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[21] Appl. No. 822,176
[22] Filed May 6, 1969
[45] Patented Nov. 3, 1970

2,722,179 11/1955 Belew..... 109/19
2,730,053 1/1956 Ellithorpe..... 109/19

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Attorney—Jones and Lockwood

[54] **BANK SECURITY SYSTEM**
16 Claims, 9 Drawing Figs.

[52] U.S. Cl..... 109/19,
109/21
[51] Int. Cl..... E05g 3/00
[50] Field of Search..... 109/19, 2,
10, 21, 30, 38, 5, 13, 7

[56] **References Cited**
UNITED STATES PATENTS
1,505,587 8/1924 Cowan 109/5
2,077,055 4/1937 Plym 109/7

ABSTRACT: This disclosure relates to a bank security system including a bulletproof enclosure for a vault and one or more teller stations, a normally-locked bulletproof access door in the enclosure, an unlocking switch for the access door located within the enclosure, a bulletproof aperture in the enclosure at each teller station permitting a teller and customer to converse, and a bulletproof teller drawer at each teller station providing means for teller and customer to transact business without physical contact. A locking and alarm system is provided which will lock the teller drawers in either the open or closed positions, disable the unlocking switch for the access door, and actuate an alarm in a remote area to notify law enforcement personnel. The locking and alarm system can be disabled only by a key or the like which is held by a person at another location outside the bank.

