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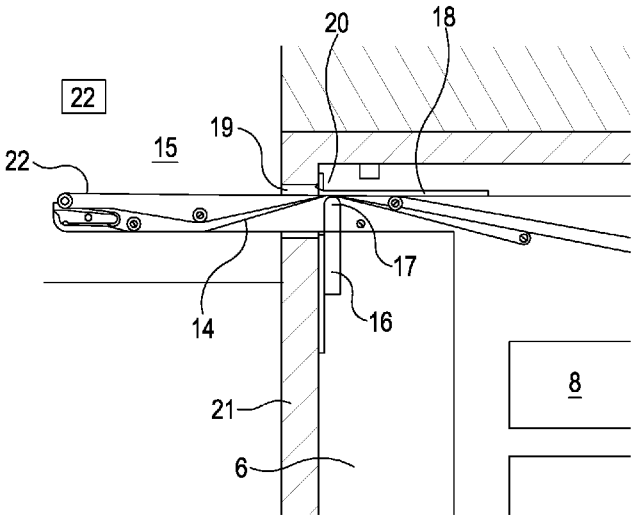


Fig. 2b

(57) Abstract: An automatic teller machine (ATM) (1) can include a security device. The ATM includes a safe (6) for holding currency (8), and a presenter mechanism (12) for conveying currency along a dispensing path (P) from the safe (6) through a safe wall slot (19) to a dispensing slot (4). The presenter mechanism (12) includes at least one conveyor belt (14) for conveying currency. The security device includes a first barrier (16) moveable by movement means towards a second barrier (18) from a first open position to a second closed position. The relative movement of the first and second barriers (16, 18) towards each other traps the conveyor belt (14) of the ATM between them and closes the dispensing path (P) when the first barrier (16) is in the second position.

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Security Device for ATM

Field of the Invention

The present invention relates to security devices for automatic teller machines (ATMs). The security devices are designed to protect ATMs from criminal attack, especially from attack by explosives, such as explosive gas mixtures and solid explosives.

Background to the Invention

An ATM is an Automated Teller Machine, an automated system that transports currency notes from currency cassettes (which are housed within a secure safe) to a customer via a dispensing slot.

A typical ATM includes a safe that houses currency cassettes containing currency (notes) of various denominations. A presenter mechanism transports the currency from the currency cassettes within the safe out to the dispensing slot. The dispensing slot is fitted with an automated shutter that opens when currency is dispensed to a customer.

The dispensing slot is fitted to a fascia of the machine which normally includes a card reader slot, screen for displaying information/instructions, control buttons and a slot for dispensing receipts.

The currency is transported from the currency cassettes within the safe to the dispensing slot by conveyor belts of the presenter mechanism. When the currency arrives at the dispensing slot the automated shutter opens and allows the customer to take their currency.

In order to dispense currency (cash) from the safe, there is a direct path from the safe body, via an opening or slot in the safe wall, out to the dispensing slot

This dispensing path provides a possible route for criminal attack on the safe within the ATM. Explosives or explosive gas mixtures may be delivered into the safe along this pathway. An explosion inside the safe can blow the safe door open allowing access to the currency stored in the safe, inside the cassettes.

There is therefore the need to protect a safe within an ATM from attack along the dispensing path.

Current approaches to counter such attacks include reinforcement of the dispensing slot and its associated shutter. However the shutter may still be forced or access gained by breaking through the fascia.

In US2009/0277362 a mechanism for blocking a safe wall slot in an ATM with a moving barrier is described. The approach described requires fitting a retracting presenter mechanism, adding to the mechanical complication of the ATM described.

Description of the Invention

The present invention provides a security device for an automatic teller machine (ATM), the ATM including a safe for holding currency, and a presenter mechanism for conveying currency along a dispensing path from the safe through a safe wall slot to a dispensing slot; wherein the presenter mechanism includes at least one conveyor belt for conveying currency;

the security device comprising:

a first barrier moveable by movement means towards a second barrier from a first open position to a second closed position; wherein the relative movement of the first and second barriers towards each other traps the conveyor belt between them and closes the dispensing path when the first barrier is in the second position.

The second barrier may be fixed or may itself move from a first open position to a second, closed position, moving towards the first barrier.

The second barrier may be a part specifically fitted to the ATM to be part of the security device. When the second barrier is a fixed barrier, it may alternatively be an existing part of the ATM, typically a part of the presenter mechanism, such as a plate that is part of a housing for the conveyor belt or belts.

Closing the dispensing path is conveniently achieved by locating the first and second barriers so as to close the dispensing path at the safe wall slot when the first barrier is in the second position. Closure at the safe wall slot is convenient as the safe wall, around the slot, provides an existing boundary to the edges of the dispensing path.

Closure at the safe wall slot is useful as it may make it more difficult to deliver explosive gases into the safe. The device may also be more resistant to attack when the safe wall slot is closed, as the barriers may be located, or substantially located, inside the safe.

In general an attack with intent to cause an explosion in the interior of an ATM may be made via the dispensing slot or by making a hole in the fascia at the front of the ATM. By closing the dispensing path, explosive devices, or a probe such as a pipe, for delivering explosive gases, cannot readily be inserted into the safe of the ATM. Closing the safe wall slot has some advantages. Even if an explosive gas mixture, or an explosive devise are successfully forced into the ATM between the dispensing slot and the safe; an explosion in that space may not breach the safe itself. Thus the attempt to access cash can be thwarted.

However, other locations are possible depending on the configuration of the presenter mechanism and its associated belt or belts. The closure may be at a part of the dispensing path forward of the safe wall slot i.e (nearer the dispensing slot). In some instances it may be advantageous to provide an apertured plate, transverse to the direction of travel along the dispensing path. The apertured plate defines an aperture through which the belt or belts of the presenter mechanism pass. The first and second barriers may be located close to or even in contact with the apertured plate. The barriers (when closed) and the apertured plate co-operate to form a barrier to attack.

The first barrier may move to the second position either upwards from below the conveyor belt or belts or downwards from above the belt or belts. The second barrier is located to the other side (above or below) of the belt or belts to allow trapping of the belt or belts between the barriers. Conveniently the first barrier moves upwards from the below the conveyor belt or belts, to close a safe wall slot that is typically towards the top of a wall of the safe holding the currency. This arrangement allows more space for the mechanism of the device, especially if movement means operates only on the first barrier.

However a downwards moving first barrier may be employed.

In either alternative, at least the first barrier moves towards the second barrier to trap the conveyor belt or belts against second barrier and close the dispensing path, typically by closing at the safe wall slot. It will be understood that the term "closure" of the dispensing path or safe wall slot does not require complete closure in the sense of hermetically sealed, although that may be achievable in some embodiments. Rather the dispensing path or safe wall slot is substantially closed, sufficient to resist ready insertion of explosives into the safe through the safe wall slot or infiltration of explosive gas mixtures into the safe.

When the dispensing path is closed by the security device, various locking devices may be employed to prevent tampering by forcing equipment or articles past the barriers and into the safe, as described in more detail hereafter. At least one locking device may be employed, to hold the first barrier in its second position.

