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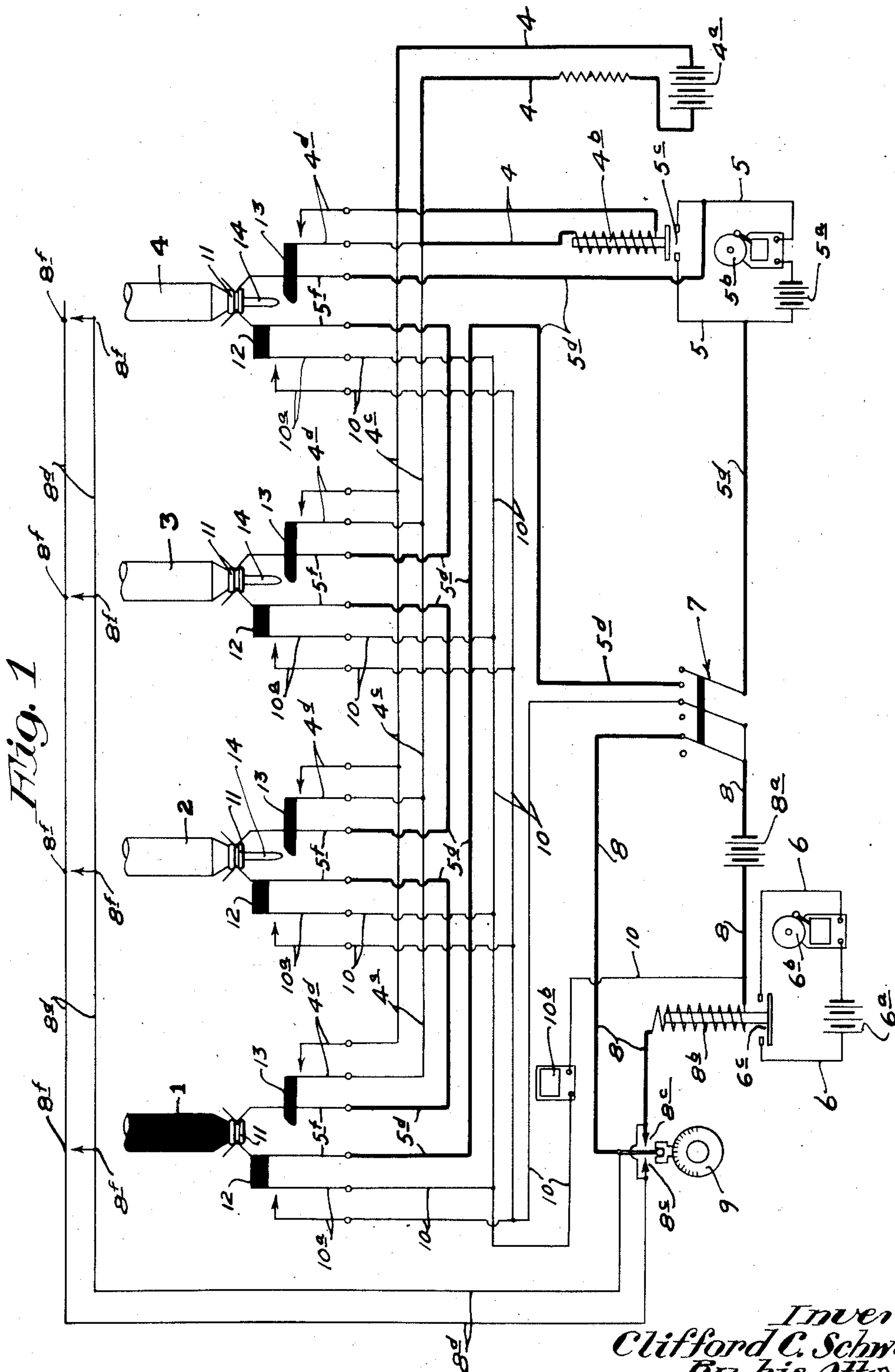
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2,021,925

