June 11, 1940. C. R. DAVIS 2,203,675

BURGLAR RESISTING SAFE

Filed Nov. 19, 1936 6 Sheets-Sheet 1

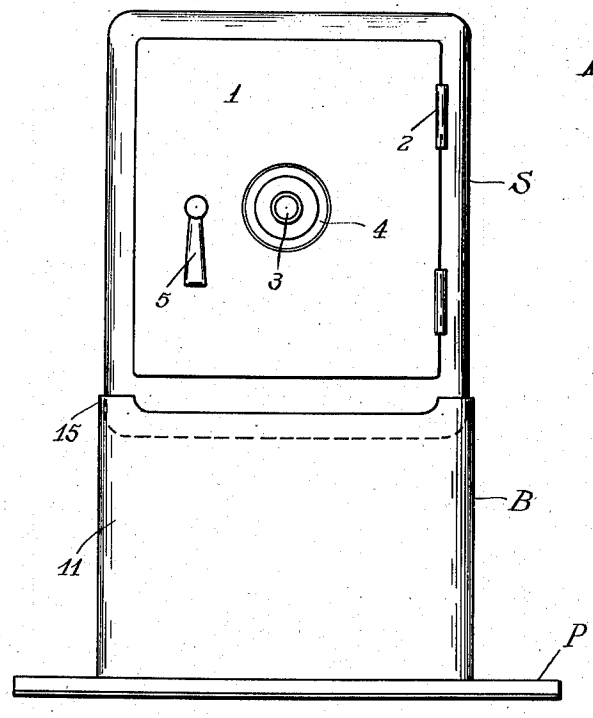


Fig 1

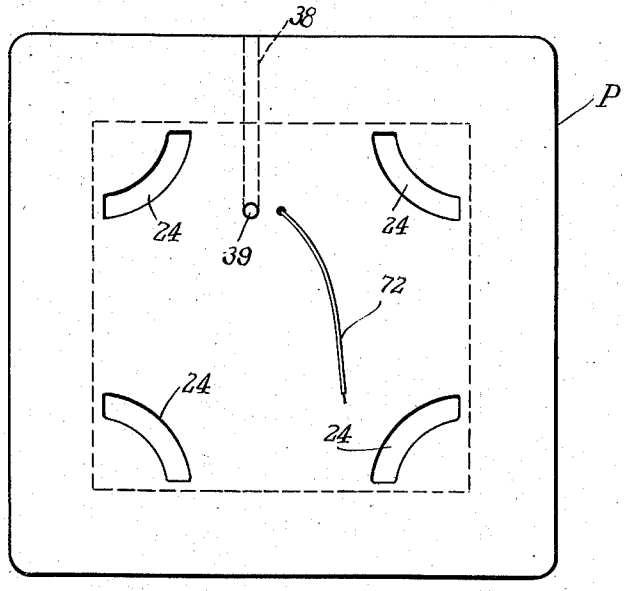


Fig. 2

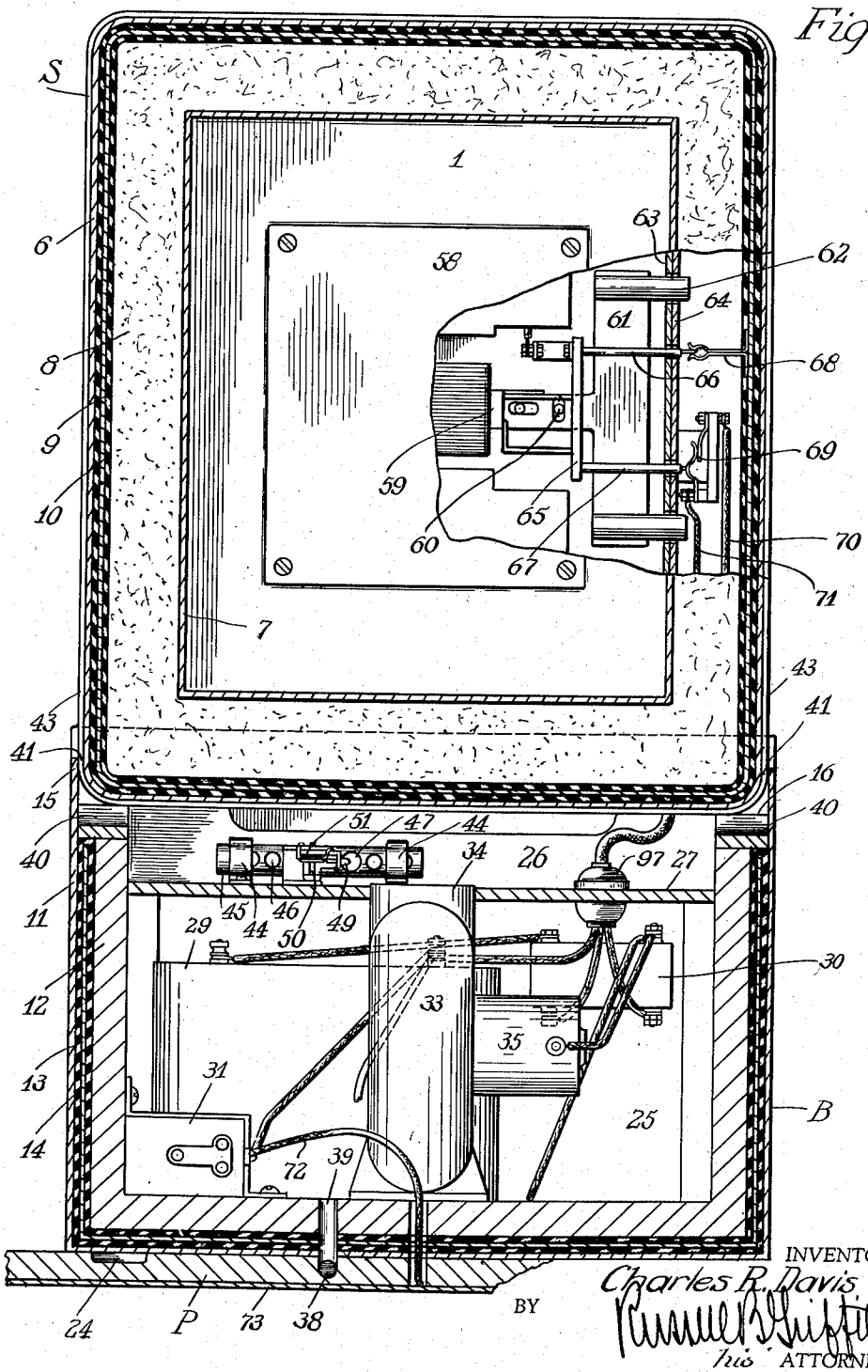
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BURGLAR RESISTING SAFE

