United States Patent [19]

Chartrand et al.

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[45] **Nov. 25, 1975**

[54] **REMOTE CONTROLLED STRONG BOX ASSEMBLY AND LATCH THEREFOR**

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[21] Appl. No.: **384,001**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 113,178, Sept. 3, 1971, abandoned.

[52] **U.S. Cl.** **109/59;** 70/242

[51] **Int. Cl.** **E01g 1/04**

[58] **Field of Search** ..... 109/23, 24, 50, 51, 58, 109/64, 65; 292/144, DIG. 43; 70/242

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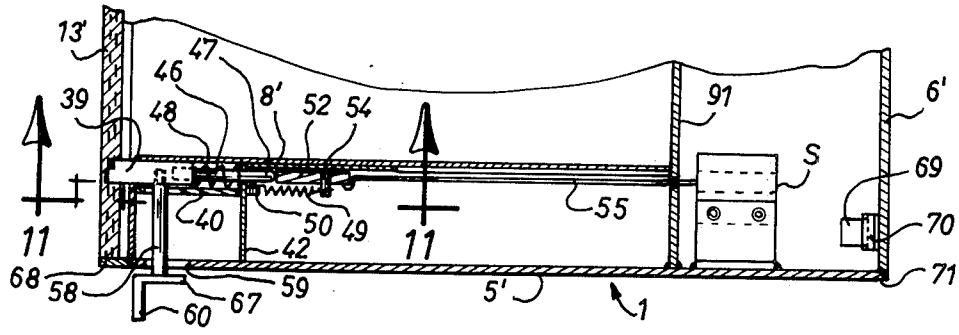
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Primary Examiner—Dennis L. Taylor

[57] **ABSTRACT**

A strong box unit adapted to be used as a single unit or as part of a multi-unit assembly and having a latch particularly adapted to be remote controlled and to defeat the attempts to gain unauthorized access to the contents of the strong boxes. A latch adapted to require both manual and remote actuation to open a door of a strong box. The latch is adapted to be operated by an electromechanical means energized by a delay circuit arranged to cancel, if desired, a delay cycle which has been started. A strong box constructed to conceal all the moving parts inside thereof and having a door with no apparent hinge. In the multi-unit assembly, a remote control is provided with a manual selector switch which is arranged to be connected to open anyone of a number of strong boxes.