ANTI-KIDNAPPING VAULT ENTRANCE CONTROL

Filed Aug. 20, 1931

2 Sheets-Sheet 1



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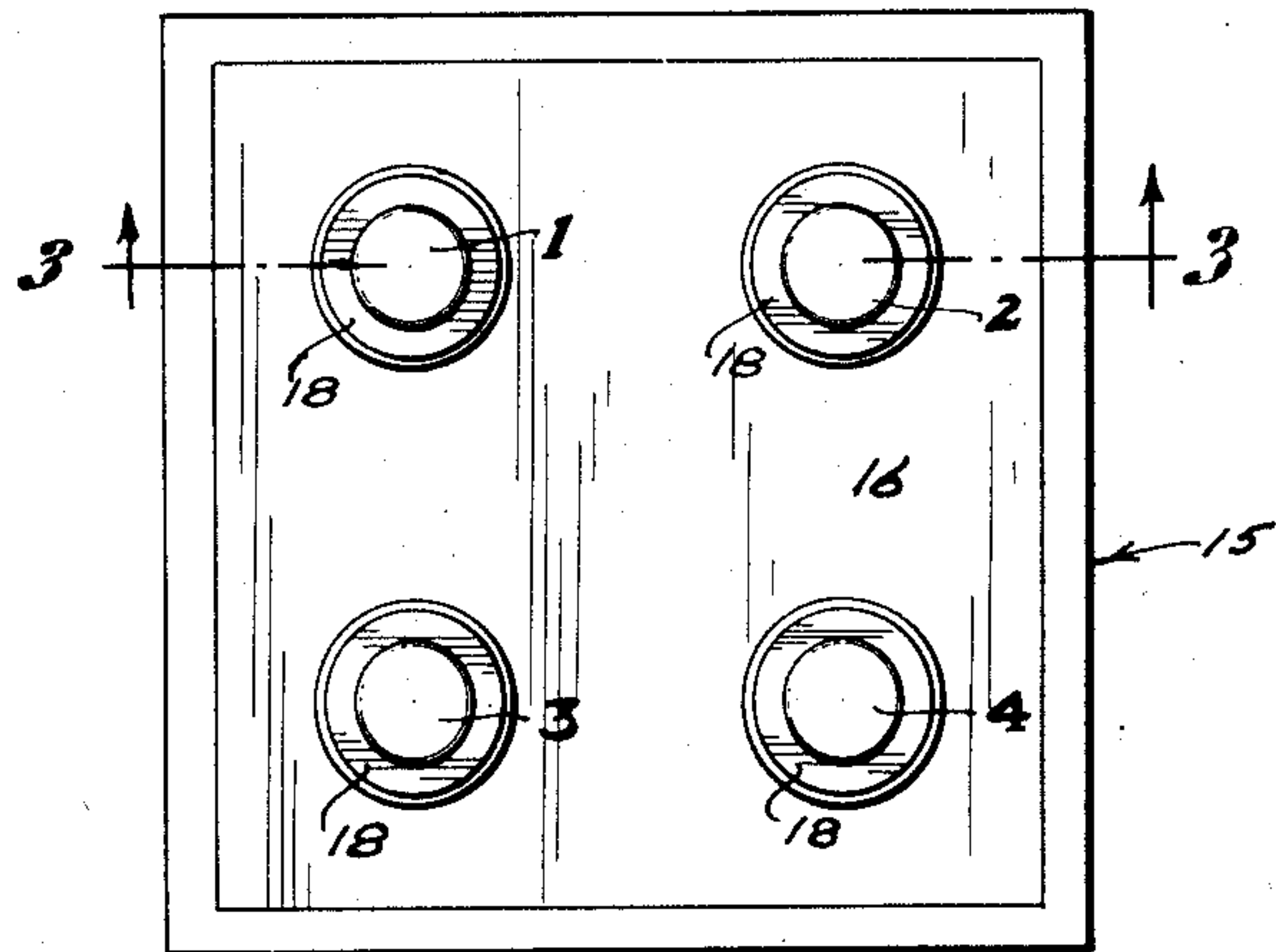