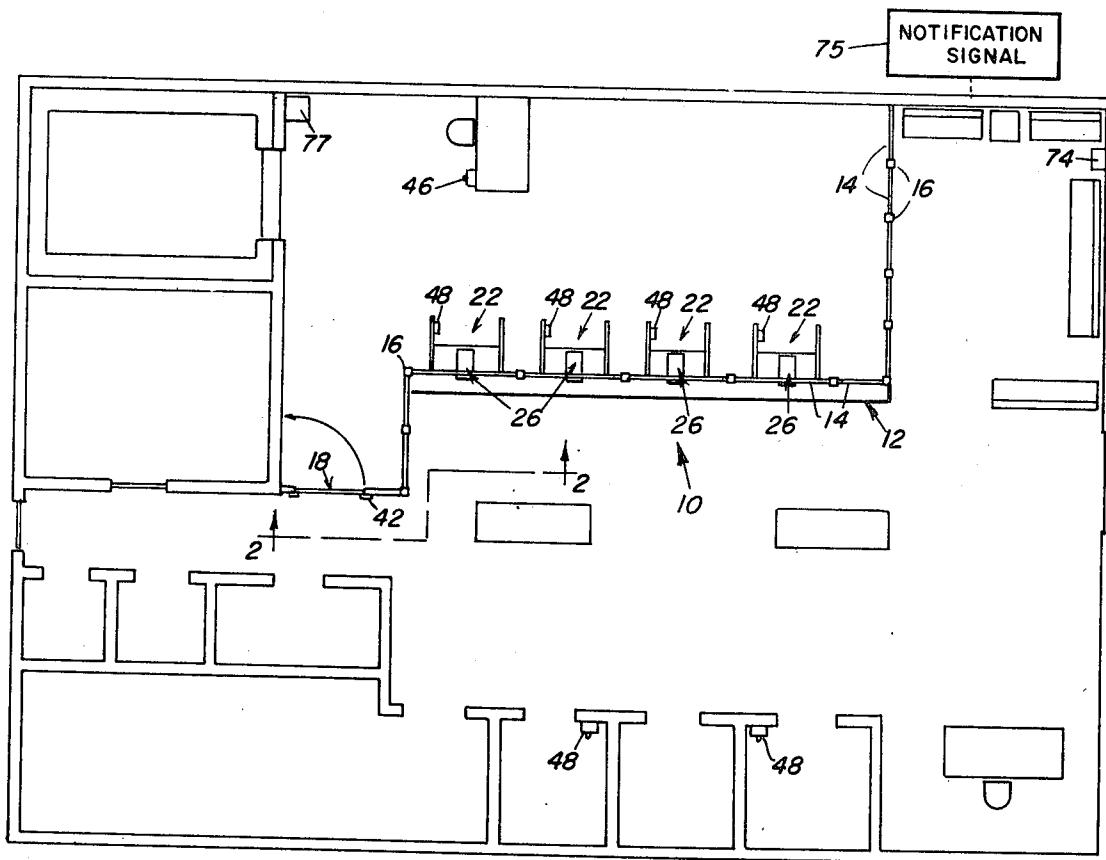


FIG. 1

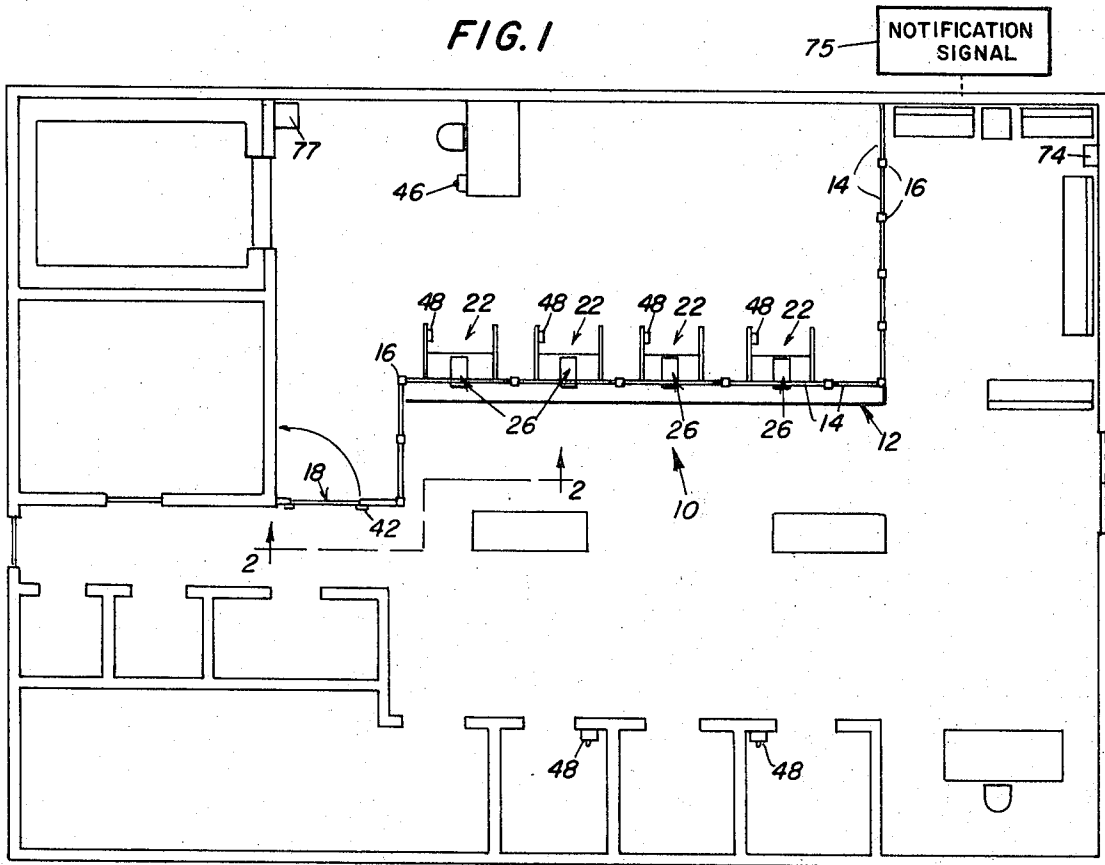
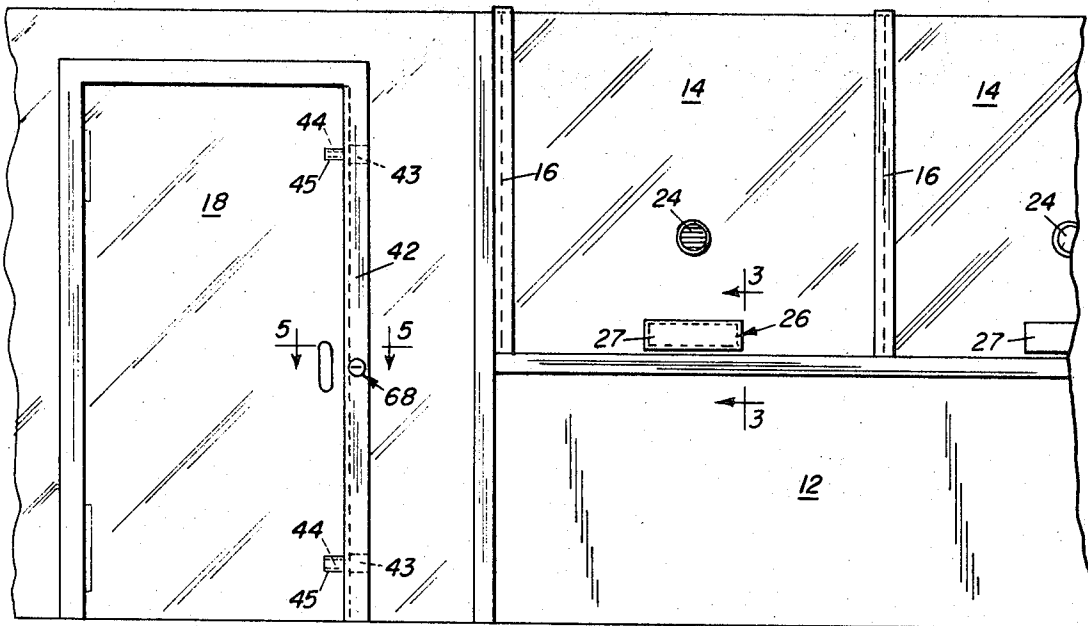