The first barrier may comprise, consist of or consist essentially of a generally vertically disposed plate moving upwards (or downwards) to the second position. The plate is transverse to or generally transverse to the direction of the dispensing path. The plate may be made of hardened steel or other tamper resistant material or materials. For example the first barrier may be a plate of two or more metal sheets laminated together. Other sheet materials may be employed in a laminated plate form of barrier, to improve resistance to tampering.

The leading edge of the first barrier, the edge that engages the conveyor belt, may include a rounded profile, at least where the edge contacts conveyor belt material in use. This acts to avoid damage to the conveyor belt material.

Additionally or alternatively the leading edge of the first barrier may include or consist of a compliant material such as a resilient rubber or polymer that distorts to conform around the conveyor belt material as the first barrier is moved to the second position. This may avoid damage to the conveyor belts and provide a better closure of the dispensing path. Further or alternative closure of the dispensing path may be achieved, for example by providing one or more strips of brush material (having bristles projecting upwards or downwards as appropriate) attached to the leading edge of either or both of the first and second barriers.

Where the first barrier comprises a generally vertically disposed plate, the compliant material may be placed along the whole leading edge, or alternatively only at leading edge portions that contact or may contact the conveyor belt or belts when the first barrier moves to its second position.

Additionally or alternatively the second barrier includes or consists of a compliant material such as a resilient rubber or polymer that distorts to conform around the conveyor belt material as the first barrier is moved to the second position. Again these options may act to avoid damage to the conveyor belts and provide a better closure of the dispensing path.

In a typical ATM the safe wall slot may be larger than the minimum required for conveyance of currency using the presenter mechanism. Accordingly the security device of the invention may include an aperture reducing plate. The aperture reducing plate is fitted to the safe wall slot, reducing the size of the safe wall slot. The aperture reducing plate may reduce the size of the safe wall slot towards, or to, the minimum required to allow the presenter mechanism to function. The aperture reducing plate can increase the security of the safe by increasing the difficulty encountered when trying to defeat the security device, by trying to force a passage through or past the barriers, when they close at the safe wall slot.

The aperture reducing plate may be a hardened steel plate. The aperture reducing plate may be fitted to the inside of the safe wall. The first barrier may be fitted behind the aperture reducing plate i.e. further towards the interior of the safe than the aperture reducing plate.

More generally it is preferred that the first and second barriers are fitted inside the safe of the ATM. There is more space for fitting the device and tampering may be more difficult when the mechanism is inside the walls of the safe and closes at the safe wall slot.

Conveniently the second barrier may be a fixed barrier. Such a fixed barrier may take the form of a keeper plate. The keeper plate may be a generally horizontally disposed fixed plate. The keeper plate may extend horizontally into the safe. The keeper plate may include a layer of a compliant material such as a resilient rubber or polymer that

distorts to conform around the conveyor belt material as the first barrier is moved to the second position. A generally horizontally disposed keeper plate may be employed where the dispensing path is generally horizontal (as is typical for at least a part of the dispensing path near the safe wall slot).

A generally horizontally disposed keeper plate extending into the safe can aid in resisting tampering intended to force a way past a vertically moving first barrier. However, a fixed second barrier that takes the form of a generally vertically disposed plate may be employed. The plate is positioned to meet the first barrier as it moves to close the dispensing path i.e. is typically transverse to the direction of the dispensing path and aligned above or below the first barrier, depending on whether the first barrier moves upwards or downwards when closing the dispensing path (moving towards the second position). The leading edge of the fixed plate may be rounded and may include compliant material on the leading edge, in the same ways as discussed above with respect to the first barrier.

In an alternative the second barrier may be a moving barrier, which moves, when driven by movement means, from a first position to a second position that is closer to the first barrier. The movement of the second barrier may be before, after, or simultaneously, with the movement of the first barrier from its first to its second position. Advantageously, movement of the second barrier is simultaneous with or nearly simultaneous with the movement of the first barrier from the first to the second position. This results in more rapid closing of the dispensing path.

A moving second barrier may comprise, consist of or consist essentially of a generally vertically disposed plate moving upwards (or downwards) to the second position. The plate is transverse to or generally transverse to the direction of the dispensing path. The plate may be made of hardened steel or other tamper resistant material or materials. For example the first barrier may be a plate of two or more metal sheets laminated together. Other sheet materials may be employed in a laminated plate form of barrier, to resist tampering. The leading edge of a second moving barrier, the edge that engages the conveyor belt, may include a rounded profile, at least where the edge contacts conveyor belt material in use. Other features such as the use of resilient material on the leading edge, as discussed above with respect to the first barrier are also contemplated.

The first barrier may rest close to or against the second barrier when the dispensing path is closed, typically by closing at the safe wall slot. Alternatively the first barrier may more closely interengage with the second barrier in various ways. For example one of the first and second barriers may include one or more projections, with each projection placed for nesting in a corresponding depression or a slot in the other barrier, when the dispensing path and/or the safe wall slot is closed. Both barriers may be provided with projections and depressions or slots for interengagement with the corresponding feature on the other barrier.

Typically the conveyor belt or belts employed in the presenter mechanisms of ATMs are provided in opposed pairs (top and bottom) running in the direction of the dispensing path, between which the currency notes are gripped as they are transported along the dispensing path after they have been dispensed from currency cassettes housed within the safe. The movement of the barrier or barriers of the device traps the belts as the dispensing path is closed.

Movement means is provided to move at least the first barrier from the first to the second position. A number of different options may be employed as movement means. Where both the first and second barriers are moving barriers, each may be provided with separate mechanisms as movement means and the mechanisms may be of similar or of different types.

For example a spring loaded actuator may shoot each moving barrier or barriers of the device into position to close the dispensing path. A bolt or bolts or other lock mechanism(s) may also operate to lock the barrier(s) in place.

Alternatively a barrier may be moved by being driven by an electric motor, for example an electric motor driving a drive screw or a worm and worm wheel arrangement to move the barrier, typically along a linear path (upwards or downwards) into the second position. Again a bolt or bolts or other locking mechanism may be employed to hold the barrier in place, resisting tampering or forcing open.

Where a bolt or bolts or other lock mechanism(s) operate to lock the barrier(s) in place the mechanism(s) may unlock automatically for example when the cash dispensing slot is closed as discussed below. Alternatively a lock mechanism may only be capable of

being reset when a user intervenes. A spring loaded actuator arrangement with a shot bolt locking mechanism, may be used as a means to keep the dispensing path closed until such time as a user (operator of the ATM) intervenes manually to reset the mechanism. This is described in more detail hereafter and with reference to a particular embodiment.

The control of the security device may be done in various ways depending on the operational requirements.

The movement means of the security device may operate so that the dispensing path is closed except when currency notes are being moved along the dispensing path. Thus the dispensing path is closed, providing a barrier against explosive attack, most of the time.