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Fig. 3



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BURGLAR RESISTING SAFE

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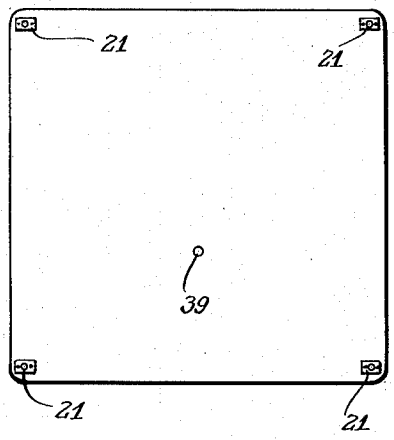
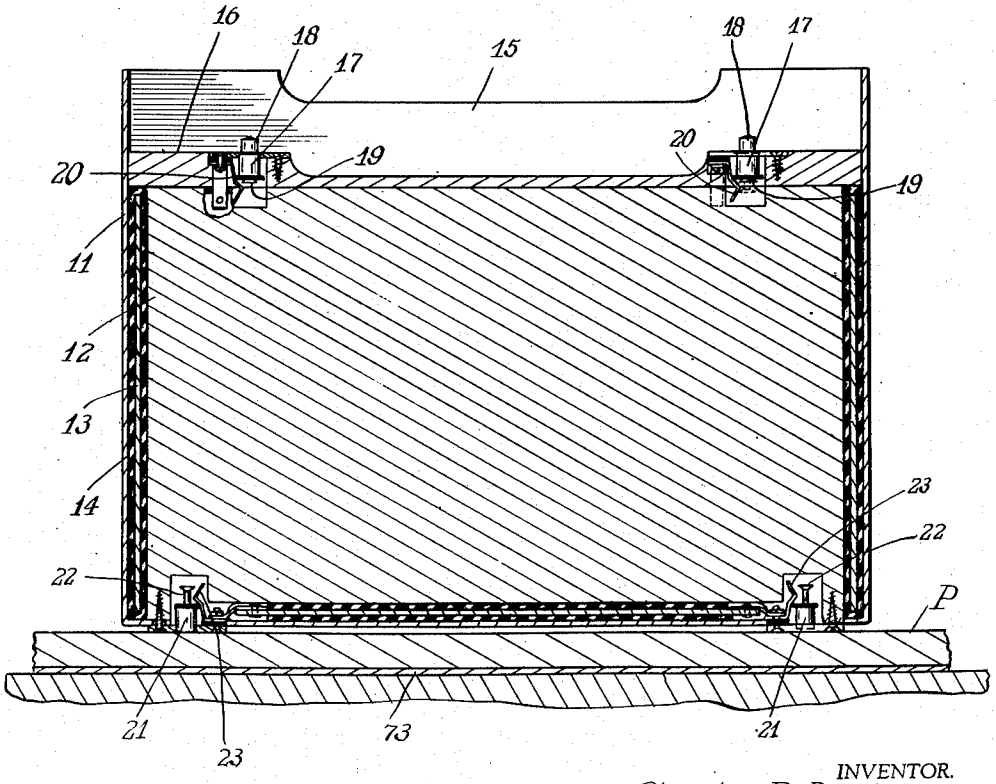