FIG. 2

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FIG. 3

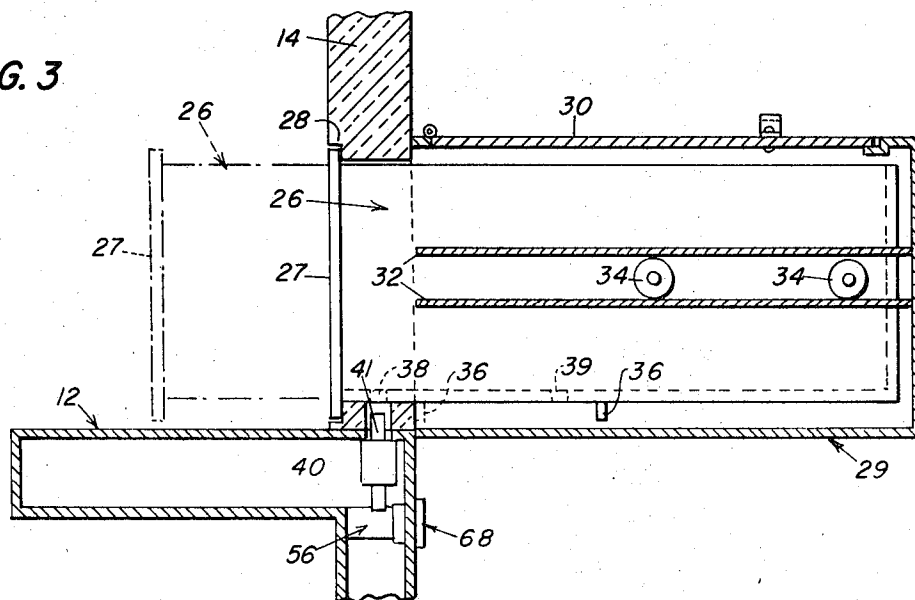


FIG. 4

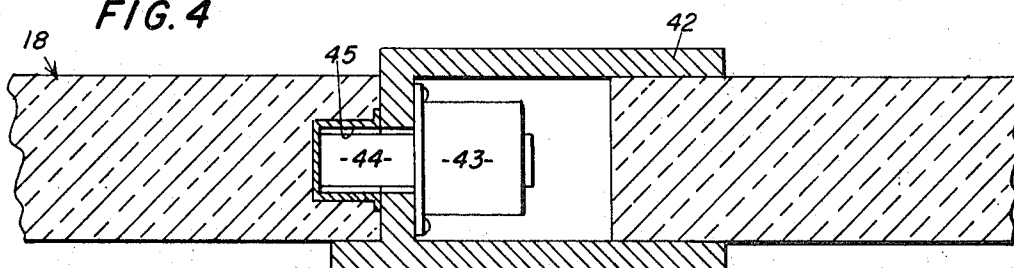


FIG. 5

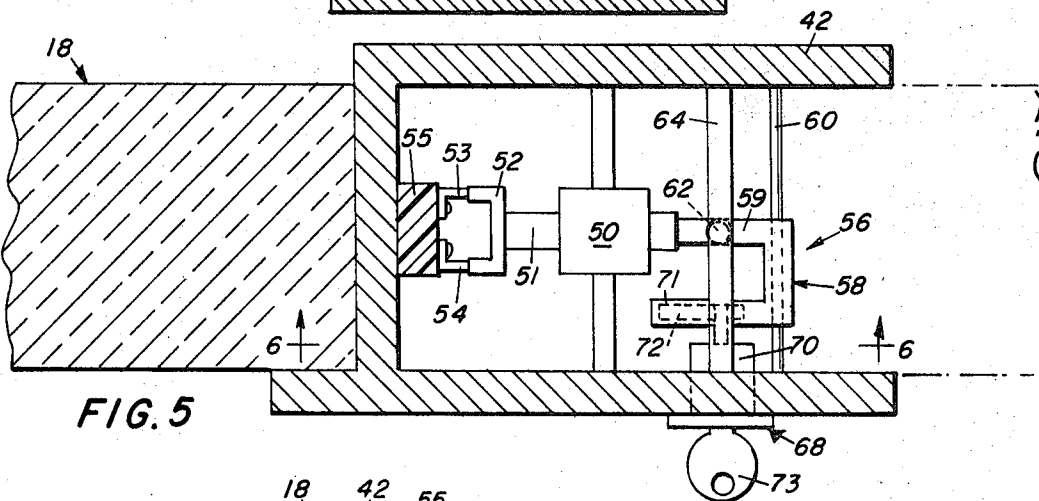
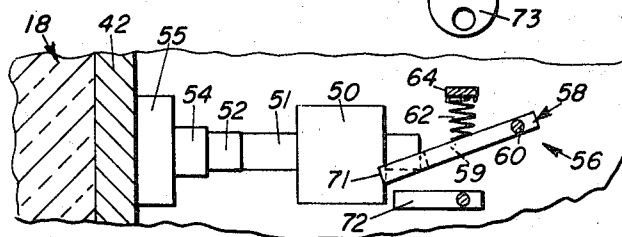