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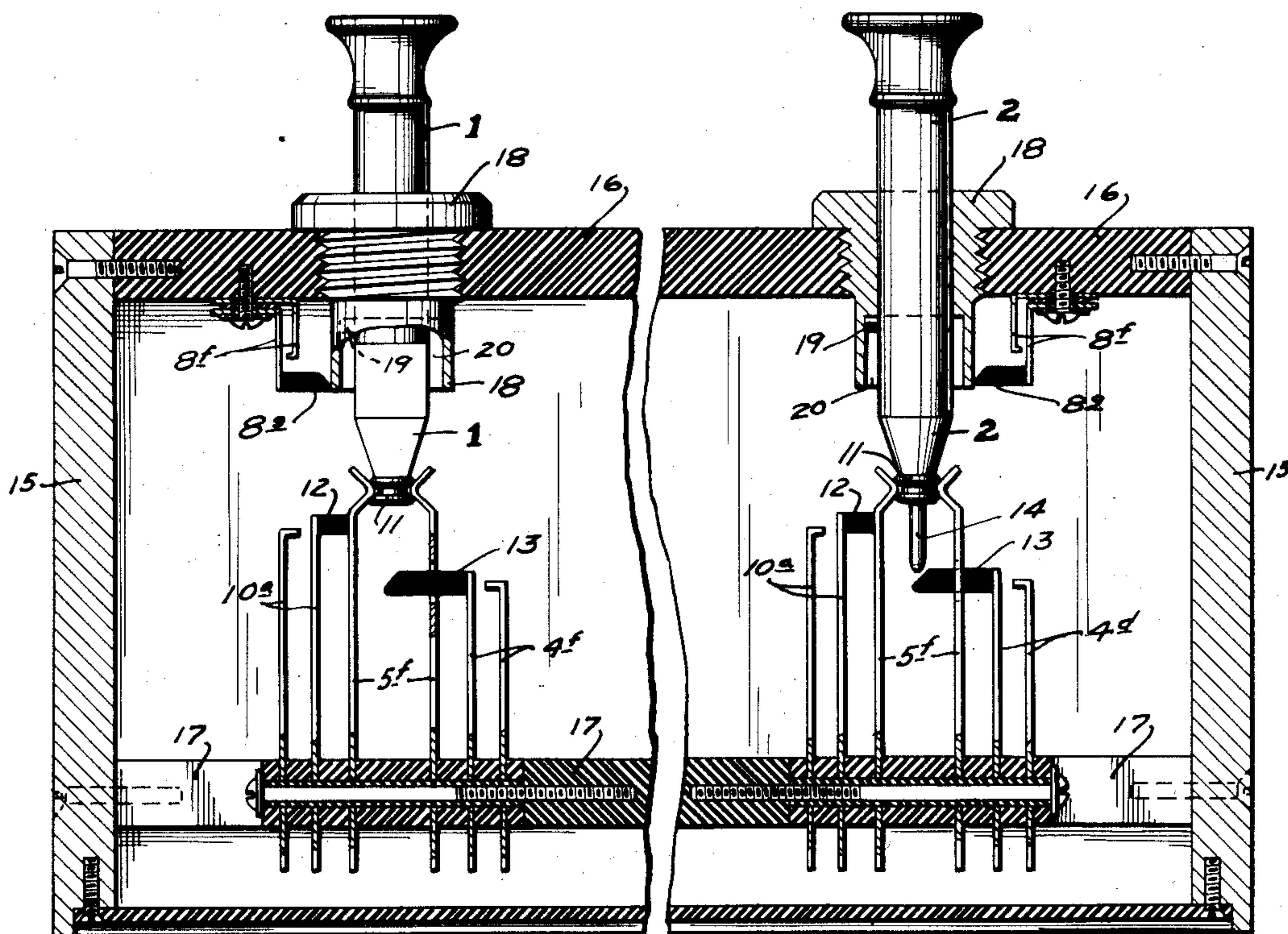
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2 Sheets-Sheet 2