Fig. 4

Fig. 5



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BURGLAR RESISTING SAFE

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Fig. 6

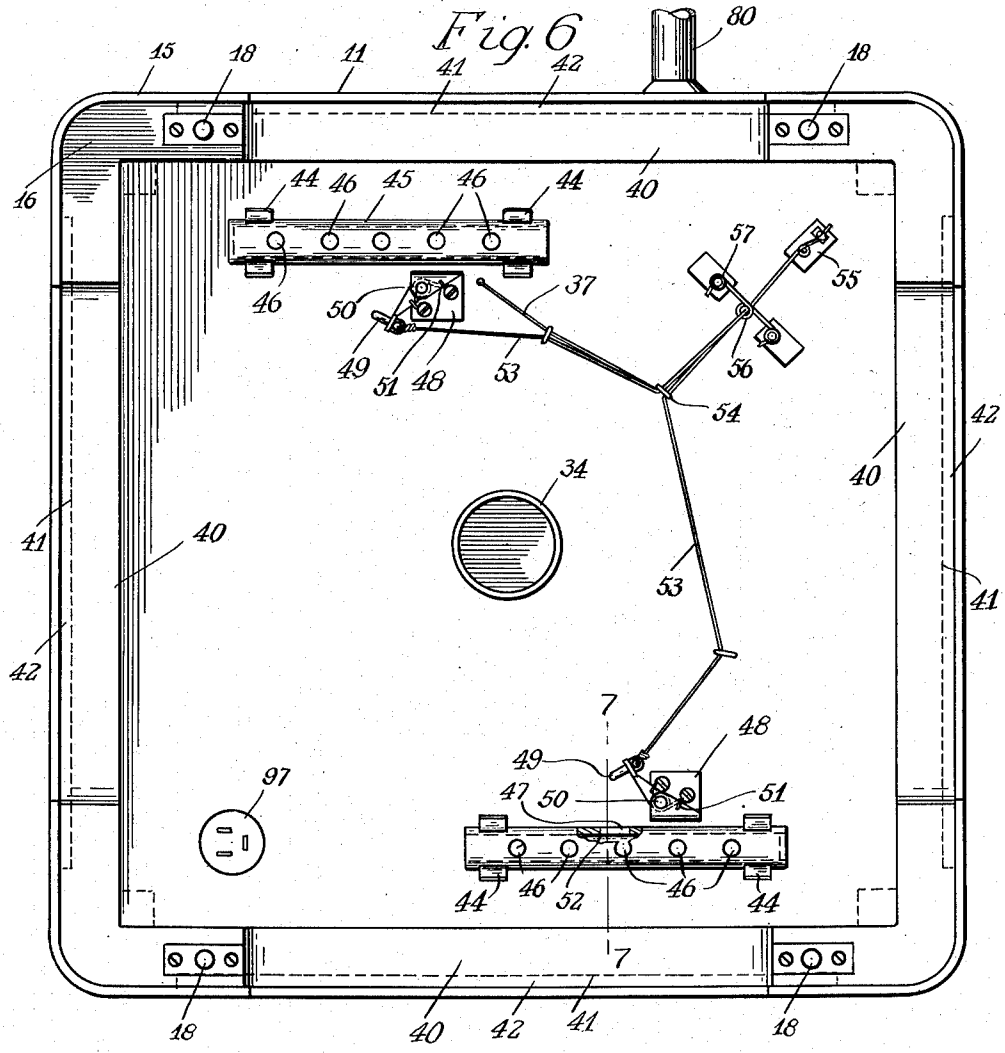
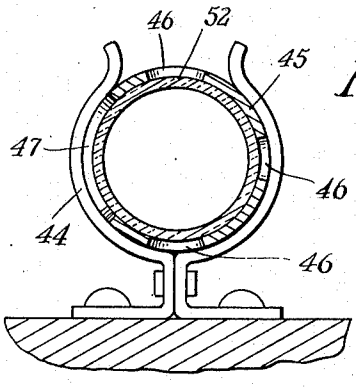