FIG. 6



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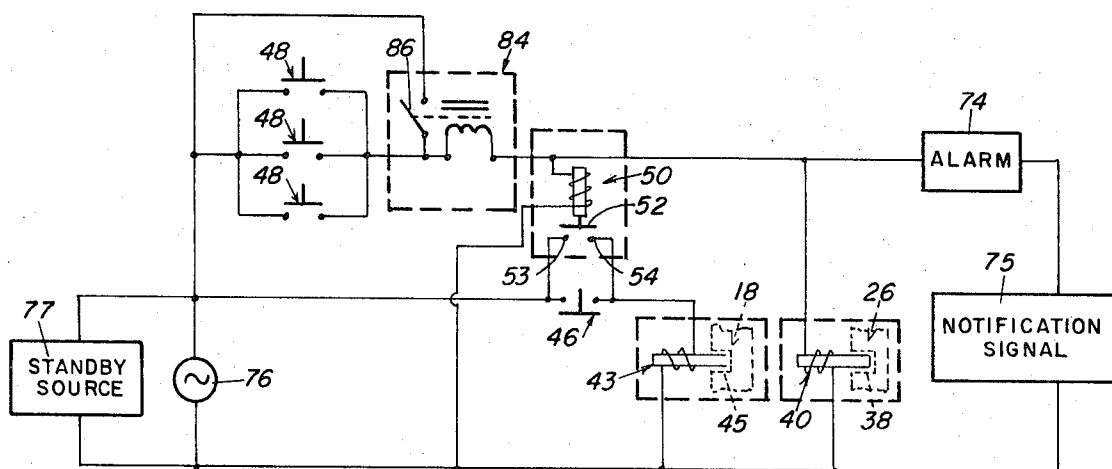


FIG. 7

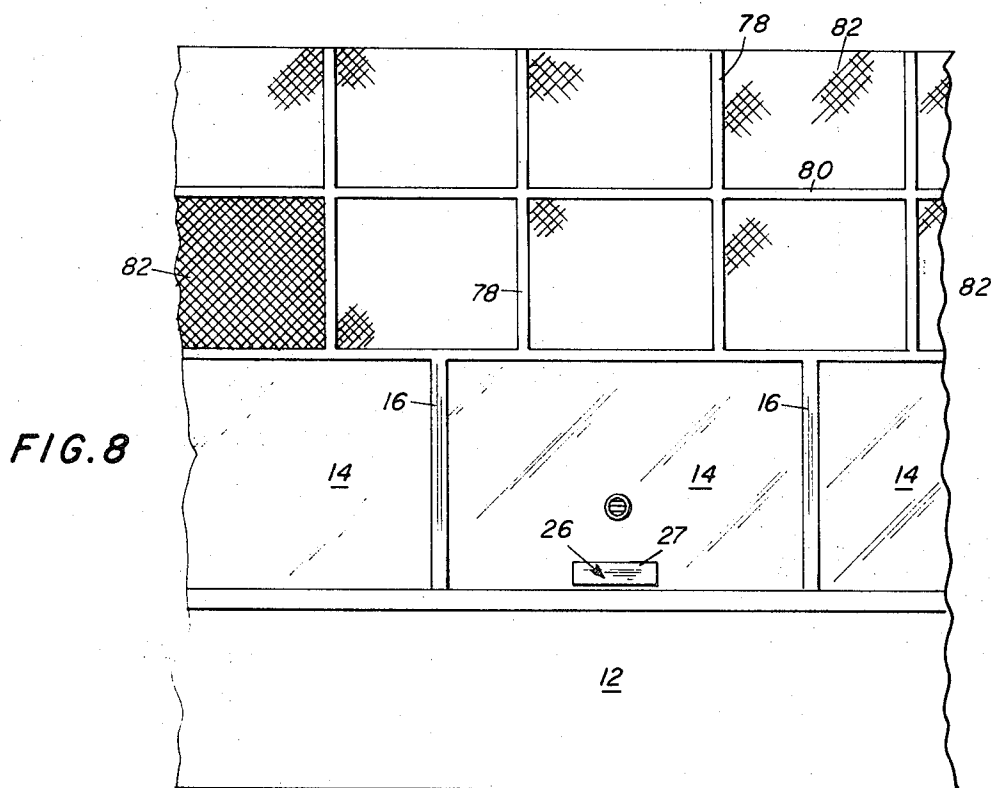


FIG. 8

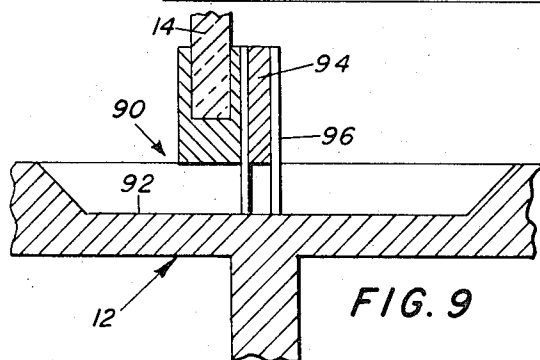


FIG. 9

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BANK SECURITY SYSTEM

BACKGROUND OF THE INVENTION

This invention relates to a bank security system which will prevent bank robberies by one or more individuals.