*Fig. 2*



*Fig. 3*



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# UNITED STATES PATENT OFFICE

2,021,925

## ANTI-KIDNAPPING VAULT ENTRANCE CONTROL

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9 Claims. (Cl. 177—314)

My present invention relates to electrical alarm systems or protecting devices especially adapted for use in banks or similar places where money or valuables are kept; to protect the same from bank robbers. The present invention affords protection in several different ways, but because of its main purpose and function, it is herein and very appropriately designated as an anti-kidnapping vault entrance control.

In the kind of bank robbery known as "kidnapping", an officer of a bank, for example, is taken from his home and made to go to the bank, and under threat of life or bodily damage, is ordered to open up the bank and the vault. In accordance with this invention, the protective system is arranged to be operated by manipulation of a multiple master switch arranged to control circuits that actuate certain devices including a remote alarm device, preferably located at a police station and which will be sounded when any one of a multiplicity of keys of the master switch, except one particular key, is depressed or moved from normal set position. The one particular key of the master switch which, when operated, will not cause the remote alarm device to be sounded, will have the appearance of all of the other keys and its position (which is interchangeable with the other keys) will be known only to the proper officials of the bank. The arrangement is such that the robber accompanying the kidnapped official will not know that the signal has been sent to the police or remote station, for so far as the indications in the bank are concerned, the same action takes place regardless of which of the keys is depressed from normal position.

The system just above outlined in part is preferably coupled up to other electrical protecting systems and arranged to co-operate therewith as in a manner which will hereinafter appear in connection with the description of a commercial embodiment of the invention wherein like characters indicate like parts throughout the several views.

Referring to the drawings:

Fig. 1 is a diagrammatic view illustrating the arrangement of the complete system designed to perform several different functions;

Fig. 2 is a plan view of the commercial arrangement of the multiple master switch; and

Fig. 3 is an enlarged section taken on the line 3—3 of Fig. 2, some parts being broken away.

The multiple master switch, as indicated, involves a multiplicity of keys or movable switch-actuating elements, of which as shown, there are

four, indicated by the numerals 1, 2, 3, and 4. At this point, see particularly Fig. 1. For each key there is a group of spring contacts 4<sup>d</sup>—4<sup>d</sup>, 5<sup>f</sup>—5<sup>f</sup>, and 10<sup>a</sup>—10<sup>a</sup>, each of the said groups with spring contacts being like each other group.

The numeral 4 indicates the first circuit herein designated as the supervisory circuit, and which includes a battery or other source of electrical energy 4<sup>a</sup>, and a magnet coil 4<sup>b</sup>. Opposite sides of the supervisory circuit 4 are connected by short-circuiting leads 4<sup>c</sup> to the normally separated spring contacts 4<sup>d</sup> of the several groups.

The numeral 5 indicates a remote circuit located preferably at a police station or headquarters, at a point from which help will come in case of bank robbery. This circuit 5 includes a battery or other source of electrical energy 5<sup>a</sup>, an electrically actuated gong 5<sup>b</sup>, and a switch 5<sup>c</sup>, which latter is normally held open by the magnet 4<sup>b</sup>, which is in the normally closed supervisory circuit 4.

The numeral 6 indicates a local alarm circuit and includes a battery or other source of electrical energy 6<sup>a</sup>, an electrically actuated gong 6<sup>b</sup>, and a normally open switch 6<sup>c</sup>. Gong 6<sup>b</sup>, will usually be located in a protected place outside of the bank building, where, when it is operated, it will loudly announce that the bank is being robbed or that it is being tampered with by robbers.

The numeral 7 indicates a multisection vault protecting switch, which will be set in the position shown in Fig. 1, during the period protected by the system. As illustrated, this multisection switch 7 is of the three-pole type and each pole and its co-operating contact or contacts constitutes a section of the switch. Shunt circuiting leads 5<sup>d</sup> connect one side of the remote alarm circuit 5 to one of the three members of the switch 7, and the other side of said circuit 5 in series with the switch contacts 5<sup>f</sup> and to one of the fixed contact points of said switch 7. Another local circuit 8 includes a battery or other source of electrical energy 8<sup>a</sup>, a magnet coil or solenoid 8<sup>b</sup>, a normally open temper switch 8<sup>c</sup> and one side of switch 7. Circuit 8 will be closed through switch 7 when the switch is set in its protecting position shown in Fig. 1; switch 3<sup>c</sup> will be closed when its movable element is moved even slightly in either one direction or the other; and solenoid 8<sup>b</sup> which is normally de-energized, will when energized, by closing of circuit 8, cause switch 6<sup>c</sup> to close alarm circuit 6 and sound alarm 6<sup>b</sup>. Switch 8<sup>c</sup> in Fig. 1, is shown as arranged to be closed by a movement in either



direction of the knob of the tumbler or other portion of the vault lock 9.