In a typical ATM the cash dispensing slot at the exterior of the machine has a shutter that opens when currency is dispensed to a client. The security device may operate so that the dispensing path is closed whenever the cash dispensing slot is open i.e. an interlock device such as an electronic, electro mechanical or mechanical interlock device, may be employed. This can ensure that at least one of the dispensing path (e.g. at the safe wall slot) and the cash dispensing slot is closed at all times, during normal operation.

Alternatively or additionally the security device may operate in response to signals from at least one sensor fitted to the ATM machine. This allows the security device to close the dispensing path; even if the cash dispensing slot is closed; even if an interlock between the dispensing path closure point and the cash dispensing slot is disabled; or even if entry to the dispensing path, towards the safe wall slot, has been made by forcing a hole through the fascia of the ATM rather than by forcing the cash dispensing slot open.

Thus for example a sensor may trigger the movement means in response to vibration, or in response to foreign objects detected (for example by infra-red motion sensors) in the region of the currency dispensing path between the currency dispensing slot and the safe wall slot. Thermally activated sensors may also be employed, to trigger

activation of the security device when high temperatures are detected (for example from cutting torch activity).

The security device of the invention may be fitted as original equipment to a new ATM or may be retrofitted to existing models of ATMs. Thus the present invention also provides an ATM fitted with the security device described herein and a kit of parts for fitting or retrofitting to an ATM.

Thus the present invention provides an automatic teller machine (ATM) comprising:

a safe for holding currency, and a presenter mechanism for conveying currency along a dispensing path from the safe through a safe wall slot to a dispensing slot;; wherein the presenter mechanism includes at least one conveyor belt for conveying currency;

the security device comprising:

a first barrier moveable towards a second barrier by movement means from a first open position to a second closed position; wherein the relative movement of the first and second barriers towards each other traps the conveyor belt between them and closes the dispensing path when the first barrier is in the second position.

The ATM of the invention may include any of the various options and refinements described herein in its security device. For example, the aperture reducing plate when the dispensing path is closed by closing at the safe wall slot, and/or one or more of the sensor options and/or movement means options.

Thus the present invention provides a kit for fitting to an automatic teller machine (ATM), wherein the ATM includes a safe for holding currency, and a presenter mechanism for conveying currency along a dispensing path from the safe through a safe wall slot to a dispensing slot;; wherein the presenter mechanism includes at least one conveyor belt for conveying currency;

the kit comprising:

movement means; and

a first barrier moveable towards a second barrier by the movement means from a first open position to a second closed position; wherein relative movement of the first and second barriers towards each other traps the

conveyor belt between them and closes the dispensing path when the first barrier is in the second position.

The kit of parts of the invention may include any of the various options and refinements described herein with respect to the security device. For example, the aperture reducing plate which may be employed where the closure is at the safe wall slot, and/or one or more of the sensor options and/or movement means options. Locking devices and interlocks as described herein may also be included in the kit. The kit may also include the second barrier and (if being used) movement means for the barrier. Otherwise the second barrier may be an existing component of the ATM and associated equipment such as a part of the presenter mechanism, for example a plate that is part of a housing for the conveyor belt or belts.

The present invention also provides a method for resisting an attack an attack involving causing an explosion in the interior of an automatic teller machine (ATM), wherein the ATM includes a safe for holding currency, and a presenter mechanism for conveying currency along a dispensing path from the safe through a safe wall slot to a dispensing slot; wherein the presenter mechanism includes at least one conveyor belt for conveying currency;

the method comprising fitting to the ATM a security device comprising:

movement means; and

a first barrier moveable towards a second barrier by the movement means from a first open position to a second closed position; wherein relative movement of the first and second barriers towards each other traps the conveyor belt between them and closes the dispensing path when the first barrier is in the second position; and

setting the security device for operation.

The method may include fitting and using any of the various options and refinements described herein with respect to the security device. For example, the aperture reducing plate where the closure is at the safe wall slot, and/or one or more of the sensor options and/or movement means options. Locking devices and interlocks as described herein may also be fitted. A second barrier and (if being used) movement means for the second barrier may be fitted. Otherwise the second barrier may be an existing component of the ATM and associated equipment such as a part of the

presenter mechanism, for example a plate that is part of a housing for the conveyor belt or belts.

An ATM may accept cash (notes) and/or cheque payments. The ATM may therefore include an insertion slot as well as a cash dispensing slot. Cash or cheques inserted into the insertion slot may be conveyed by a second presenter mechanism along a path through a safe wall slot to the interior of the safe. The second presenter mechanism may include at least one conveyor belt for conveying currency and/or cheques. Where such an arrangement is fitted a second security device may be provided. The second security device may take the same form as that described herein for the security device. The second security device may include any of the various options and refinements described herein with respect to the security device. For example, the aperture reducing plate where the closure is at the safe wall slot, and/or one or more of the sensor options and/or movement means options. Locking devices and interlocks as described herein may also be fitted. A second barrier and (if being used) movement means for the second barrier may be fitted. Otherwise the second barrier may be an existing component of the ATM and associated equipment such as a part of the second presenter mechanism, for example a plate that is part of a housing for the conveyor belt or belts of the second presenter mechanism.

Brief Description of the Drawings

Figures 1a and 1b show an ATM machine in schematic front elevation and schematic cut away side elevation;

Figures 2a and 2b show in schematic side elevations operation of an ATM security device;

Figures 3a and 3b show in schematic side elevations operation of another ATM security device;

Figures 4a, 4b, 4c and 4d show operation of ATM security devices; and

Figures 5a and 5b show in schematic front elevation an ATM presenter mechanism.

Description of Some Preferred Embodiments

Figure 1a shows in schematic front elevation an ATM (automatic teller machine) 1. The ATM has a fascia 2 including a dispensing slot 4 fitted with a shutter 5 for dispensing currency.

As can be seen from schematic cut away side elevation figure 1b, the ATM 1 includes a safe 6 containing cassettes of currency 8. The safe 6 has a door 10 at the rear to provide access for an operator, to replenish the cassettes.

In use, a presenter mechanism 12 (only partly shown for clarity), transports currency from safe 6, by means that include conveyor belts 14, via the space 15 behind the fascia 2 to the dispensing slot 4 on the fascia 2. The route from safe 6 through to dispensing slot 4 constitutes a dispensing path P for the currency.

A sensor 22 is located at slot 4 in this example, with further sensors 22 optionally fitted in space 15 and/or at or near the presenter mechanism 12

Schematic detail figure 2a shows conveyor belts 14 of presenter mechanism 12 passing through safe wall slot 19 to space 15 and towards the dispensing slot 4 (not shown in this figure, see figure 1b).

As part of a security device of the invention, a first, moving barrier 16 in the form of a vertically disposed plate is located below the conveyor belts 14 and includes a rounded top edge 17. A second, fixed barrier 18 in the form of a horizontally disposed keeper plate is positioned above the conveyor plates 14.

The aperture of safe wall slot 19 is made smaller by the use of a wall aperture plate 20, fitted inside the wall 21 of safe 6 (see figures 5a, 5b discussed hereafter).