While there are many different types of bank security systems and methods for preventing robberies there are two major problems inherent in these present systems. First, with most security systems used today, there is some physical contact between the teller and the customer, thereby allowing a potential robber to prevent the teller from activating the alarm system. Second, most security systems known in the art can be disabled by someone located within the bank, thereby allowing the robber, by threatening an employee or customer in the bank, to force an employee of the bank to disable the security system.

Although the prior art shows numerous individual security features, such as bulletproof speaker apertures, bulletproof structures for teller stations, teller drawers, locking means for teller windows, and alarm systems for notifying persons outside the bank, these features and systems as previously developed and used do not eliminate the problems as stated above.

SUMMARY OF THE INVENTION

It is, therefore, an object of this invention to provide a bank security system which will prevent physical contact between a teller and a customer by providing a completely enclosed bulletproof structure.

Another object of this invention is to provide a bank security system which can be activated within the bank when a robbery occurs and can be disabled only by a person outside the bank, thereby making ineffective any threats of violence by the robber on persons outside the security enclosure.

Still another object of this invention is to provide a bank security system which can be activated within the bank to notify persons outside the bank that a robbery is taking place.

These and other objects are accomplished by the present invention through the use of a bank security system which will protect bank employees enclosed within a bulletproof area, and allow them or anyone else within the bank to activate the system, notify the proper authorities that a robbery is occurring, and nullify threats to employees and customers because of the employees' inability to disable the system. The invention includes a bulletproof enclosure for a vault and one or more teller stations; a bulletproof access door in the enclosure which is normally locked; an unlocking switch for the access door located within the enclosure; a bulletproof speaker aperture in the enclosure at each teller station for permitting a teller and a customer to converse; a bulletproof teller drawer at each teller station for the transaction of normal bank business without physical contact between the teller and the customer; and a locking and alarm system which will lock the teller drawers in either the open or closed positions, disable the access door unlocking switch, and activate an alarm in the bank and notification signal in an area remote from the bank to notify law enforcement personnel, said locking system means being releaseable only by persons located outside the bank and thus not susceptible to threats by the robber.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and additional objects, features, and advantages of the invention will be apparent to those skilled in the art from the following detailed description of a preferred embodiment thereof, taken with the accompanying drawings, in which:

FIG. 1 is a floor plan of a typical bank which is equipped with a security system according to the present invention;

FIG. 2 is an elevation view of a bulletproof enclosure according to the invention, taken on line 2-2 of FIG. 1;

FIG. 3 is an enlarged side detail view of a teller drawer showing a section of a typical drawer locking means, taken on line 3-3 of FIG. 2;

FIG. 4 is an enlarged cross-sectional view of a door frame showing the top of a door locking solenoid, taken on line 4-4 in FIG. 2;

FIG. 5 is an enlarged top cross-sectional view of the door frame showing an unlocking switch disable solenoid, taken on line 5-5 in FIG. 2;

FIG. 6 is an enlarged side view in cross-section of the door frame showing the unlocking switch disable solenoid, taken on line 6-6 in FIG. 5;

FIG. 7 is a schematic diagram of a typical circuit for a locking and alarm system according to my invention;

FIG. 8 is an elevation view of a bulletproof enclosure according to my invention, modified to allow installation in high ceiling rooms; and

FIG. 9 is a sectional side view of a modified form of teller opening in said enclosure.

DESCRIPTION OF A PREFERRED EMBODIMENT

Referring more particularly to the drawings, in FIG. 1 the numeral 10 indicates a bulletproof enclosure having a reinforced counter 12 and a plurality of bulletproof glass panels 14 which are secured together by reinforced joints 16. A bulletproof access door 18 is located in the enclosure 10 to allow ingress and egress by authorized personnel.

A plurality of teller stations 22 are located within the enclosure 10, and each has a bulletproof speaker aperture 24 located in the bulletproof panels 14 (see FIG. 2) to allow a teller and a customer to converse while transacting business. A teller drawer 26 located below the speaker aperture 24, as shown in FIGS. 2 and 3, allows the teller and the customer to pass money, checks, deposit slips, etc. into and out of the enclosure 10 without the necessity of physical contact. Such drawers are generally in use at drive-in or sidewalk bank windows; however, the present drawer is modified, as will be described.

The teller drawer 26 shown in FIG. 3 has a front plate 27 secured to the outer end which is received in a cutout portion 28 of the bulletproof panel 14, making the outer surface of the front plate 27 flush with the outside surface of the panel 14 when the drawer is closed. A teller drawer frame 29 is located within the enclosure and supports the teller drawer 26. A frame door 30 in the drawer frame 29 can be opened to provide access to the drawer, permitting the teller to place money and other articles in the drawer 26 and to remove articles placed therein by the customer when the drawer is open. The drawer door 30 is closed when the drawer 26 is moved by a suitable lever or plunger arrangement (not shown) from within to without the enclosure. This closure of door 30 prevents communication between the inside and the outside of the enclosure while business is being transacted and thus prevents any physical contact between the teller and the customer.

