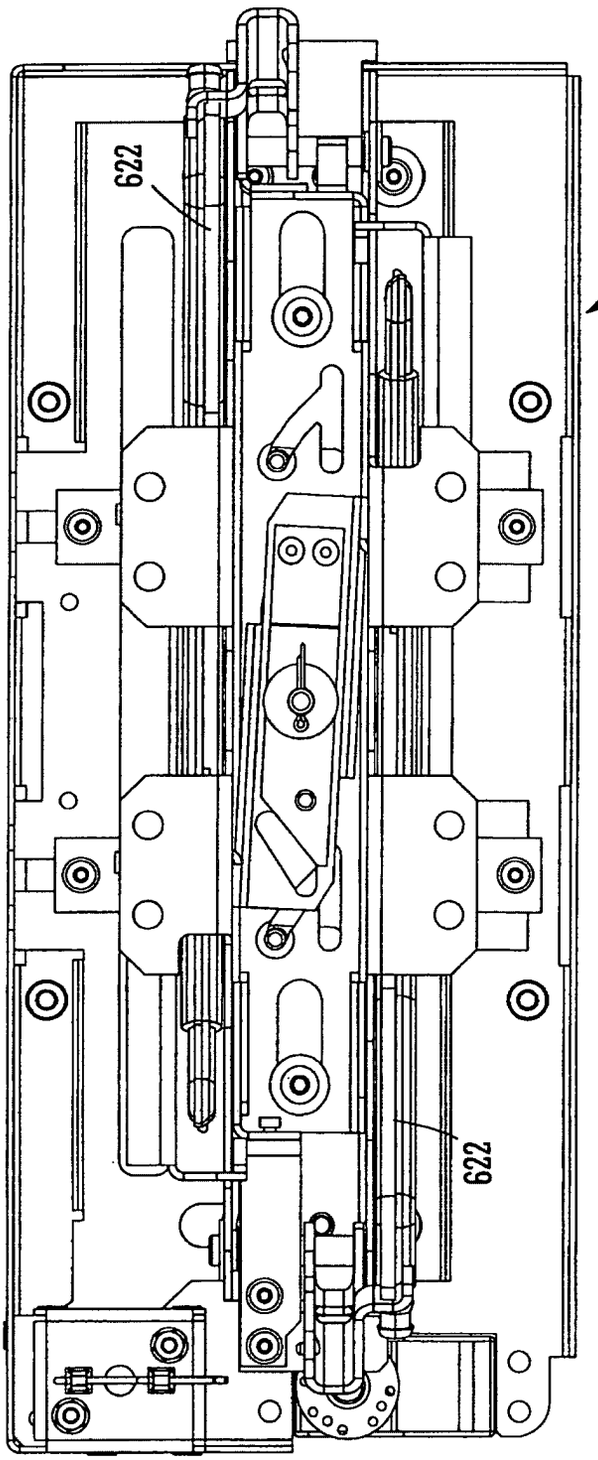

FIG. 23

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 04 25 1784

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 3 344 757 A (ROGER TOUYET) 3 October 1967 (1967-10-03) * column 1, line 17 - line 26 * * column 2, line 67 - column 3, line 52 * * column 5, line 55 - line 62; claims; figures *	5,8	A45C13/24
A	US 6 536 348 B1 (GRAL RENE) 25 March 2003 (2003-03-25) * column 1, line 7 - column 2, line 18; claims; figures *	1-15	
A	FR 2 792 674 A (PIETRA GERARD) 27 October 2000 (2000-10-27) * the whole document *	1-15	
A	US 2003/011466 A1 (CARADONNA BENITO-JEAN ET AL) 16 January 2003 (2003-01-16) * paragraphs [0001],[0004],[0050],[0126]-[0132]; claims; figures *	1-15	TECHNICAL FIELDS SEARCHED (Int.Cl.7)
A	US 4 799 435 A (BOUTROY MARC) 24 January 1989 (1989-01-24) * column 2, line 6 - line 25; claims; figures *	1-15	A45C E05G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	24 June 2004	Acerbis, G

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82