Here it should be stated that circuits 6 and 8 are representative of vault-protecting circuits such as now found in up-to-date protecting systems and that circuit 8 will usually be arranged to be closed by anyone of several different kinds of tampering with the vault-protecting system. Shunting circuiting leads 3<sup>d</sup> are connected to the opposite sides of circuits 8 and are extended to the key supports or mountings of the multiple master switch in a manner and for a purpose which will hereinafter be more fully explained.

From the switch contacts 10<sup>a</sup>, short-circuiting leads 13 extend one to one of the intermediate fixed contacts of the switch 7 and the other through an electrical buzzer 10<sup>b</sup>, to that lead of circuit 8 which is on the opposite side of the battery 2<sup>a</sup> from master switch 7.

Switch keys 1, 2, 3, and 4 are provided with grooved metallic buttons 11 that perform two functions, to wit: they normally but yieldingly hold the keys in raised positions by engagement with V-shaped ends of the spring contacts 5<sup>f</sup> and they serve as electrical conductors to connect the contacts 5<sup>f</sup> of the several groups in series. Here it should be further noted that the normally separated spring contacts 4<sup>d</sup> of the several groups are connected in multiple and that the normally separated spring contacts 10<sup>a</sup> of the several groups are also connected in multiple. Left-hand spring contacts 5<sup>f</sup> are connected to the adjacent spring contacts 10<sup>a</sup> by insulating blocks 12. The left-hand spring contacts 4<sup>d</sup> are provided at their free ends with finger-like cam-acting projections 13 of insulating material that project through perforations in the right-hand spring contacts 5<sup>f</sup> without engagement therewith.

In the arrangement illustrated, the body of the key designated by the numeral 1 is of insulating material, while the bodies of all of the other keys are metallic and hence electrical conductors. All of the said keys except the key 1 are provided with depending pin-like projections 14 which, when depressed, engage underlying beveled ends of the fingers 13 and force the corresponding spring contact 4<sup>d</sup> into engagement with its companion spring contact 4<sup>d</sup>, thereby short-circuiting circuit 4 and causing the magnet coil 4<sup>b</sup> to be de-energized with the result that switch 5<sup>c</sup> will close alarm circuit 5 and sound the remote alarm gong 5<sup>b</sup>.

The keys 1, 2, 3, and 4 of the master switch are mounted in a suitable casing and, as shown, they are mounted in a box-like casing 15 having a top plate 16, of insulating material, and a horizontal intermediate supporting plate 17 also of insulating material. The spring contacts 4<sup>d</sup>, 5<sup>f</sup>, and 10<sup>a</sup> are suitably mounted in the insulating plate 17 and thereby insulated from each other. The keys 1, 2, 3, and 4 are mounted to slide through bearing sleeves 18 detachably applied to the top plate 16 by any suitable means such as threaded engagement, shown in Fig. 3. The keys 1, 2, 3, and 4 are shown as provided with radially projecting pins 19 that work in slots 20 of the sleeves 18 and prevent the keys from being drawn upward out of the sleeves. The sleeves with the keys are, of course, interchangeable as to position so that the position of key 1 can be known only to the person locating the same. All of the keys are beveled so that when depressed, they will spread the spring contacts 5<sup>f</sup> and engage the co-operating normally separated contacts 10<sup>a</sup>.

For co-operation with each of the keys and with the shunt circuit and leads 8<sup>d</sup>, the latter are con-

nected in multiple with normally separated spring tamper switch contacts 8<sup>f</sup>, one of each pair of which is provided with a cam-acting block 8<sup>g</sup> that is normally engaged by the adjacent sleeve 18 and sprung out of contact with its companion contact 8<sup>f</sup>, as shown in Fig. 3. It will be obvious that should any one of the bearing sleeves 18 be removed, that the spring tamper switch contacts 8<sup>f</sup> will be closed and the local alarm sounded as a result thereof.