Rails 32 secured to and located within the drawer frame 29 support a plurality of rollers 34 which are secured to the side of the teller drawer 26, permitting the drawer to move back and forth freely. A limit strip 36 secured to the bottom of the drawer 26 engages the panel 14 as the drawer 26 moves out of the enclosure, preventing the drawer from being pulled completely out of the drawer frame 29. Front and rear locking recesses 38 and 39, respectively, are located in the side wall of the drawer 26, recess 38 being located near the front plate of the drawer and recess 39 being located near the strip 36. These recesses are designed to receive a locking device, and are so located that a single lock can fix the drawer in either an open or a closed position.

A drawer locking solenoid 40, similar to the one shown in U.S. Pat. No. 2,030,219 to Meilink issued on Feb. 11, 1936 is mounted within the counter 12 and is arranged to eject a core 41 into either recess 38 or 39, depending on the position of the drawer 26. Each drawer 26 has a drawer locking solenoid 40 for securing each side of the drawer in the open or closed position. The solenoids are normally deenergized so that the

drawer will move freely for normal banking transactions, but upon occurrence of an emergency the solenoids can be energized to lock their cores into the recesses to prevent the drawer from being moved in either direction.

FIGS. 2 and 4 illustrate the manner in which the access door 18 is locked to prevent entry into the vault and teller enclosure. A door frame 42 carries two door locking solenoids 43, each of which has a core 44 extending through the frame into an insert 45 in the access door. The door locking solenoids 43 are normally energized to hold the cores in their respective inserts to keep the access door 18 locked. The door locking solenoids are controlled by an unlocking switch 46 which is located within the enclosure 10 and which is manually operable to deenergize the solenoid. This causes the cores 44 to move out of inserts 45, and allows the door to be opened.

When an attempted robbery occurs, one of a plurality of alarm push buttons 48 (FIG. 1) located at various areas within the bank can be activated to energize the drawer locking solenoids 40, securing all teller drawers, and to activate a disable solenoid 50 which will disable unlocking switch 46, thereby preventing the access door 18 from being opened by that switch. The unlocking switch disable solenoid 50 which is mounted within the door frame 42, is shown in FIGS. 5 and 6 in top and side views. The solenoid armature 51 carries a contact arm 52 which is movable upon energization of the solenoid to engage contacts 53 and 54 which are mounted on an insulating block 55 located within the frame 43. Solenoid 50 is normally deenergized so that the access door 18 may be opened by activating the unlocking switch 46 within the enclosure 10, but when energized, solenoid 50 insures that the access door cannot be opened by anyone within the enclosure by disabling switch 46.

To make sure that no person within the enclosure 10 or within the bank can open the access door or any of the teller drawers, even under threat by a would-be robber, the disable solenoid 50 and each of the drawer locking solenoids 40 have a latching mechanism, such as that indicated generally at 56, which operates when its corresponding solenoid is energized. The latching mechanism prevents the solenoid cores, or armatures, from being retracted upon deenergization of the respective solenoid coils. This latching mechanism holds the armature 51 of switch disable solenoid 50 in a position to close, contacts 54, thereby providing a constant energizing current for the door locking solenoids 43 so that solenoids 43 cannot be deenergized and the access door cannot be opened. Similar latching mechanisms cooperate with the cores 41 of the drawer locking solenoids 40, so that these cores will remain in the recesses 38 and 39 of the corresponding teller drawers 26 until the latching mechanism is released. The latching mechanism 56 shown with solenoid 50 includes a U-shaped latch member 58 which is pivotally mounted on a rod 60 behind the unlocking switch disable solenoid, as shown in FIGS. 5 and 6. Arm 59 of the latch member normally will rest on the upper surface of core 51 so as to allow movement of the core. A spring 62 carried on a support piece 64 biases the fork member 58 downwardly so that when the coil 50 is energized to move the core (to the left, as viewed in FIG. 5), the latch member 58 will be urged down into the position shown in FIG. 6, thus preventing the core from retracting until the latching mechanism is released.

A key operated lock 68 is provided to release the latching mechanism. A tumbler 70 which has a link, or cam arm, 72 secured thereto is carried by the lock 68. The link 72 is located adjacent arm 71 of latch member 58 so that when the proper key 73 is inserted into the lock 68 the link 72 may be rotated upwardly against arm 71, lifting the latch member 58 away from its locking position behind the solenoid core. If the solenoid has been deenergized, the solenoid core will be repositioned in the solenoid coil, the contact arm 52 and contacts 53 and 54 will open, and the access door can again be opened by the unlocking switch 46. A similar key operated lock is positioned behind each of the latching mechanisms associated with the drawer locking solenoids 40, this arrange-

ment requiring that each latching mechanism be released separately.