14 Claims, 19 Drawing Figures



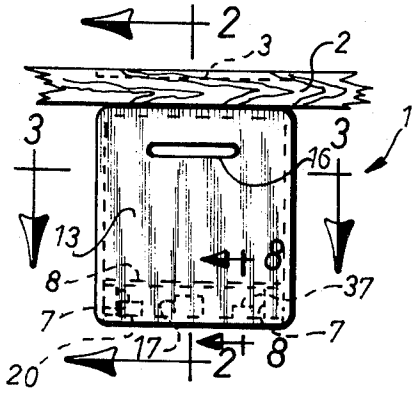


FIG.1

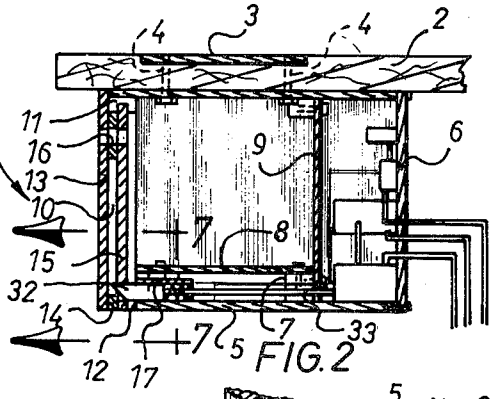


FIG.2

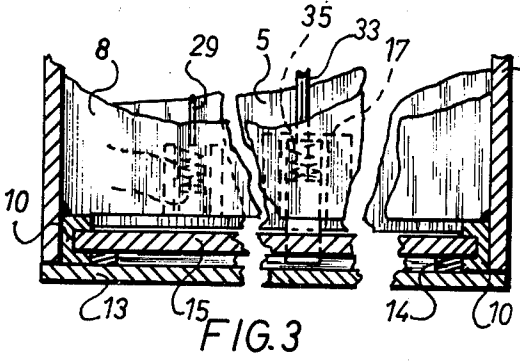


FIG.3

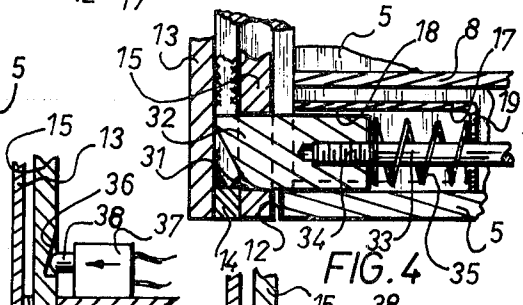


FIG.4

FIG.8

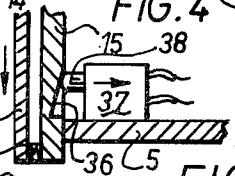


FIG.9

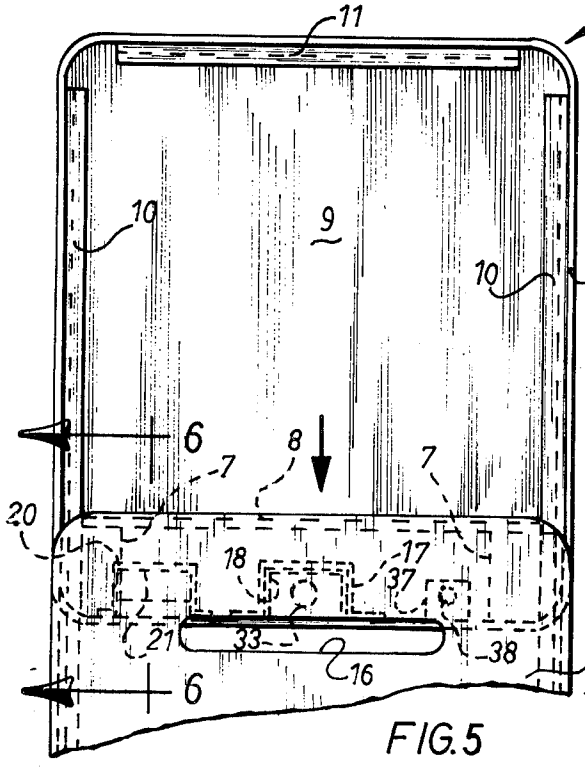


FIG.5

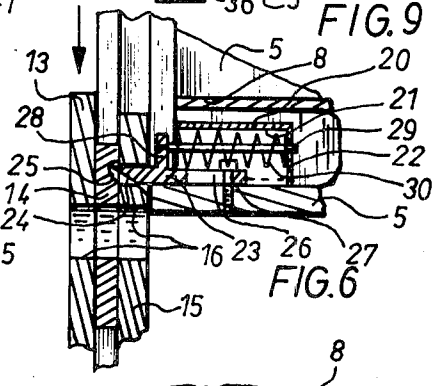


FIG.6

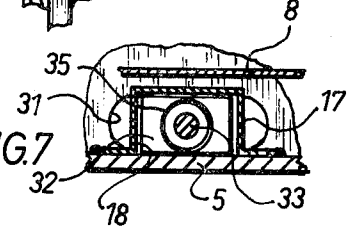


FIG.7

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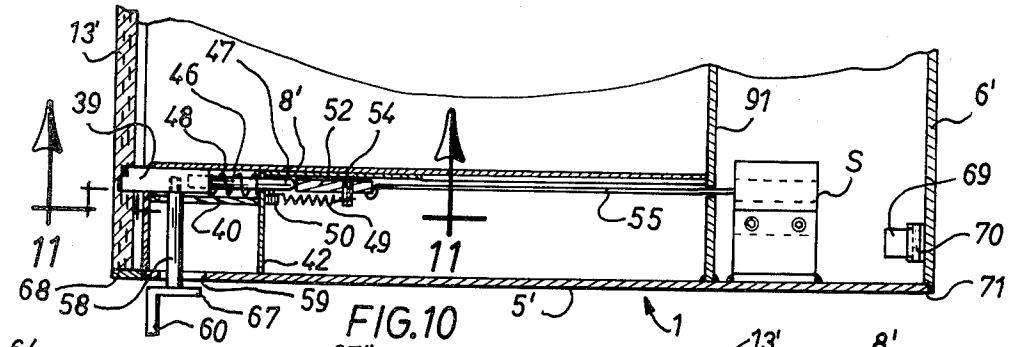