#### *Manner of installation and operation*

For the purpose of illustration, it will be assumed that the multiple master switch which includes the keys 1, 2, 3, and 4, will be placed outside of the protected zone of the bank or at any rate, at some place outside of the protected zone or at some place where it may be readily operated by persons authorized to do so, and also that the vault protecting switch 7 will be similarly located. Also it is indicated that loud-sounding gong will be placed at a protected place outside of the bank building while the gong 5<sup>b</sup> is located at a remote point such as a police station.

Fig. 1 shows the condition of the system when it is set for vault protection with all of the operating parts dormant but ready for action in case the system is tampered with, except the one key known only to the authorized persons of the bank.

First we will consider the use of the system under ordinary conditions. The authorized person coming to the bank to open up the vault, say in the morning, who knows the position of key 1, depresses the same. This breaks the continuity of circuit 5<sup>d</sup> so that circuit 5<sup>d</sup> will not close the alarm circuit 5 and sound alarm 5<sup>b</sup> when leads 5<sup>d</sup> are connected by movement of switch 7 toward the left in respect to Fig. 1, so as to cut the protective system out of action. Moreover, the movement of switch 7 to "off" position opens the protecting circuit 8 so that alarm device 6<sup>b</sup> will not be sounded when the vault is opened by manipulation of its lock; or if the shunt leads 8<sup>d</sup> be closed between contacts 3<sup>f</sup> by removing and interchanging of position of switch keys 1, 2, 3 and 4.

Depression of key 1 or any other key for that matter, will engage co-operating contacts 10<sup>a</sup> and close circuit through supervisory buzzer 10<sup>b</sup>, but said buzzer will, of course, be cut out of action when switch 7 is moved to "off" position. The key 1 will, of course, be left depressed while the vault protection is "off". The buzzer 10<sup>b</sup> when operated will, as will presently be noted, serve as a supervisory indicator.

At the close of banking hours, to set the protecting system for action, switch 7 will, of course, be moved back to its position shown in Fig. 1. When this is done, key 1 having been left in a depressed position, buzzer circuit will then be closed by virtue of position of co-operating contacts 10<sup>a</sup>, buzzer circuit will be completed through the switch 7 announcing to the operator that depressed key 1 must be restored to its retracted or upper position to complete the proper setting of the system for action. As indicated, interchange of the position of the keys without throwing in of the alarm devices into action can be accomplished at any time when switch 7 is in "off" position. Here attention is called to the fact that even when switch 7 is at its "off" position, if anyone of the metallic keys 2, 3, or 4 be depressed, co-operating contacts 4<sup>d</sup> will be engaged, thereby short-circuiting supervisory circuit 4, causing magnet 4<sup>b</sup> to be de-energized and switch 5<sup>c</sup> to close re-



mote circuit 5 and sound remote circuit alarm gong 5<sup>b</sup>. This affords means whereby by depression of one of the keys 2, 3 and 4, alarm can be sounded in the police station or like place at any time during bank hours or during the time that the other protecting devices are out of action. In case of a bank robbery or threatened robbery, some official of the bank, knowing the position of keys 2, 3 and 4, will send in an alarm by depressing one thereof or if he does not know the position of said keys, he can always send in such an alarm by depressing all keys, which will cause sounding of the alarm even if key 1 was one of the keys depressed.

Obviously, if the bank robber should tamper with the combination lock 9 or otherwise by tampering, close circuit 8 during the protected period, coil 8<sup>b</sup> would be energized, causing switch 6<sup>c</sup> to close the circuit 6 and sound the loud alarm gong 6<sup>b</sup>.