In addition to activating the door and drawer locking system, the alarm push button 48 may activate a suitable alarm 74 (FIG. 1) within the bank and a notification signal 75 located outside the bank at a remote location to notify interested parties that a robbery is in process. Upon notification, the interested parties can inform law enforcement officials and proceed to the bank with the key 73 which is used to disable the security system.

FIG. 7 is a schematic diagram of a typical electric circuit which may be used to operate the security system of the present invention. The system is connected to a conventional power source 76, which preferably includes a standby supply 77. The door locking solenoid 43 is connected across the power supply, in series with the normally-closed unlocking switch 46, so that solenoid 43 normally is energized to lock door 18, as has been described. Opening switch 46 deenergizes solenoid 43 to allow its core to be withdrawn from recess 45, thereby permitting the door to be opened.

Also connected across the power source 76, and in series with a plurality of normally-open alarm push buttons 48, is the disable solenoid 50, the contact arm 52 of which serves to bridge contacts 53 and 54. These latter contacts are connected to opposite sides of push button 46, so that when arm 52 bridges contacts 53 and 54 upon energization of solenoid 50, push button 46 is bypassed, and door locking solenoid 43 cannot be deenergized to permit door 18 to open. The alarm push buttons 48 are connected in parallel with each other, so that depression of any one will energize solenoid 50. This solenoid will mechanically latch, as has been described, to keep door 18 locked even after push button 48 has been released.

The drawer locking solenoids 40 are connected across the power supply and in series with push buttons 48, as shown in FIG. 7, so that depression of one or more buttons 48 will lock the several teller drawers. The alarm push buttons also energize the alarm 74 and the notification signal 75, which are connected in parallel with solenoids 40.

FIG. 8 is illustrative of a modification to the enclosure 10 to allow its installation in banks with high ceilings, where it may be undesirable to extend glass panels 14 the full height of the room. The enclosure can be modified by placing a grid of vertical support members 78 and horizontal support members 80 above the panels 14 and securing a strong wire mesh 82 within the grid squares to prevent the passage of money or other articles over the panels 14. The panels 14 in this modified version should extend approximately 9 to 10 feet above the floor level or similar distance above the counter to prevent a potential robber from reaching over the top of the panels. The wire mesh 82 will allow ventilation, heat, and light to pass behind the enclosure, eliminating the necessity of modifying existing facilities in older banks in which the security system is being installed.

Other variations of the system may include a time delay latching relay 84 as shown in FIG. 7 which can be used in addition to or in place of the mechanical latching mechanism 56 to prevent release of the door and teller drawer locks. The time delay latching relay 84 may be connected in series with push buttons 48, and when energized by closure of one of these buttons will close a normally-open switch contact 86. This latter switch bypasses the push buttons 48 to keep the circuit energized after release of the alarm button for a predetermined period of time, for example, 15 minutes. During the period that switch 86 is held closed by the delay coil, the drawer locking solenoids 40 and the unlocking switch disable solenoid 50 remain activated, even after the alarm push button 48 is released, thereby preventing the deactivation of the system until a predetermined time period elapses. If the mechanical latches are used in combination with the time delay, the key will be ineffective to unlatch a solenoid, for the solenoid will be energized until switch 86 opens. However, it may be found to be satisfactory to use only the time delay relay 84 in some applications, but it is preferred to use the mechanical latches

to insure that someone from outside the bank is present before the system is unlocked. A further variation would combine a mechanical latching mechanism with relay 84, so that bypass switch 86 could only be opened with a key.

Other modified security systems can be constructed wherein the enclosure would be provided with an opening such as a trough or teller's window, such as that indicated at 90 in FIG. 9, which would permit the transaction of business between the teller and the customer. To meet the purposes of this invention, such a window would have some means for closing and locking the opening and thus securing the enclosure. A typical embodiment would be a trough 92 formed in the enclosure counter 12 which would permit items to be passed under the bulletproof panel 14. A sliding door 94 with a guillotineline closing action would be releasably secured to the bulletproof panel above the trough and supported in suitable side guides 96. The closure 94 may be held open by a suitable solenoid armature mechanism which would be released so that the closure dropped into the trough when the appropriate alarm means is activated. Suitable latching devices would insure that the enclosure would remain closed and secure, until released by persons outside the bank, in a manner similar to the latch embodiment described in detail hereinabove.

The system can be modified further by completely removing the bulletproof enclosure and using the locking and alarm system described above. In such a system, the conventional money drawer and a vault door would be automatically closed by means of a spring or hydraulically actuated apparatus and can be locked in a closed position when an alarm pushbutton is depressed. Latching devices similar to those described above would insure that the drawers and the vault could only be unlocked by persons normally outside the bank; that is, bank personnel would not have access to the unlocking mechanism. The alarm within the bank and the notification signal outside the bank would be retained to notify the proper personnel. Such a system would utilize an alarm and latching circuit such as that described above, but would allow contact between the robbers and bank employees.