FIG.10

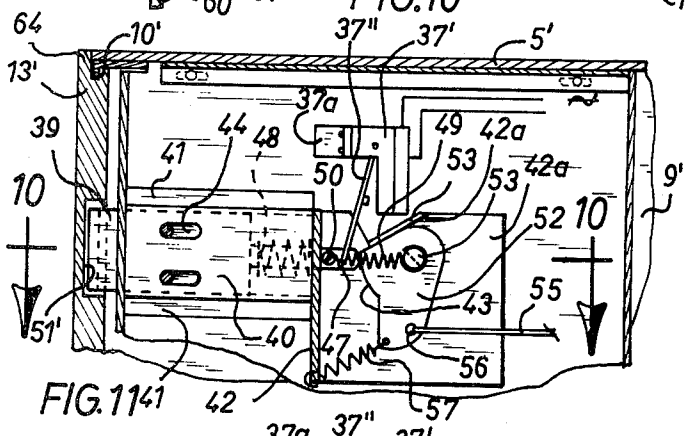


FIG.11

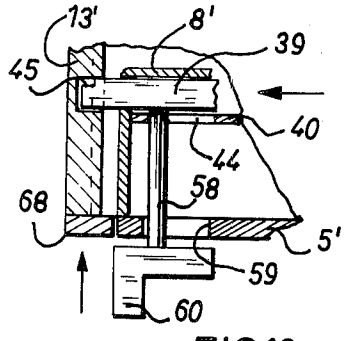


FIG.13

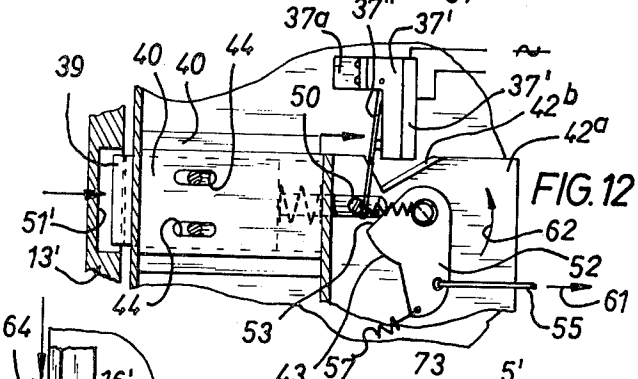


FIG.12

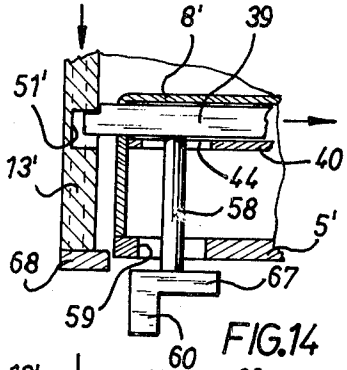


FIG.14

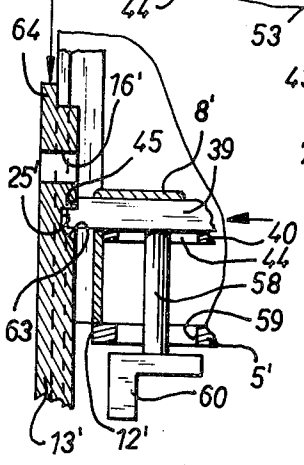


FIG.14a

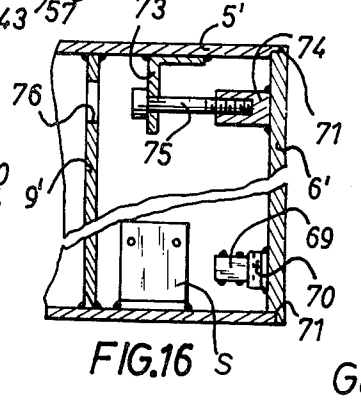


FIG.16

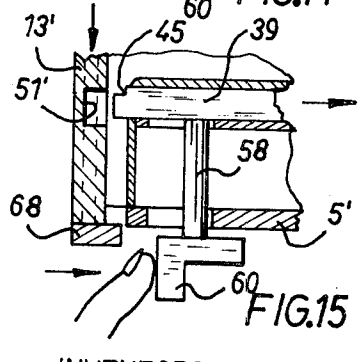


FIG.15

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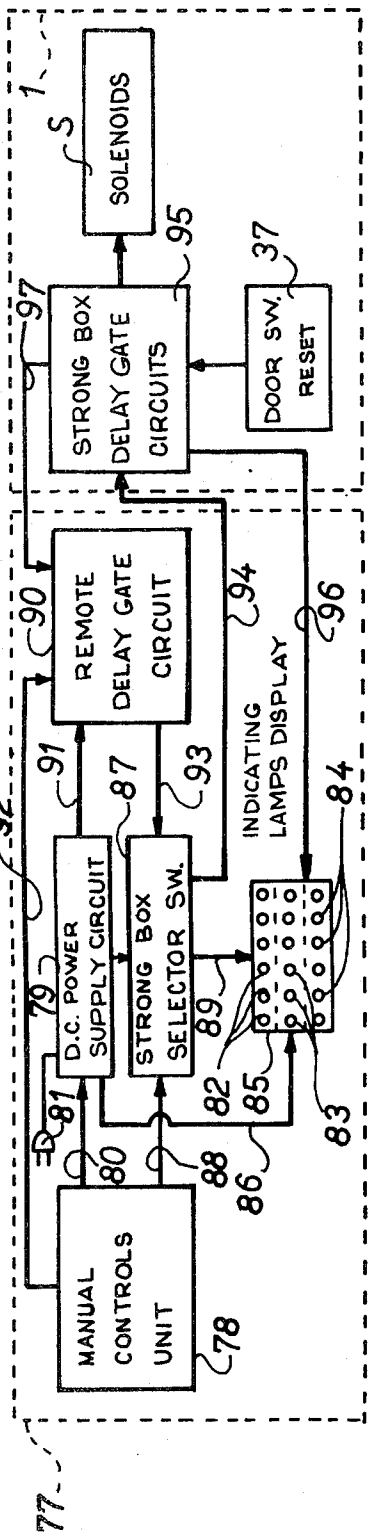


FIG17

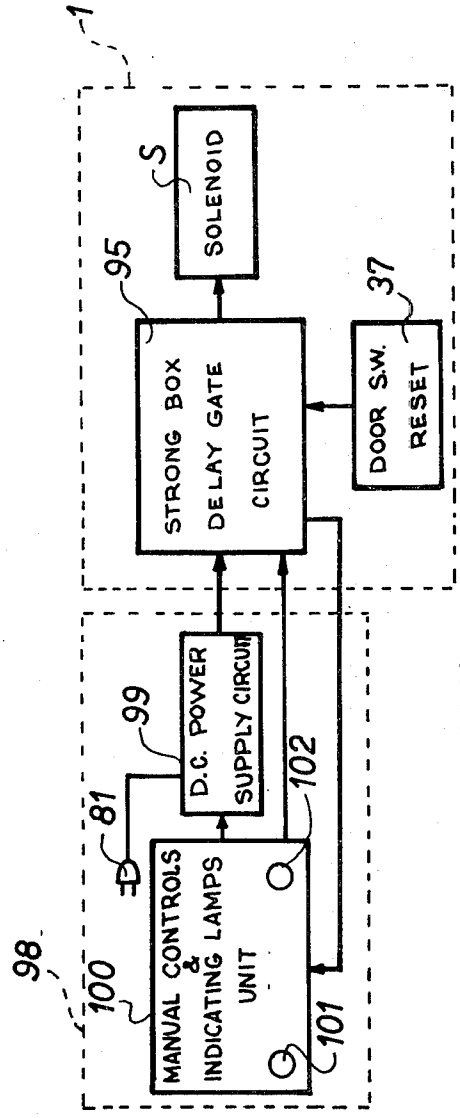


FIG.18

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REMOTE CONTROLLED STRONG BOX ASSEMBLY AND LATCH THEREFOR

This application is a continuation-in-part of application Ser. No. 113,178, filed Sept. 3, 1971, now abandoned.

This invention relates to strong boxes and, more particularly, to remote controlled strong boxes and to a latch adapted to be used therewith.

The safe handling of money presents serious problems in places like banks, stores and box offices. Different measures and strong boxes have been proposed so far to counter the action of thieves, with only partial success. Furthermore, it has been noted, for instance, that with the present systems, the cashiers must frequently count their money to put some away or must bring more to their cash, resulting in substantial circulation of money inside the establishment, be it a bank, a store or a box office. The above practice results in dangerous exposure of important sums of money to eventual thieves. It has been noted, and confirmed by the statistics, that the thieves operate usually very quickly and stay an average of about two minutes or less on the scene of the robbery and it appears to be important for them to operate fast.

It is a general object of the invention to take advantage of the above statistically confirmed timed operation of the thieves to counter their illegal action.

It is a more specific object of the invention to provide a strong box assembly with a latch actuated by a delay circuit to psychologically counter the action of the thieves.

It is another object of the invention to provide a latch which must be actuated, both by a remote control and manually, to physically counter the action of the thieves.

It is a further object of the invention to provide a strong box assembly including a strong box and a remote control therefor arranged such as to require more than one thief to gain access to the interior of the strong box.

It is a further object of the invention to provide a strong box assembly having a remote control and a plurality of strong boxes connected thereto to form a multi-unit assembly and a manual selector switch in the remote control to select the strong box to be opened.

It is another object of the invention to provide a strong box with an opening to allow a cashier to insert money therein without opening the door to thereby safely divest himself of the surpluses of money without exposing the latter to the view of the public and possibly thieves.

It is another object of the invention to provide a strong box arranged to be opened by a delay circuit, wherein a started delay cycle can be cancelled or reset to zero by the operation of a key switch, a manual selector switch or by a delay cycle reject switch or by tampering.

It is another object of the invention to provide a strong box unit with a door having no apparent hinge or lock and being strong and relatively tamper-proof, said unit being adapted to be conveniently fixed under a counter for easy access thereto by a cashier.