If, as in the case of so-called "kidnapping", a bank official should be forcibly taken to the bank and ordered to open up the bank and vault or both, he would appear to comply with the request, and, in fact, would comply with the request, but instead of depressing key 1, would depress one of the keys 2, 3 and 4; and, as already stated, the depression of any of said keys 2, 3 and 4, will engage co-operating contacts 4<sup>d</sup>, shorting circuit 4, causing magnet 4<sup>d</sup> to be de-energized, allowing switch 5<sup>c</sup> to close circuit 5 and causing sounding of the alarm 5 at the police station, but the sounding of this alarm at the police station would not be known to the robber. Of course, depression of key 1, which does not have the pin or projection 14, will not result in the alarm signal just above indicated, but there would be no reason for the bank official to depress that key and the robber would not dare to take his chances (which with the number of keys illustrated, would be one of four) in depressing a key in the hope of getting the right key. In practice, of course, the number of keys of the type of the keys 2, 3 and 4 may be greatly increased, while there would be but one of the keys No. 1, and this, of course, would reduce the chances of the robber making the correct selection of the right key to prevent the sending out of the signal.

If the robber instructs the kidnapped bank official to throw switch 7 to "off" position without depressing any of the keys 1, 2, 3 and 4, then the circuit through leads 5<sup>d</sup>, a part of remote circuit 5 and through battery 5<sup>a</sup> and gong 5<sup>b</sup>, will be closed when the said gong at the police station will be sounded. As previously pointed out, by first depressing key 1, the system may be so manipulated that the remote gong 5<sup>b</sup> will not be sounded when switch 7 is thrown to "off" position and the bank official even under duress would have no reason for pressing that key, because depression of any of the other keys which sends in the signal to the police station, will not be known to the bank robber until the proper assistance arrives. The robbers will find the gun squad or police waiting for them at the outside of the bank.

What I claim is:

1. The combination with a remote alarm and a normally open circuit therefor, and a local alarm and a normally open circuit therefor, of a master switch including a plurality of groups of contacts and a plurality of master switch contact group operating keys, each key being positioned for co-operation with a different contact group and said keys being interchangeable, each group of master switch contacts including a nor-

mally open pair of co-operating contacts connected to control the remote alarm circuit, several of said keys including means operative, under movements in a direction other than required to displace the keys from positions for contact group co-operation, to close the remote alarm controlling contacts of any group of contacts in respect to which they are co-operatively positioned, and at least one of said keys being inoperative on said remote alarm controlling contacts, means for controlling the local alarm circuit including tamper switch means operative to close the local alarm circuit under displacing movements of any one of the keys from a position for co-operation with a contact group and means including at least one of said keys and the co-operating group contacts for operating a control circuit when said at least one of said keys is moved in a direction other than required to displace the same from contact group co-operating position.

2. The combination with a remote alarm and a normally open circuit therefor, and a local alarm and a normally open circuit therefor, of a master switch including a plurality of like groups of contacts, and a plurality of master switch contact group operating keys, each key being positioned for co-operation with a different contact group, said keys being interchangeable and all thereof, except one, being alike, each group of master switch contacts including a normally open pair of co-operating contacts connected to control the remote alarm circuit, each of the several like keys including means operative, under movements in a direction other than required to displace the keys from positions of contact group co-operation, to close the remote alarm controlling contacts of any group in respect to which it is positioned for co-operation, but unlike of said keys being inoperative on said remote alarm controlling contacts, tamper switch means operative to close the local alarm circuit under displacing movements of any one of several of said keys from a position for co-operation with a contact group and means including said unlike of said keys and the co-operating group contacts for operating a control circuit when said unlike of said keys is moved in a direction other than required to displace the same from contact group co-operating position.

3. The combination with a remote alarm and a normally open circuit therefor, and a local alarm and a normally open circuit therefor, of a master switch including a plurality of groups of contacts, closure means for said contacts, a key for each contact group, key-receiving openings in the said closure means for admitting portions of the keys, said keys being interchangeable and each thereof being positioned with a different one of said key-receiving openings for co-operation with an associated contact group, each group of master switch contacts including a co-operating normally open pair of contacts connected to control the said remote alarm circuit, the portions of several of said keys that project into the said closure including means operative, under movements in a direction other than required to displace the keys to close the remote alarm controlling contacts of any group thereof in respect to which they are co-operatively positioned, and the other of said keys being incapable of closing said remote alarm controlling contacts, the portions of said keys extending out of said closure means being alike, means for controlling the local alarm circuit including tamper switch contacts operative automatically to close the alarm cir-



5     cuit under displacing movements of any one of the keys from a key receiving opening and means including said other of said keys and the co-operating group contacts for operating a control circuit when said unlike of said keys is moved in a direction other than required to displace the same from contact group co-operating position.