Although the security system is primarily for use after a robbery has been initiated, it can also serve as a deterrent against robberies. By extensive advertising in the press, on bulletin boards, and on signs within the bank stating that the system has been installed, it can be made clear that no threats of physical violence to any personnel within the bank can be effective in requiring a person within the bank to release the system, because the personnel within the bank will be unable to do so.

It can be seen from the above description and drawings that the bank security system provides a means to completely enclose a teller station and vault area, prevents physical contact between the teller and the customer, provides a locking system which can only be released by persons outside the bank, and provides an alarm system to notify the proper authorities outside the bank.

The described embodiment can be modified in numerous ways as suggested above; however, these and other variations and changes can be made in the invention without departing from the true spirit and scope thereof as defined in the following claims.

I claim:

1. A bank security system including in combination, a drawer means; a locking means for securing said drawer means which locking means can be released only by a person normally located outside the bank; and activating means for actuating said locking means.

2. The bank security system of claim 1, wherein said drawer means is a plurality of cash drawers, said activating means serving to lock all of said drawers simultaneously.

3. The bank security system of claim 1, further including an alarm located within the bank and a notification signal located in an area outside of the bank, wherein said means for activating said locking means also activates said alarm and said notification signal.

4. The bank security system of claim 1, further including bulletproof teller station enclosure means which will enclose said drawer means and will permit conversation between a teller and a customer and the transaction of business without physical contact.

5. The bank security system of claim 4, wherein said bank includes a vault and at least one teller station; said enclosure means including a bulletproof wall surrounding the vault and teller station; a bulletproof access door in said wall permitting ingress and egress to said enclosure; a door locking means for said access door which is normally locked; unlocking means located within said enclosure for releasing said door locking means; disabling means for said unlocking means responsive to said activating means for said locking means; a speaker aperture for permitting the teller and the customer to converse; said drawer means comprising a teller drawer which can move within or without said enclosure, permitting the transaction of business without physical contact between the teller and the customer.

6. The bank security system of claim 5, further including an alarm located within the bank and a notification signal located in an area outside the bank, wherein said activating means for said locking means activates said alarm and said notification signal.

7. The bank security system of claim 1, further including time delay means for preventing said locking means from releasing for a predetermined period.

8. The bank security system of claim 1, further including an enclosure means comprising a bulletproof panel of a predetermined height to prevent a robber from reaching said drawer means while permitting a teller and a customer to converse and transact business, a wire mesh extending from the top of said panel to a wall or ceiling, and a plurality of support members for carrying said wire mesh.

9. In a bank security system for preventing robberies which includes an enclosure for a vault and teller station and a system of locking the enclosure to prevent persons within the bank from being able to release the system, comprising: a bulletproof enclosure surrounding the vault and the teller station; a bulletproof access door in the enclosure permitting ingress and egress; normally activated door locking means for said access door; unlocking switch means located within the enclosure for deactivating said door locking means; disabling means for said unlocking switch means; a speaker aperture for permitting a teller and a customer to converse; means in said enclosure for permitting the transaction of business between the teller and the customer; locking means for securing said means for permitting transaction of business; and emergency means for activating both said access door disabling means and said last-named locking means.

10. The bank security system of claim 9, wherein said means for permitting transaction of business comprises a closable opening in said enclosure at said teller station, said last-named locking means serving to prevent physical contact between the teller and the customer.

11. The bank security system of claim 9, wherein said enclosure permits a teller and a bank customer to converse and transact business without physical contact with each other, said means for permitting transaction of business comprising a teller drawer movable through said enclosure, said last-named locking means consisting of means for securing said teller drawer.

12. The bank security system of claim 11, further including an alarm located within the bank and a notification signal located in an area outside of the bank, wherein said emergency means for activating said locking means also activates said alarm and said notification signal.

13. The bank security system of claim 12, further including latching means for maintaining activation of said access door disabling means and said drawer locking means.

14. The bank security system of claim 13, wherein said latching means comprises key-releasable mechanical latches, said key being held at a location outside said bank whereby

during an attempted robbery no personnel in said bank will be able to release said latching means.

15. The bank security system of claim 14, wherein said latching means comprises a time-delay relay, whereby said access door and teller drawer cannot be opened for a predetermined period of time after activation of said access door disabling means and drawer locking means.

16. A bank security system including in combination, a bulletproof enclosure means for enclosing a vault and at least one teller station; an opening in said enclosure means for permitting business to be transacted between a teller and a customer; bulletproof closing means for closing and locking

said opening; an activating means for said closing means; an access door in said enclosure for permitting ingress and egress to said enclosure; a normally-locked door locking means for said access door; unlocking means located within said enclosure for releasing said door locking means; disabling means responsive to said activating means preventing release of said unlocking means and for preventing unlocking of said closing means; and latching means for maintaining activation of said disabling means, said latching means being releasable only by a person normally located outside the bank.

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