It is another object of the invention to provide a strong box which is essentialy controlled from the inside thereof, such as to inconspicuously open to confuse the thieves.

It is another object of the invention to provide a strong box with a door locked by a latch which must be released by a key switch at a distance from the strong box.

The invention will now be defined with reference to the embodiments which are illustrated, by way of example only, in the accompanying drawings, in which:

FIG. **1** shows a front view of a first embodiment of a strong box according to the invention;

FIG. **2** is a cross-sectional view as seen along line **2—2** in FIG. **1**;

FIG. **3** is a cross-sectional view as seen along line **3—3** in FIG. **1**;

FIG. **4** is an enlarged cross-sectional view of part of FIG. **2**;

FIG. **5** is an enlarged front elevation view of the strong box of FIG. **1** shown with the door open;

FIG. **6** is a cross-sectional view as seen along line **6—6** in FIG. **5**;

FIG. **7** is a cross-sectional view as seen along line **7—7** in FIG. **2**;

FIG. **8** is a cross-sectional view as seen along line **8—8** in FIG. **1**;

FIG. **9** is a view corresponding to the view of FIG. **8** but showing the door slightly open;

FIG. **10** is a cross-sectional view corresponding to the view of FIG. **2** but showing another embodiment of the strong box and illustrating a preferred latch;

FIG. **11** is a cross-sectional view as seen along line **11—11** in FIG. **10**, showing the latch in locking position;

FIG. **12** is a view corresponding to the view of FIG. **11** showing the latch in electronically actuated position;

FIG. **13** is a cross-sectional elevation view showing the preferred latch in locking position;

FIG. **14** is a cross-sectional elevation showing the preferred latch in electronically retracted position;

FIG. **14***a* is a cross-sectional elevation view showing the preferred latch in engagement with the door of a strong box to stop the door in open position;

FIG. **15** is a cross-sectional elevation view showing the preferred latch in manually retracted position;

FIG. **16** is a cross-sectional view of the rear portion of a strong box;

FIG. **17** is a schematic diagram of a control circuit for the remote control of a multi-unit assembly according to the invention; and

FIG. **18** is a schematic diagram of a control circut for a single-unit strong box assembly.

STRUCTURE OF THE STRONG BOXES

A strong box **1** according to the invention is shown suspended from a counter **2**, for instance in a bank, store or box office. A rigid mounting plate **3** is fixed onto the counter **2** and bolts **4** are provided to suspend the strong box **1** from the mounting plate **3** and against the undersurface of the counter **2**. The strong box **1** comprises a strong tubular casing **5** having a rectangular cross-section and one end closed by a panel or plate **6** secured thereto to form the back wall of the strong box **1**. Interior supports **7** are provided in the casing **5** and a false bottom **8** is spot welded or otherwise firmly fixed to the supports **7** and the casing **5**. A partition **9** is transversely arranged inside the casing **5** in front and spaced from the back wall **6** to form a space to mount a strong box control circuit as diagrammatically illustrated in FIG. **17** or **18**. Lateral guide rails **10** and a top

rail 11 defining a door aperture are welded against the inner front edge of the casing 5 to mount a door therein for up-and-down sliding movement.

As will be understood later, the up-and-down sliding movement of the door is particularly advantageous, since the door can be opened by gravity without the assistance of any actuator. Obviously, the principle of the invention is applicable as well to doors which slide laterally or which are hinged by a concealed hinge, such as to make it difficult for the thieves to open the door. A cutout 12 is provided at the front end of the casing 5 in the bottom thereof to allow downward sliding of the door hereinafter described. The door structure comprises an outer front plate 13, an intermediate frame 14 and an inner plate 15 welded together and constructed such that the inner plate 15 slides into the slots of the side rails 10 and of the top rail 11. A slot 16 extends from one side to the other of the door, through the plate 13, the intermediate frame 14 and the plate 15 to allow insertion of valuables, such as money and bonds into the strong box 1 without having to open the door.

The features which are particular to the strong box of FIGS. 1 to 7 inclusive will now be described with reference to said Figures. A bracket 17 having a guideway opening 18 of rectangular cross-section and a back plate 19 is welded onto the bottom portion of the casing 5 and extends lengthwise thereof. A similar bracket 20 having a guideway opening 21 and a back plate 22 is also welded onto the bottom portion of the casing 5 and extends lengthwise thereof.

A door stopping block 23 is slidably mounted longitudinally into the opening 21 to limit or stop the opening movement of the strong box door. The door stopping block 23 has a slot 26 extending longitudinally thereof. A screw, pin or the like 27 is fixed into the bottom portion of the casing 5 and extends through the slot 26, such as to guide the door stopping block 23 for longitudinal movement towards and away from the door. The door stopping block 23 further has an upstanding projection 28 and a pin 29 is fixed to said projection and extends rearwardly thereof through a hole provided into the back plate 22 for slidable displacement of the pin 29 into the hole. A spring 30 is coiled around the pin 29 and is held between the upward projection 28 and the back plate 22 to bias the door stopping block 23 towards engagement into the recess 25 made in the top marginal portion of the door.

An opening 31 forming a catch is provided on the inner side of the door adjacent the bottom thereof. A latch member 32 is slidably mounted into the guideway 18 in registry with the opening or catch 31. An actuating rod 33 is threaded at 34 into the latch member 32 and extends therefrom away from the door. A compression spring 35 is coiled around the actuating rod 33 between the latch member 32 and the back plate 19 and urges the latch member 32 towards engagement in the opening 31.

Reference will now be made to FIGS. 8 and 9 to describe a door switch used with the embodiment of FIGS. 1 to 7 inclusive. A notch 36 having an inclined surface is provided on the rear side of the plate 15 adjacent the bottom edge thereof. A door micro-switch 37 having a spring biased push button 38 is mounted inside the casing 5 onto the bottom portion of the latter, such that the push button 38 registers with the notch 36 when the door is fully closed as in FIG. 8.

It should be noted that the inclined surface of the notch 36 is arranged to cam the push button 38 out of the notch 36 when the door starts to lower or open. In practice, the notch 36 is arranged to close the micro-switch 37 as soon as the door has been opened slightly, for instance as little as one-eighth of an inch.