In response to a signal from one or more sensors 22 a moving means (not shown in this figure, but see figures 4 for examples of moving means that may be employed with moving barriers of the invention.), moves the moving barrier 16 from its first (open) position as shown in figure 2a to a second (closed) position as shown in figure 2b. The direction of motion is suggested by arrow X. Sensor or sensors 22 may be located for example in space 15, at dispensing slot 4, or on presenter mechanism 12.

Sensors 22 may be for example vibration or motion sensors, infra-red motion detection sensors or thermally activated sensors.

As can be seen in figure 2b rounded top edge 17 of barrier 16 compresses conveyor belts 14 against barrier (keeper plate) 18, acting to close at the safe wall slot 19; in this example closure is aided by the presence of aperture plate 20. The barriers 16, 18 and 20, act to close the dispensing path P by closing at the safe wall slot 19. Unless closed, the dispensing path could allow insertion of explosive material into the safe 6. This protection is provided even if access past the fascia 2 is achieved by forcing open dispensing slot 4 or otherwise gaining access past the fascia 2.

Figures 3a and 3b show the operation of another security device comprising two barriers. In this example first moving barrier 16 is complemented by second moving barrier 23. Both barriers 16 and 23 take the form of vertically disposed plates. As indicated by arrows X and Y, when operated the moving barriers 16 and 23 move towards each other to compress the conveyor belts 14 and close at the safe wall slot 19.

Figures 4a and 4b show, in more detail, partial perspective views of part of a presenter mechanism 12, fitted with a security device of the invention. The presenter mechanism 12 has a front end A which delivers currency out from three pairs of conveyor belts 14, with one belt 14a of each pair above a corresponding lower belt 14b, to a dispenser slot of an ATM (not shown in this partial view). The rear end B of the presenter mechanism is located in use inside a safe of an ATM, where it picks up currency from cassettes. Aperture reducing plate 20 will be inside and flush with the safe wall. Part 18a of a fixed barrier (keeper plate) 18 is inside the reducing plate 20 i.e. inside the safe in use. The other part 18b of keeper plate 18 is outside the safe in use, serving to protect the presenter mechanism from attack from above.

Moving barrier 16 takes the form of a slotted plate moveable on guides 24 and rods 25 (see figures 4c, 4d) in the direction X. In figure 4a the moving barrier 16 is in the first position and the presenter mechanism 12 may operate normally to dispense currency. Springs 26, part of a spring loaded actuator mechanism (moving means) are compressed. On release of the springs 26 when activated by a sensor signal, the barrier 16 moves in direction X towards fixed barrier 18. As shown in figure 4b the moving barrier 16 is forced by the springs up into its second position. Barrier 16 may be locked in this position by the operation of a bolt 27 (see figure 4c) or other lock mechanism.

In some designs of ATM presenter mechanism, a fixed barrier such as plate 18 may be a standard part of the presenter mechanism. In which case fitting a fixed barrier 18 to co-operate with moving barrier 16, to close the dispensing path may not be required.

In the example of figures 4a and 4b the dispensing path for currency is closed by closing at the safe wall slot. Parts 16, 18a and 20 co-operate to provide the closure. Alternatively the moving barrier 16 could, for example be located forwards of the position shown, for example at some point Y forward of the part of presenter mechanism 12 and below portion 18b of fixed barrier 18. At that location the barrier 16 can serve to close the dispensing path, rather than specifically at the safe wall slot. An apertured plate similar to part 20 could be provided at the more forward location Y of the barrier 16 to provide a similar arrangement to that depicted in figures 4a and 4b, but with closure of the dispensing path occurring a distance in front of the safe wall slot.

Certain features of the apparatus are more easily seen in cut away figures 4c and 4d, In these figures aperture reducing plate 20, part A of the presenter mechanism and part 18b of barrier 18 are not shown.

In figure 4c the guides 24 and rods 25 or the slotted plate moving barrier 16 can be seen. Also visible through an aperture in plate 16 is bolt 27. Bolt 27 engages a hole 29 in the barrier 16 to prevent its motion under the action of springs 26. When bolt 27 is withdrawn from hole 29 in response to a signal from a sensor, the springs 26 force the barrier 16 in direction X to the closed (second) position as depicted in figure 4d. In this position bolt 27 can engage with a lower hole 30 to lock the barriers 16 and 18 together.

Also shown in figures 4c and 4d are teeth 28 on the leading edge of barrier 16 with corresponding slots 32 on part 18a of barrier (fixed plate)18. When barrier 16 is moved to the second position the teeth 28 are engaged with the slots 32 – they pass through them – giving a securely locked arrangement. As alternatives the teeth 28 might engage depressions in a fixed barrier. As a yet further alternative the fixed barrier 18 might carry teeth, with slots or depressions being provided on moving barrier 16.

In a closed position, such as depicted in figure 4d entry into an ATM safe along the path of conveyor belts 14 is closed. Better sealing, to resist entry of explosive gases, may be obtained where the leading edge 17 of barrier 16 and/or the bottom face of barrier 18 includes resilient material such as a rubber or plastic. Brush features may also be provided along at least part of the leading edge 17 or may depend from the bottom face of barrier 18.

Figures 4e and 4f show another arrangement, in similar views to those of figures 4c and 4d. The arrangement of figure 4e shows a moving barrier 16 mounted on screws 33 threaded through end portions 34 of the barrier 16. The screws are powered by a DC motor 36 via a drive belt 38. When the drive is activated to rotate the screws the barrier 16 rises in the direction X to the closed position as depicted in figure 4f. This arrangement may be employed, for example, when it is desired to interlock the position of barrier 16 with the opening on a cash dispensing slot, so that barrier 16 is controlled to be always in the position of figure 4f when the cash dispensing slot of an ATM is open.

Figure 5a shows in schematic front elevation the end A of a presenter mechanism such as that shown in figure 4a. As can be seen in figure 5a the safe wall slot 19 has space above the conveyor belts 14 which could provide access for tampering with the a safe.

In figure 5b the positioning of aperture reducing plate 20 is depicted, showing how the slot 19 is reduced to the minimum or near to the minimum required for the passage of the conveyor belt arrangement.

CLAIMS:

1. A security device for an automatic teller machine (ATM), the ATM including a safe for holding currency, and a presenter mechanism for conveying currency along a dispensing path from the safe through a safe wall slot to a dispensing slot; wherein the presenter mechanism includes at least one conveyor belt for conveying currency;

the security device comprising:

a first barrier moveable by movement means towards a second barrier from a first open position to a second closed position; wherein the relative movement of the first and second barriers towards each other traps the conveyor belt between them and closes the dispensing path when the first barrier is in the second position.

2. The security device of claim 1 wherein closure of the dispensing path is at the safe wall slot.

3. The security device of claim 2 wherein the first and second barriers are fitted inside the safe of the ATM, in use.

4. The security device of claim 2 or claim 3 wherein the safe wall slot is closed by operation of the security device.

5. The security device of any one of claims 1 to 4 wherein second barrier is a fixed barrier.

6. The security device of claim 5 wherein the second barrier is a part of the security device.

7. The security device of any preceding claim wherein the second barrier is a moving barrier.

8. The security device of any preceding claim wherein the security device further comprises an aperture reducing plate, fitted to the safe wall slot of an ATM, in use.