Fig. 7



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BURGLAR RESISTING SAFE

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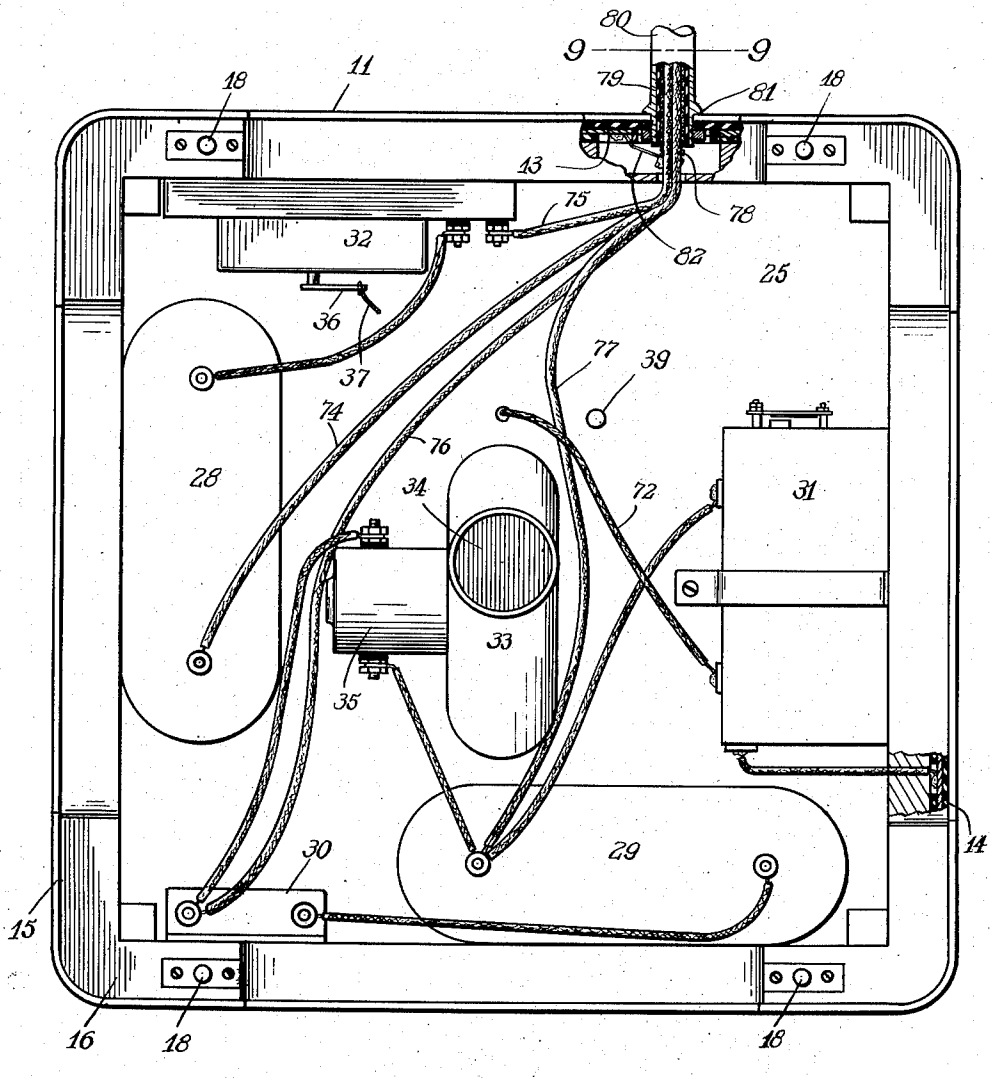