COMBINED MANUAL AND ELECTRONIC LATCH

The door stopping block 23 and the latch member 32 described in relation to FIGS. 1 to 7 inclusive are preferably replaced by a single manual and electronic latch combination which will now be described in relation to FIGS. 10 to 15 inclusive wherein the same elements as above described are identified by the same reference numerals.

The latch of FIGS. 10 to 15 inclusive includes a latch member or plunger 39 slidably mounted into a guideway opening defined by a bracket 40 having side flanges 41 fixed by welding or otherwise against the undersurface of the false bottom 8. Another bracket is provided behind bracket 40 and includes a back wall or plate 42, which has a horizontal plate 42*a* and a flange 42*b* depending from the latter. The bracket includes a pair of slots 44 extending lengthwise thereof. The latch member or plunger 39 is formed with a step shoulder 45 at the end adjacent the door. A rod or rod portion 46 is fixed to the latch member 39 and extends therefrom away from the door to define a free end 47 extending rearwardly of the back plate 42. A compression spring 48 is coiled around the rod 46 and abuts plunger 39 and back plate 42 to urge plunger 39 into door latching position. A tension spring 49 has one end attached to a bolt 50 fixed to rod 46 and has its other end fixed to a pivot 54 of a cam 52. The spring 49 is arranged such that, when the latch member 39 engages fully into the opening or door notch 51 of the door, as shown in FIG. 10, the spring 49 is under tension and biases the plunger 39 to retract the same from the opening 51. The spring 49 is also arranged such that, when the plunger 39 has been fully retracted, as shown in FIG. 15, the tension into the spring 49 has been released. The spring 49 makes a complete turn on pivot 54 and its free end is inserted into a transverse hole thereof, such as to also serve to retain cam 52 on pivot 54. The tension force of spring 49 on rod 46 is greater than the compression force exerted on plunger 39 by spring 48. Both springs 48 and 49 act in opposite direction.

An actuating rod 55 is hooked into an aperture 56 of the cam 52 to pull on the latter to rotate the same such as to allow the free end 47 to engage the cam face 53, allowing retraction of the plunger 39 by the action of the prevalent tension spring 49. A pair of posts or the like 58 are fixed into the lower face of the latch member 39 and extend downwardly therefrom through the slots 44 and similar slots 59 in the bottom portion of the casing 5. A handle 60 is fixed at the free end of the two rods 58 and joins the latter transversely of the strong box 1.

The above-described latch operates as follows.

The actuating rod 55 is operatively associated to an electromechanical means, such as an electro-magnetor, a solenoid and plunger means, shown at S, to respond to a pulse therethrough to be displaced in the direction of the arrow 61 and to rotate the cam 52 in the direction of the arrow 62, thereby causing the cam face 53 to register with the free end 47 of the rod 46. The coil spring 49 causes the plunger 39 and the rod 46 to retract away from the door by biasing the free end 47 in contact with the cam face 53. The retraction of the

plunger 39 is limited by the counteraction of the return spring 57 and also of spring 48, which is compressed by retracting plunger 39 and by the straight cam face 53 forming a less acute angle with rod 46. The plunger sufficiently retracts to allow the door to engage the step shoulder 45. At that moment, the door is partly opened, about one-eighth of an inch, and a micro-switch 37' (corresponding to door micro-switch 37 of the first embodiment), is closed by the action of bolt 50 on its operating arm 37''. Micro-switch 37' is secured to a bracket 37*a* affixed to false bottom 8'. To complete the opening of the door, the handle 60 must be displaced rearwardly and released to complete the disengagement of the latch 39 from door notch 51 corresponding to opening 31. When this is done, the door starts to slide further downward under gravity.

It will be understood that the manual action on the handle 60 further rotates cam 52 against the action of return spring 57 and further compresses spring 48. As soon as handle 60 is released, the plunger 39 is biased into engagement against the inner side of the falling door, such that, when a door recess 25', provided near the top of door 13' at the inner face thereof, comes in line with the plunger 39, the latter under the action of the springs 48 and 57 engages into the recess 25' and stops the downward movement of the door. The recess 25' has a height to only receive the outer thinner end portion of the plunger 39, as can best be seen in FIG. 14*a*, in order to prevent full advance of plunger 39, which would result in plunger locking by cam 52. The door is closed by displacing the same upwardly, thereby causing the lower edge of the outer end of plunger 39 to engage inclined face 63 of recess 25' and to displace the plunger 39 rearwardly until it disengages from the recess 25' to allow full closure of the door. When the latter reaches the fully closed position, the plunger 39 is automatically pushed into engagement in the door notch 51 by springs 48 and 57 and the return spring 57 simultaneously rotates the cam 52 in the direction opposite to arrow 62 which displaces the actuating rod 55 in the direction opposite to arrow 61, as shown in FIG. 11. The latter shows the locking position taken by the cam 52 when the plunger is in latching position, the cam 52 then abutting against the flange 42b, as shown in FIG. 10.

It should be noted that, when the cam 52 and the plunger 39 are in their respective locking position, the latch 39 cannot be retracted by the manual actuation of the handle 60 due to the engagement of the rod 46 normally and radially to circumferential cam face 43 of the cam 52. As can be seen in FIG. 12, after the cam 52 has been operated by the solenoid S, the plunger 39 and the rod 46 can be retracted by the handle 60, since the rod 46 does not contact the cam face 53 normally thereto and, therefore, can cause rotation of cam 52.

The handle 60 is preferably provided with a flange portion 67 to conceal the slots 59 from view. Similarly, a flange 68 is provided at the lower edge of the door 13' to close the opening 12' which is provided to allow downward sliding of the door. Should a robber succeed in breaking handle 60, plate 42 forms a guard which still prevents access to cam 52. As shown in FIG. 11, bolt 50 abutting on back wall 42 prevents plunger 39 from contacting the bottom of door notch 51. Thus, hitting on door 13' cannot cause retraction of the plunger 39. Door 13' is made of a one-piece solid plate with a shoulder 64 around the top and sides to be flush with the external wall surfaces of casing 5'. The door sides have a groove to slidably receive guide rails 10' secured to casing 5'.