9. The security device of any preceding claim wherein the first barrier comprises, a generally vertically disposed plate moving upwards or downwards to the second position.

10. The security device of claim 9 wherein the plate is transverse to or generally transverse to the direction of the dispensing path.

11. The security device of any preceding claim wherein the first barrier moves upwards from below the at least one conveyor belt.

12. The security device of any one of claims 1 to 10 wherein the first barrier moves downwards from above the at least one conveyor belt.

13. The security device of any preceding claim wherein the leading edge of the first barrier comprises a compliant material.

14. The security device of any preceding claim wherein the second barrier comprises a compliant material that distorts to conform around the at least one conveyor belt as the first barrier moves to the second position.

15. The security device of any preceding claim wherein the security device is provided with at least one locking device to secure the first barrier in the second position.

16. The security device of claim 5 wherein the second barrier is a generally horizontally disposed fixed plate.

17. The security device of claim 16 wherein the generally horizontally disposed fixed plate extends in to the safe of the ATM in use.

18. The security device of any preceding claim wherein the movement means for the first barrier comprises a spring loaded actuator.

19. The security device of any one of claims 1 to 17 wherein the movement means for the first barrier comprises an electric motor to drive the motion of the barrier.

20. The security device of any preceding claim wherein an interlock device is provided to ensure that at least one of the dispensing path and the cash dispensing slot is closed at all times in normal operation.

21. The security device of any preceding claim wherein at least one sensor is provided and the closure of the dispensing path is operated in response to a signal from the at least one sensor fitted to the ATM machine.

22. The security device of claim 21 wherein the sensor sends a signal in response to one of vibration, motion detected by infra-red and change in temperature.

23. The security device of claim 1 wherein closure of the dispensing path is forward of the safe wall slot, nearer the dispensing slot.

24. The security device of any preceding claim wherein one of the first and second barriers includes one or more projections, with each projection placed for nesting in a corresponding depression or a slot in the other barrier, when the dispensing path and/or the safe wall slot is closed.

25. The security device of any preceding claim wherein the movement means operates so that the first barrier is in the second position, closing the dispensing path, except when currency is to be conveyed along the dispensing path.

26. An automatic teller machine (ATM) including a security device in accordance with any one of claims 1 to 25.

27. A kit for fitting to an automatic teller machine (ATM), wherein the ATM includes a safe for holding currency, and a presenter mechanism for conveying currency along a dispensing path from the safe through a safe wall slot to a dispensing slot;; wherein the presenter mechanism includes at least one conveyor belt for conveying currency;

the kit comprising:

movement means; and

a first barrier moveable towards a second barrier by the movement means from a first open position to a second closed position; wherein relative

movement of the first and second barriers towards each other traps the conveyor belt between them and closes the dispensing path when the first barrier is in the second position.

28. A method for resisting an attack involving causing an explosion in the interior of an automatic teller machine (ATM), wherein the ATM includes a safe for holding currency, and a presenter mechanism for conveying currency along a dispensing path from the safe through a safe wall slot to a dispensing slot; wherein the presenter mechanism includes at least one conveyor belt for conveying currency;

the method comprising fitting to the ATM a security device comprising:

movement means; and

a first barrier moveable towards a second barrier by the movement means from a first open position to a second closed position; wherein relative movement of the first and second barriers towards each other traps the conveyor belt between them and closes the dispensing path when the first barrier is in the second position; and

setting the security device for operation.