10     4. In a switch mechanism of the kind described, the combination with a panel, circuit controlling contacts located behind said panel, a guide sleeve removably mounted in said panel, a contact actuating key working through said sleeve and operative from the front of the panel to manipulate the said contacts, said key being removable from  
15     said panel with and only with the guide sleeve, and means for producing a signal in case the contact actuating key is removed, said means including a signalling device having a circuit and co-operating tamper switch contacts controlling said  
20     circuit and being operatively associated with and controlling by the said guide sleeve under inserting and removing movements thereof.

25     5. The combination with a protected zone and a lock therefor, of an alarm, a master switch including a plurality of groups of contacts and a plurality of master switch contact group-operating keys, each key being positioned for co-operation with a different contact group and being interchangeable, an alarm controlling circuit,  
30     each group of master switch contacts including contacts connected to operate said alarm controlling circuit, certain of said keys including means for operating said contacts of any group in respect to which they are co-operatively positioned under movements thereof in a direction  
35     other than required to displace the same, and other of said keys being in all positions inoperative on said alarm controlling contacts, a second alarm controlling circuit, each group of contacts  
40     further including contacts connected to operate said second alarm control circuit, certain of said keys each including means operative on the second noted contacts in normal and all other contact group co-operating positions to maintain  
45     said second noted contacts in alarm operating condition, the said other of said keys including means for maintaining said second noted contacts in alarm operating condition when and only when in normal position, a third alarm controlling circuit, tamper switch means for operating  
50     said last noted alarm controlling circuit and being operative by manipulation of the protected zone lock, and switch mechanism associated with the second and third alarm controlling circuits  
55     and operative in one position to render operation of the second noted master switch contacts ineffective on the second noted alarm circuit and operation of said tamper switch contacts effective on the third alarm controlling circuit, and being  
60     operative in another position to render operation of the second noted master switch contacts effective

tive on the second noted alarm controlling circuit and the operation of the tamper switch contacts ineffective on the last noted alarm controlling circuit.

6. The combination with a protected zone and a lock therefor, of a remote alarm and a control circuit therefor, a local alarm and a control circuit therefor, a master switch including a plurality of groups of contacts and a plurality of master switch contact group-operating keys, each  
10     key being positioned for co-operation with a different contact group and being interchangeable, each group of master switch contacts including a pair of co-operating contacts connected to control the said remote alarm circuit, several of said  
15     keys including means operative when moved from normal positions in a direction other than required to displace the same from positions of contact group cooperation to operate said remote alarm controlling contacts of any group of con-  
20     tacts in respect to which they are co-operatively positioned and cause operation of the remote alarm, other of said keys being, in all positions, inoperative on the said remote alarm controlling contacts, another remote alarm controlling circuit, each contact group further including other remote alarm controlling contacts, all of said  
25     last noted contacts being serially connected and interposed in series with the last noted alarm controlling circuit, the said several keys each including means for closing the last noted contacts in all their contact group co-operating positions, the other of said keys including means for closing said last noted contacts, when  
30     and when only, said other of said keys are in normal positions, tamper switch means operative by manipulation of the protected zone lock to close the local alarm circuit, a two-position multi section switch having one section connected in the last noted remote alarm controlling circuit and  
35     one section connected in circuit with the tamper switch means.

7. The structure defined in claim 5 in further combination with means for automatically operating an alarm circuit under displacing movements of any one of said keys.

8. The structure defined in claim 6 in further combination with means including tamper switch contacts for automatically operating an alarm under displacing movements of any one of said  
50     keys.

9. The structure defined in claim 6 in further combination with means including tamper switch contacts and said multisection switch for automatically operating an alarm under displacing  
55     movements of any one of said keys when said switch is in a position to render the first noted tamper switch means operative to close the said local alarm controlling circuit.

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