OTHER STRUCTURAL FEATURES OF THE STRONG BOXES

In FIGS. 10 and 16, there is illustrated a manner of removably attaching the back wall or plate 6' to the tubular casing 5' to form an enclosure structure. An angle-shaped bracket 69 having a laterally extending flange is welded to the inside of a side wall of the casing 5' and extends adjacent the rear edge thereof. An elongated plate 70 is welded along one of its edges against the inner side and along the bottom edge of the back wall 6'. The elongated plate 70 has its other edge spaced from the back wall 6', such as to engage the flange of the angle-shaped bracket 69. The edges of the back plage 6' are provided with a shoulder 71 adapted to engage on the rear edges of the casing 5' to form a positioning support for the back plate 6'. One or more brackets 73 are fixed against the undersurface of the top portion of the tubular enclosure 5' and depends downwardly therefrom. A similar number of screw-threaded bosses 74 are welded against the the inner face of the back plate 6' and screws 75, or the like, are threaded into the bosses 74 and cooperate with the brackets 73 to releasably hold the back plate 6'. A hole 76 is provided through the inside partition 9' in alignment with the screws 75. The latter are preferably formed with a head which requires a special tool for unscrewing thereof to make it more difficult to be opened by unauthorized persons. When the door cannot be normally opened, the above tool can be inserted through door slot 16' (which corresponds to door slot of the first embodiment) and the hole 76 to reach and unscrew the screws 75 to remove the back plate 6'. Obviously, the latter can also be removed to gain access to the strong box control circuit and elements located behind the partition 9' and under the false bottom 8'. As it can be seen, the back plate 6' is put in place by first engaging the side end thereof into place such that the plate 70 engages the forward side of the upstanding projection of the angle shape piece 69. The other side of the plate 6' is thereafter pushed forward into position and the plate 6' is screwed in place by the screws 75.

The door structure of the first embodiment is preferably formed with inner and outer plates 13 and 15 of heavy steel construction, such as No. 11 gauge stainless steel, and the intermediate frame 14 thereof is of welded construction. The door structure of the second embodiment is a one-piece steel plate. If desired, the door may be provided with a transparent window portion to see inside the strong box without having to open the door.

It must also be appreciated that the door is arranged to open very unconspicuously by means of an internally concealed latch. The latter in the case of the embodiment of FIGS. 1 to 7 inclusive is preferably made of non-magnetic material, such that it cannot be actuated from the outside by a magnet or the like.

Another feature of the latch members is that they are always biased and ready to lock the door; therefore, if the cashier perceives a danger of robbery, he has only to push the door to the fully closed position and the latch member will engage into the catch opening or notch.

CONTROL FOR A MULTI-UNIT ASSEMBLY

One or more of the above-described strong box **1** may be installed into a system or strong box assembly and arranged to be remote controlled, for instance by the manager from his office in a bank or another commercial establishment. Remote control systems in schematic form will now be defined with reference to FIGS. **17** and **18.**

It must be pointed out that the remote control makes it necessary to have a remote control operator and a strong box attendant to manually open the strong box.

It is a feature of the invention to further trouble the action of thieves by providing a remote control incuding a delay circuit which induces a delay, into the unlatching of the door, which lasts longer than the abovementioned 2 minutes normally spent by the thieves on the scene of their robbery.

A multi-unit assembly including six strong boxes connected to a single remote control is illustrated in FIG. **17** and will now be described, but it must be understood that the principle of the invention is applicable as well to systems having other numbers of strong boxes. The multi-unit assembly includes besides the six strong boxes **1,** a remote control box or unit **77** indicated by dash lines in FIG. **17.** The remote control box or unit **77** includes the remote control box elements which are assembled in any suitable and practical manner, which does not form part of the present invention.

More particularly, the remote control box **77** includes manual controls, not shown, which are conveniently represented by the box **78** in FIG. **17.** The manual controls preferably include an ON-OFF power switch, a key switch, a delay cycle reject switch, a delay cycle initiating switch and a strong box selector button. For a purpose which should be better understood later, an alarm switch and intercom controls may also be operatively associated with the manual controls in the box **78.** A d.c. power supply circuit **79,** of any convenient construction, is connected by the connection **80** to the manual controls **78** to be switched on and off by the ON-OFF power switch forming part thereof. An a.c. plug **81,** for instance for the ordinary wall outlet type, is connected to the d.c. power supply circuit **79** to feed the latter. An arrays of indicating lamps **82, 83** and **84** are arranged to form an indicating lamps display **85.** A connection **86** extends from the d.c. power supply circuit **79** to the indicating lamps display **85** to bias the latter in readiness to be switched on, as will be explained later.

A manual selector switch **87** of any suitable type or construction has series of contacts, not shown, arranged to select anyone of the six strong boxes and is connected, as indicated by the arrow **88,** to the manual controls **78** to be operated by the above-mentioned selector button thereof. A first series of contacts of the selector switch **87** are connected by a similar number of conductors **89** to indicating lamps **82** respectively to indicate which strong box **1** has been selected to be opened. The heavy lines in the control circuits of FIG. **17** indicate that a plurality of separate conductors, six in the described embodiment, extend there and connect to each other the circuits at the opposite ends thereof.

A remote delay gate circuit **90,** preferably of the semi-conductor type and of any appropriate design to produce a time delay of at least one minute, is biased by means of a connection **91** linked to the d.c. power supply unit **79.** A connection **92** links the manual controls **78** to the remote delay gate circuit **90** to suitably join the above-mentioned delay initiating switch and delay cycle reject switch to the remote delay gate circuit **90** to either initiate a delay cycle or to reject or cancel a started but incomplete delay cycle. An electrical connectin **93** joins the remote delay gate circuit **90** to the strong box selector switch **87** to transmit an output indicative of the termination of a remote delay period through one of a series of contacts of the switch **87** through the appropriate conductor of the plurality of conductors **94** to a strong box delay gate circuit **95.** The latter is also of any appropriate design to produce a time delay adjustable in the range from 2 to 15 minutes. A multiple-conductor connection **96** joins the strong box delay gate circuits **95** to the indicating lamps **83** and **84.** The multiple-conductors of the connection **96** are connected to the strong box delay gate circuits **95** to illuminate the appropriate lamp **83** when the corresponding strong box delay gate circuit is in the process of producing a delay cycle and to illuminate the appropriate lamp **84** when the door of the strong box is open. The door switch **37** or **37′,** described in relation with FIGS. **8** and **9** or **11** and **12,** serves to control the corresponding strong box delay gate circuit **95** to allow the production of a delay cycle therein and the flow of current to the corresponding indicating lamp **84.**

The solenoids S, one in each strong box **1,** are connected to the respective strong box delay gate circuit **95.** At the completion of a delay cycle, an output is produced by one of the strong box delay gate circuits **95** energizing the corresponding solenoid S, and causing partial unlatching of the door of the enclosing strong box **1.** The corresponding door switch **37** or **37′** is then actuated resulting in illumination of the associated lamp **84.** A feedback connection **97** is provided to bias the remote delay gate circuit **90,** such as to prevent reactuation thereof before an initiated delay cycle has been produced or cancelled.