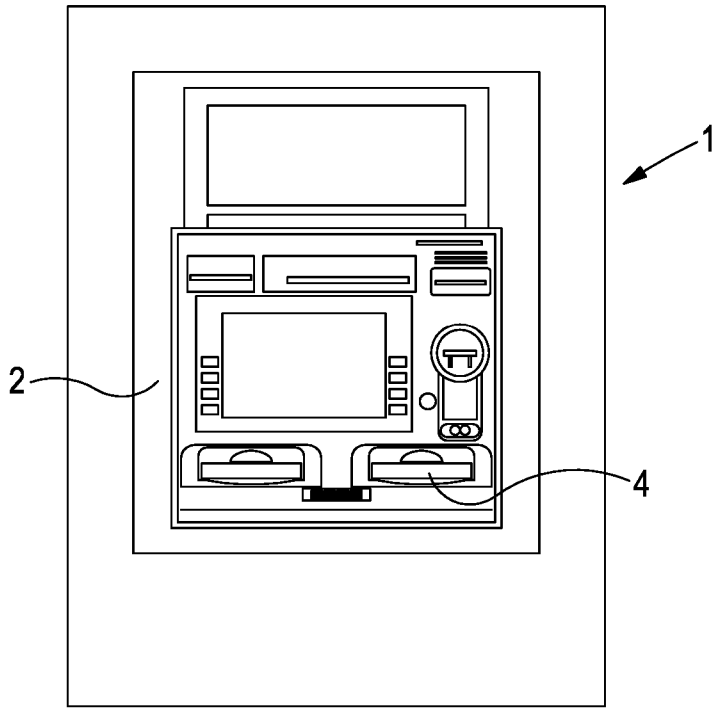


Fig. 1a

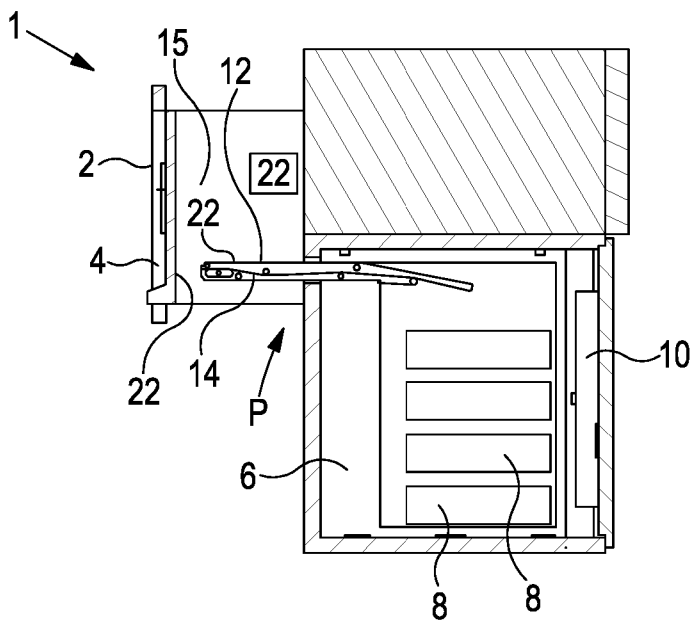


Fig. 1b

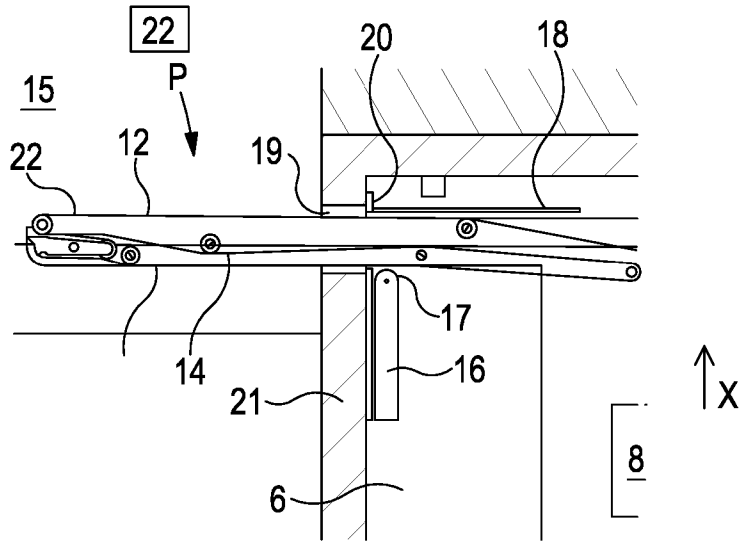


Fig. 2a

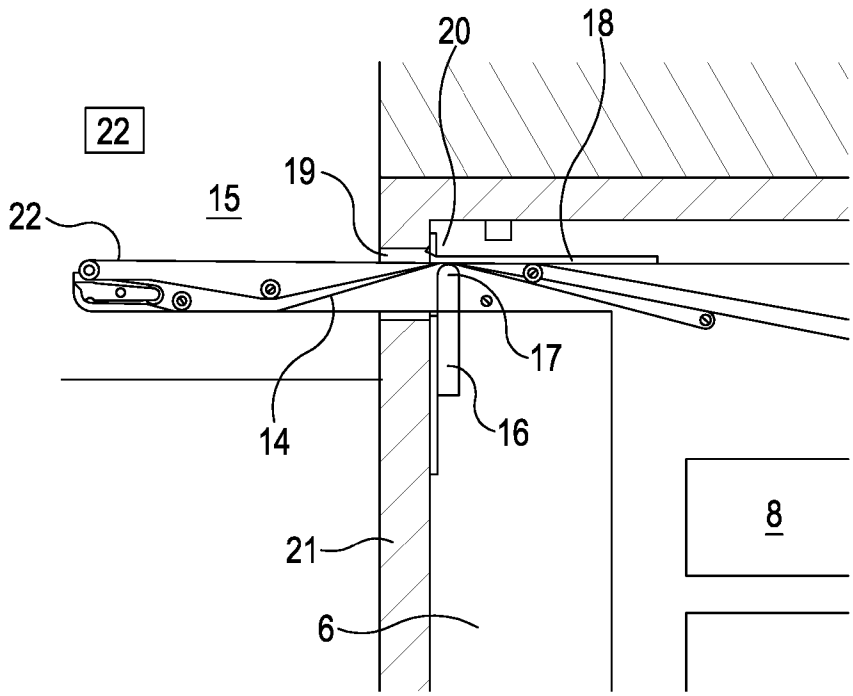


Fig. 2b

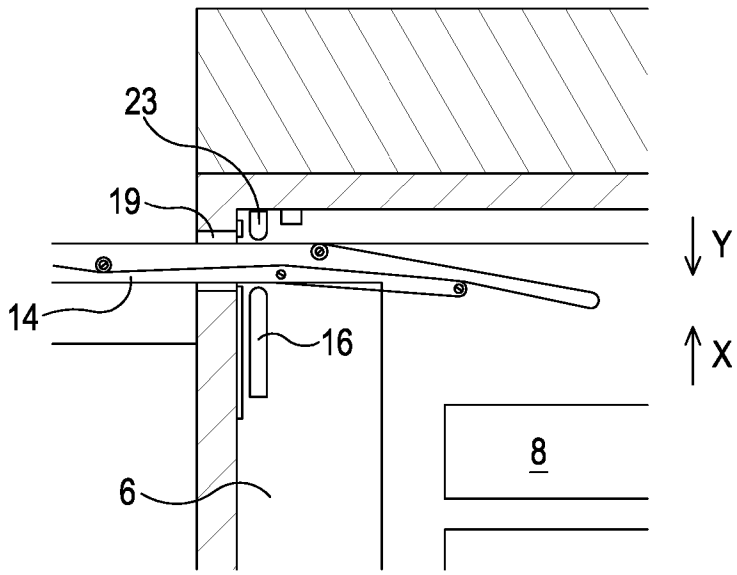


Fig. 3a

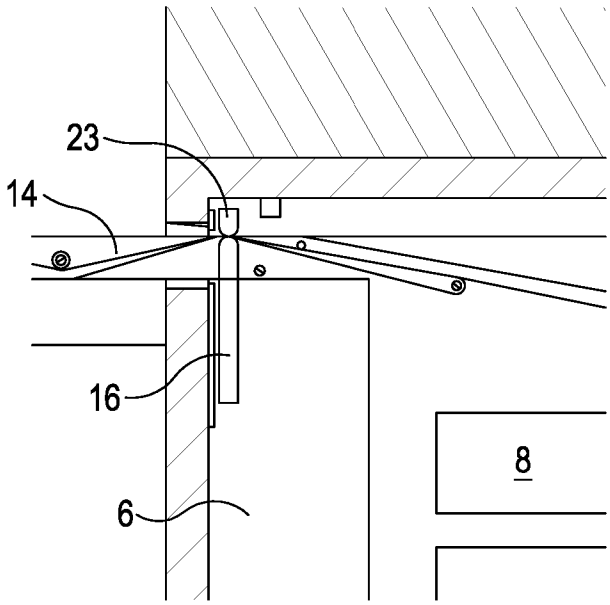


Fig. 3b

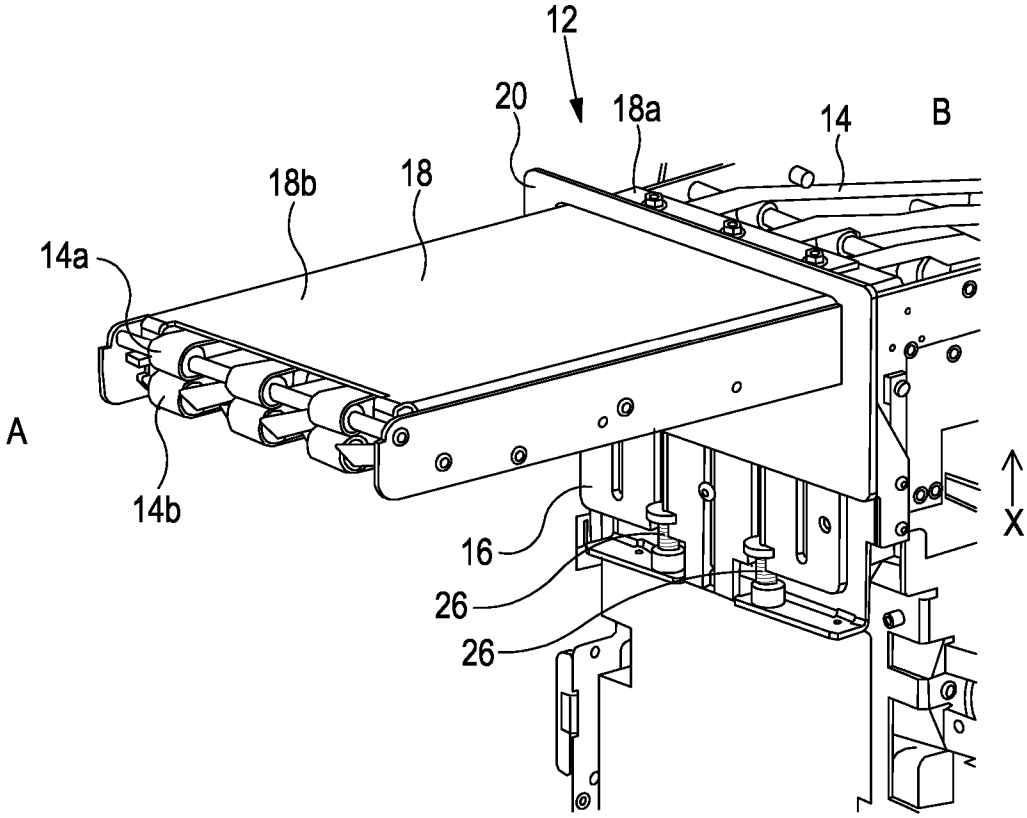

12
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18a