Since the strong boxes **1** are adapted to be controlled from a remote location relative thereto, there are advantages for the operator of the remote control **77** to be able to communicate with the cashier from the remote location. Such communication is particularly useful to give instructions to the cashier when the strong boxes are otherwise opened, such as at the end of the day to count the money and to take it to the vault. In order to allow for such communications, the intercom controls which are mounted onto the manual control box **78** are connected to an intercom system to operate the same in any manner known in the art and which does not form part of the present invention.

The manual control elements of the manual control box **78** are conventional and will not be further defined. The manual controls **78** preferably includes the above-mentioned key switch, not shown, to prevent unauthorized access to and operation of the strong boxes **1.** An alarm may be provided in relation with the control circuit and arranged to be switched on by the actuation of the alarm switch which can also be mounted onto the manual control box unit **78** or remote control unit **77.**

OPERATION OF THE MULTI-UNIT STRONG BOX ASSEMBLY

The complete operation of the multi-unit control illustrated in FIG. **17** will now be described. After the plug **81** has been inserted in a conventional a.c. outlet,

the power is switched on by closing the ON-OFF power switch of the manual controls **78.** Power is then supplied by the d.c. power supply unit **79** to the remainder of the control circuit.

A key switch, not shown, is preferably provided and arranged to cause energization of the remote delay gate circuit **90.** The selector button or knob, not shown, can thereafter be rotated to a position to select one strong box which it is desired to open. If the door of the selected strong box, say strong box **1,** is not fully closed, the micro-switch **37** or **37'** will cause current to go through the corresponding lamp **84** to warn the operator of the manual controls **78.** The micro-switch **37** or **37'** which is also connected to the corresponding strong box delay gate circuit **95** when the door has not fully opened, prevents initiation of a delay cycle.

If we now assume that the door is fully closed, the micro-switch **37** or **37'** causes appropriate energization of the corresponding strong box delay gate circuit to then allow operation of the corresponding solenoid S. The corresponding lamp **82** is then illuminated to indicate the readiness of the corresponding delay circuit. The actuation of the delay initiating button then causes initiation of a the delay cycle and the production of an output after a predetermined time delay.

The output produced by the remote delay gate circuit **90** is fed to the strong box delay gate circuit of the selected strong box through the appropriate contacts of the strong box selector switch **87.**

After the delay cycle, the strong box delay gate circuit **95** produces operation of the corresponding solenoid S. As mentioned earlier, the door is then allowed to partially open and stop in that position. As soon as the door has been slightly open, about one-eighth of an inch or more, the micro-switch **37** or **37'** operates to cause the corresponding lamp **84** to go on, and the corresponding indicating lamp **83** to go out. As mentioned earlier, the full release of the door is completed by the manual contact provided for that purpose.

Another strong box may subsequently be opened by turning the above-mentioned selector button or knob to select another strong box and by re-actuating the delay initiating control switch.

The operator of the remote control may cancel and reset the programming circuit by turning the key switch to the OFF position. The operator may also de-energize the complete control circuit by opening the power line switch or he may actuate the delay cycle reject button and hence reset the delay gate circuits.

The cashier may be enabled to cancel or reset an initiated delay cycle by operating a manual reset switch, not shown, which may be conveniently fixed to the corresponding strong box in a conventional manner.

If the operator desires to sound the alarm when the door of any strong box is opened, he switches on the alarm circuit by operation of the above-mentioned alarm switch.

As desired, the multi-strong box assembly comprises a remote control delay gate circuit **90** and a strong box delay gate circuit **95** which are provided each with a delay interval such that the total time delay or interval from the actuation of the delay initiating button to the operation of the desired solenoid S exceeds the aforementioned statistically confirmed two minutes usually taken by the thieves to commit a robbery. For example, a delay of one minute for the remote control and of two minutes for the strong box control have been found satisfactory. This gives a total delay of three minutes before the opening of a strong box.

It must be noted that the control circuit, namely the key switch may be connected with the police station, to warn the police which could then intervene under certain predetermined circumstances.

CONTROL FOR A SINGLE-UNIT STRONG BOX ASSEMBLY

A control circuit designed to operate the door of only one strong box is schematically illustrated in FIG. **18** and will now be described. The elements of the single-unit control circuit of FIG. **18,** which are similar to elements of the previously described figures, will be identified by the same reference numerals.

The remote control circuit **98** includes a d.c. power supply **99** including substantially the same elements as the d.c. power supply circuit **79** assembled as is well known in the art. The manual control and indicating lamp unit **100** for a single unit includes a key switch and a pair of indicating lamps **101** and **102.**

The strong box delay gate circuit **95** and the door switch **37** and the solenoid S, whether for a multi-unit assembly or for a single-unit assembly, are the same.

OPERATION OF THE SINGLE-UNIT STRONG BOX ASSEMBLY

The control circuit of FIG. **18** is primarily energized by inserting the plug **81** thereof into an a.c. outlet. If the door is opened, the lamp **102** goes on due to the flow of current therethrough from the energized strong box delay gate circuit **95.** The other lamp **101** is not then illuminated, since the circuit therethrough is interrupted by the strong box delay gate circuit **95.**

When the door is fully closed, the flow of current from the strong box delay gate circuit **95** through the lamp **102** is interrupted by the door switch **37** or **37'** and the latter lamp is not illuminated. For here on, the operation of the remainder of the strong box circuit is as explained earlier with reference to FIG. **17** to energize the solenoid S, thereby unlocking the door, of the single-unit strong box assembly.

What we claim is:

1. A strong box assembly for the protection of valuables comprising a strong enclosure structure having a door aperture, a door structure mounted on said enclosure structure and arranged to close said door aperture, a latch means mounted onto one of said structure to releasably lock said door structure in closed position, a remote-controlled actuating means positioned inside said enclosure structure, engaging said latch means, and constructed and arranged to be operated from a remote location outside said enclosure structure, a manual actuating means operatively connected to said remote-controlled latch means, projecting exteriorly of said enclosure structure, and constructed and arranged to be manually operated to complete unlatching of said door and wherein the other of said structures has a notch, one of said latch means and notch has a step and actuation of said remote-controlled actuating means causes said latch means to take an intermediate retracted position into which said step is operatively engaged and arranged to retain said door in a partially open position, and said manual actuating means is constructed and arranged to further retract said latch means to clear said notch and release said door structure for complete opening.

2. A strong box assembly as defined in claim 1, wherein guide tracks are provided along opposite side edges of said door aperture, said door is slidably mounted in engagement with said guide tracks and said notch is formed into the inner side of said door, said latch means includes a plunger, a first spring engaging said plunger and biasing the latter away from said door structure, a cam movably carried by said enclosure structure, engaging said plunger to move the latter and operatively connected to said remote-controlled actuating means, and a second spring biasing said cam to a position in which said cam locks said plunger into full engagement with said notch, said remote-controlled actuating means, when actuated, moving said cam against the bias of said second spring to a plunger unlocking position.

3. A strong box assembly as defined in claim 1, wherein said enclosure structure is provided with guide tracks arranged along opposite edges of said door aperture to extend upwardly when said enclosure structure is operatively mounted, said door structure slidably engages said guide tracks and is arranged to open under gravity upon release of said latch means, said notch is a first notch formed near the lower end of said door structure, the latter has a second notch formed near the upper end of said door structure and extending into the inner side thereof and said plunger is arranged to engage into said first notch to lock said door structure in closed position, and into said second notch to retain said door structure in open position.

4. A strong box assembly as defined in claim 2, wherein said means to further retract said latch means includes a handle attached to said plunger projecting and accessible outside said enclosure structure, for further retraction of said plunger and complete opening of said door structure relative to said enclosure structure.

5. A strong box assembly as defined in claim 4, wherein said plunger is slidably mounted to engage into said notch, said handle is rigidly fixed to said plunger, said enclosure structure has a slot through an outside wall thereof, said handle is displaceable into said slot for actuation of said plunger.

6. A strong box assembly as defined in claim 5, further including a guard wall between said cam and said slot to prevent access to said cam through said slot.

7. A strong box assembly as defined in claim 5, wherein a bracket forming a bore for said plunger is fixed inside said enclosure structure, said plunger is mounted into said bore for reciprocating movement to and fro relative to said door structure, said plunger has a rod portion having a free end extending therefrom, away from said door structure, said cam is pivoted adjacent said free end of said rod portion, said first spring is tensioned between said rod portion and said enclosure and is arranged to bias said plunger away from said door structure and to apply said rod portion against said cam, a rod is connected to said cam and to said remote-controlled actuating means to be displaced by the latter, said cam has its pivot in alignment with said rod portion and has a partially circular cam face coaxial with said pivot and engaging said rod portion in the locking position of said cam.

8. A strong box assembly for the protection of valuables comprising a strong enclosure structure having a door aperture, a door structure mounted on said enclosure structure and arranged to close said door aperture, a latch means mounted onto one of said structures to releasably lock said door structure in closed position, a remote-controlled actuating means positioned inside said enclosure structure, engaging said latch means, and constructed and arranged to be operated from a remote location outside said enclosure structure, a manual actuating means operatively connected to said remote-controlled latch means, projecting exteriorly of said enclosure structure, and constructed and arranged to be manually operated to complete unlatching of said door and wherein said door structure is provided with a slot therethrough for the insertion of valuables and said enclosure structure includes a rear panel which is attached to said enclosure structure by inside fasteners constructed and arranged to be released by a tool inserted through said slot when said door structure is closed.

9. A strong box assembly as defined in claim 8, wherein said enclosure structure includes a transverse partition extending inside thereof in inwardly spaced relationship relative to said rear panel, the latter has internally threaded bosses rigidly fixed on the inside thereof and facing said transverse partition, the latter has apertures therethrough and said fasteners include screws rotatably retained by said enclosure structure and arranged to engage and be threaded into said bosses by said tool.

10. A strong box assembly as defined in claim 1, wherein said remote-controlled actuating means is an electro-mechanical actuating means and further comprising a control circuit connected to said electromechanical actuating means and including a delay circuit and manual delay cycle control means connected to one another and constructed and arranged to cause said delay circuit to produce a predetermined delay cycle and to produce operation of said remote-controlled actuating means to open said door after said predetermined delay cycle and wherein said manual delay cycle control means includes a key switch connected to said delay circuit to control energization thereof and to place the same in readiness to produce a delay cycle, and a delay cycle initiating switch connected to said delay circuit and constructed and arranged to cause the latter to start a delay cycle.

11. A strong box assembly as defined in claim 10, wherein a door-operated switch is mounted onto said enclosure structure and arranged to be actuated by said door structure between a door-open and a door-closed positions, a first and a second indicating lamps and said door-operated switch are connected to said delay circuit and arranged to indicate the open-door and a delay cycle producing conditions respectively.

12. A strong box assembly as defined in claim 11, wherein said key switch and said first and second indicating lamps are mounted onto a remote control unit connected to said delay circuit for remote operation of said door.

13. A strong box assembly as defined in claim 10, further including other strong enclosures each having a door, a latch means, and a remote-controlled actuating means defining a plurality of strong box units, said manual delay cycle control means includes a manual selector switch having sets of contacts arranged to select one of said units and to operate the remote-controlled actuating means of said one unit.

14. A strong box assembly as defined in claim 13, wherein a door-operated switch is mounted into each enclosure structure in association with the corresponding door thereof to be actuated by the same between a door-open and a door-closed positions, a first and a

second indicating lamps are provided for each strong box unit and with the corresponding door-operated switch are connected to said delay circuit and arranged to indicate the open-door and a delay cycle producing conditions respectively.

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