14
B
18b
18
14a
A
14b
16
26
26
X

Fig. 4a

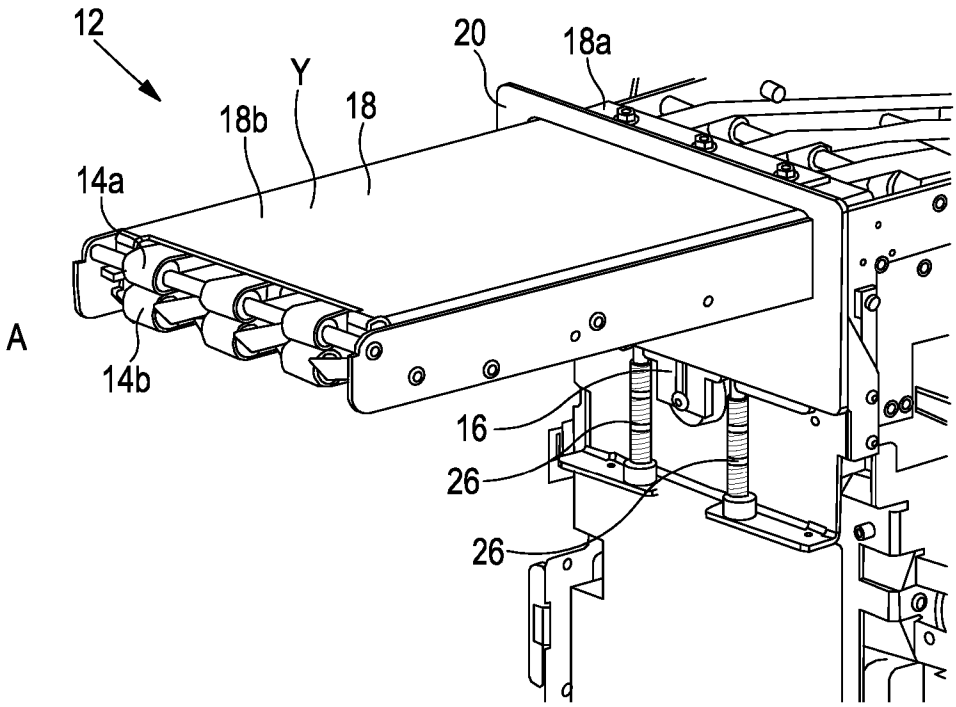

12
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18a
Y
18b
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14a
A
14b
16
26
26

Fig. 4b

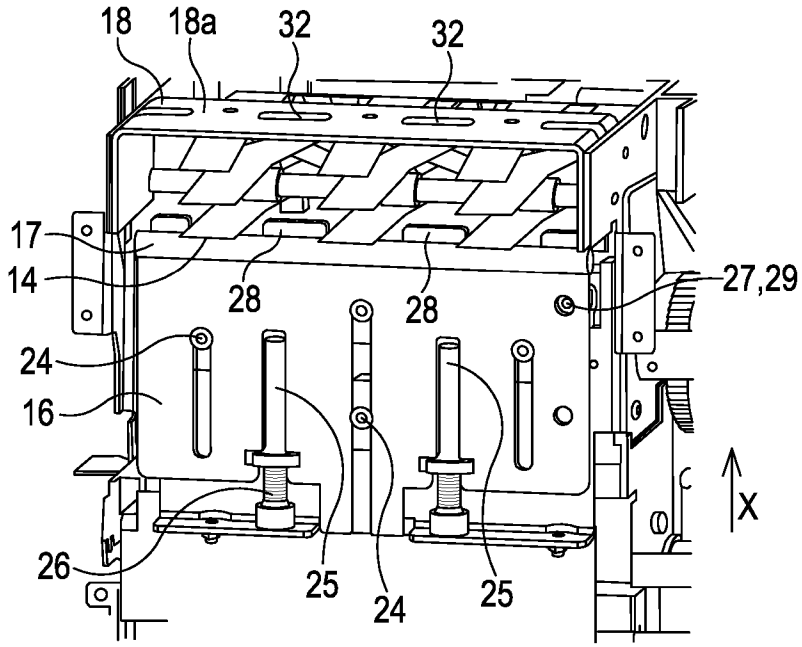

18
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X
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25

Fig. 4c

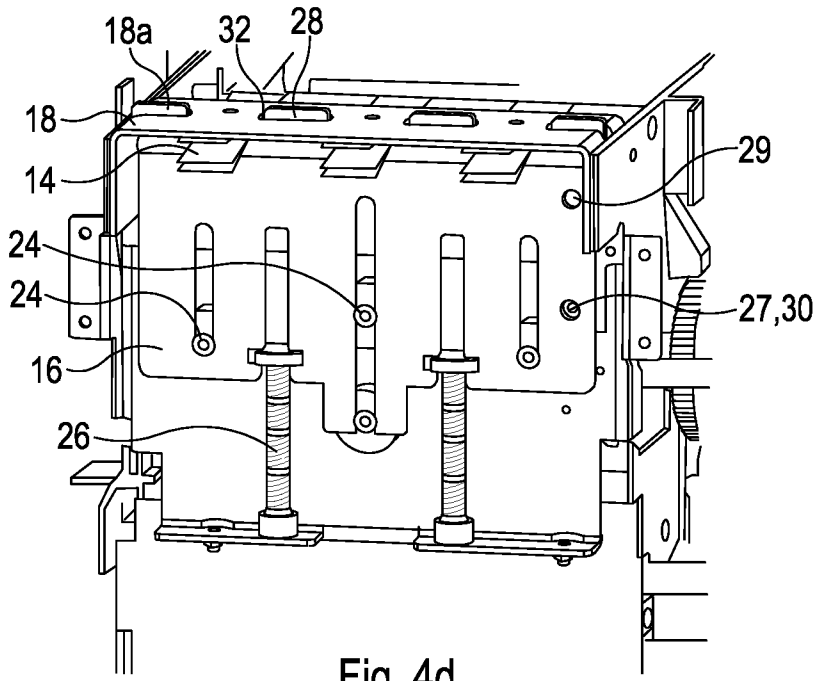

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16
26

Fig. 4d

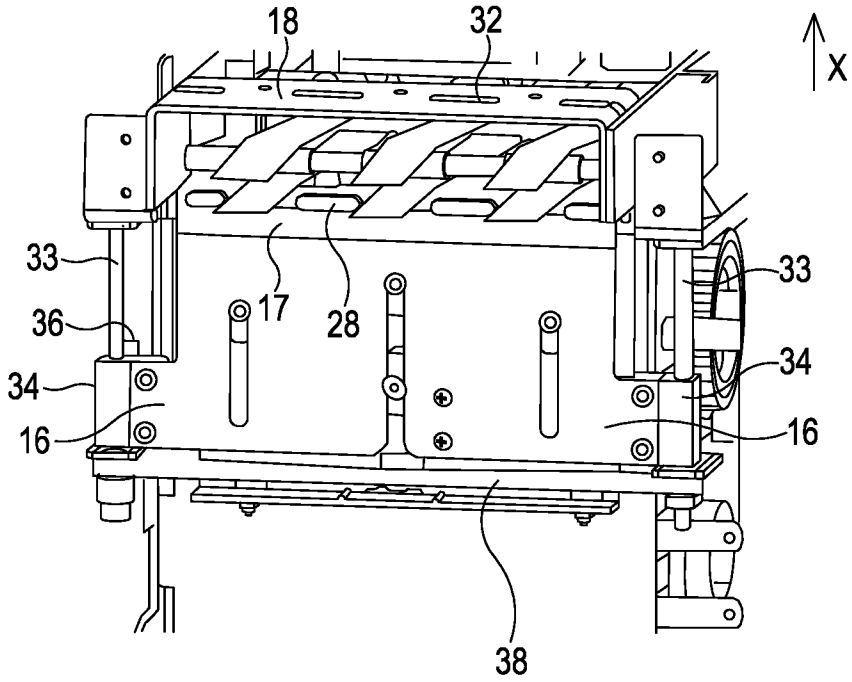


Fig. 4e

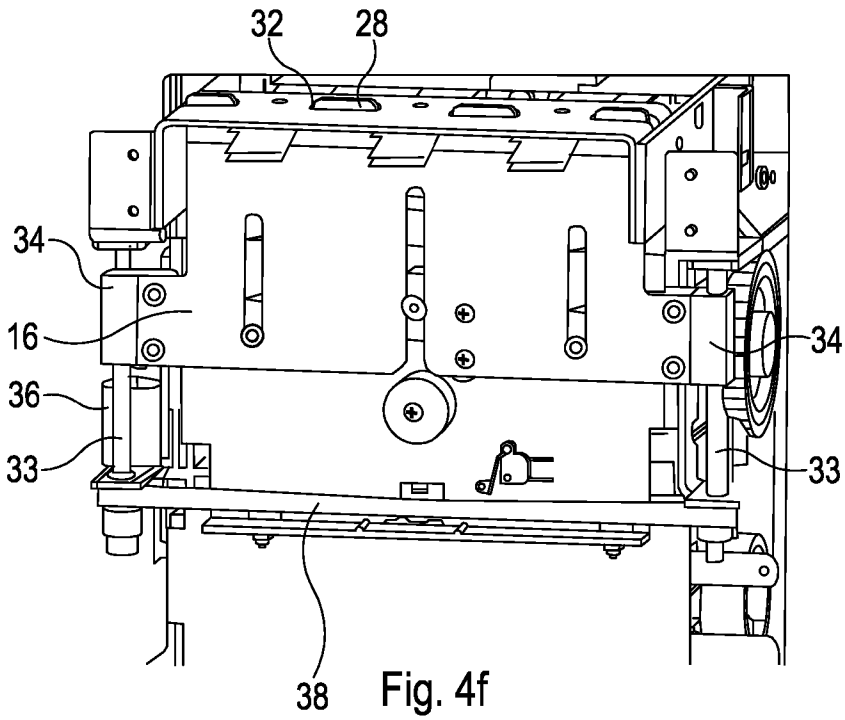


Fig. 4f

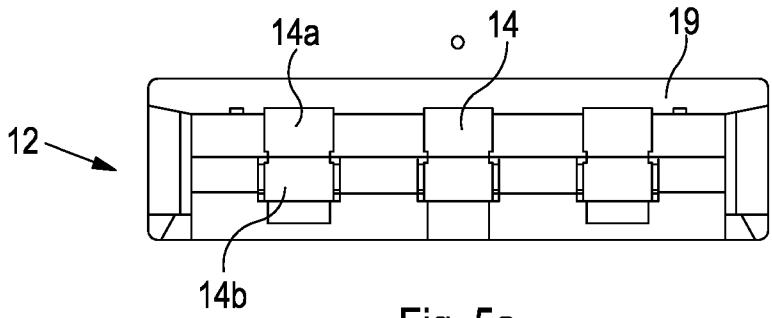


Fig. 5a

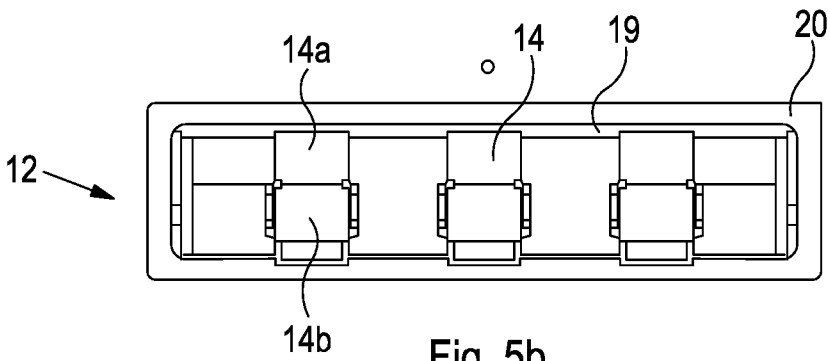


Fig. 5b

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2017/051344

A. CLASSIFICATION OF SUBJECT MATTER
INV. G07F19/00 E05G1/02 E06B9/02
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
G07F E05G E06B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 2 648 168 A1 (M I B S R L [IT]) 9 October 2013 (2013-10-09) the whole document -----	1-28
X	JP 2007 035005 A (OIZUMI KK) 8 February 2007 (2007-02-08) the whole document -----	1-28

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
3 July 2017	11/07/2017

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Guenov, Mihail

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/GB2017/051344

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2648168 A1	09-10-2013	EP 2648168 A1	09-10-2013
		US 2013256332 A1	03-10-2013
JP 2007035005 A	08-02-2007	NONE	