Fig. 8

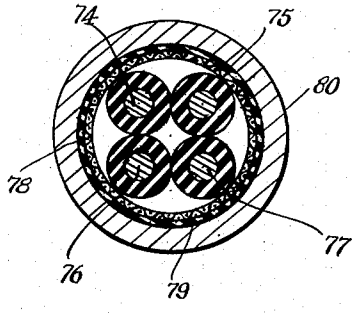


Fig. 9

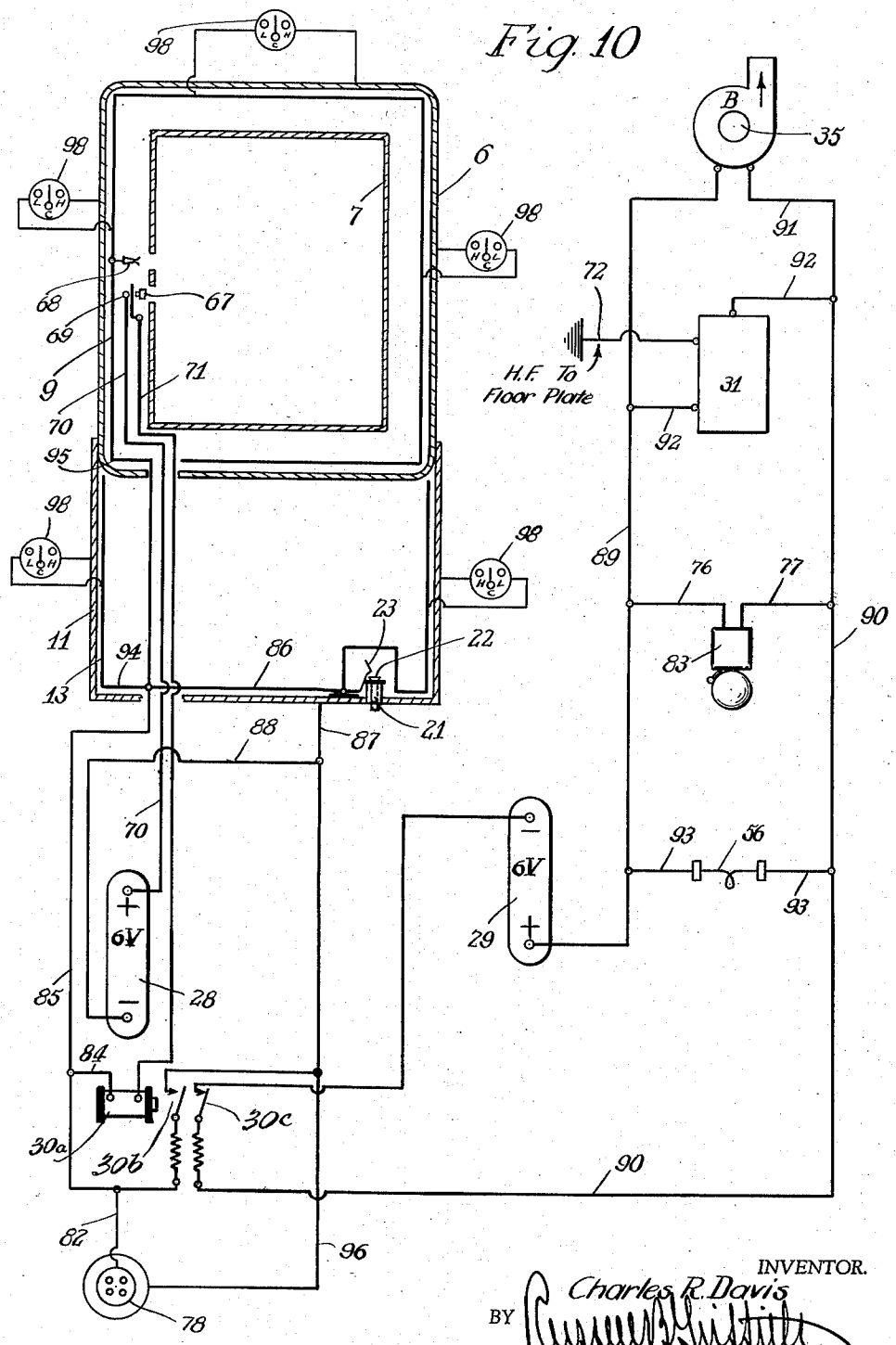
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BURGLAR RESISTING SAFE

Filed Nov. 19, 1936 6 Sheets-Sheet 6

Fig. 10



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Patented June 11, 1940

2,203,675

UNITED STATES PATENT OFFICE

2,203,675

BURGLAR RESISTING SAFE

Charles R. Davis, Rochester, N. Y.

Application November 19, 1936, Serial No. 111,669

7 Claims. (Cl. 109—29)

My present invention relates to burglar resisting and detecting devices and more particularly to safes and/or strong boxes in which valuables are stored, and it has for its object to provide such a device in a neat, efficient and commercial form which shall be fitted with various means that will promptly detect and give an alarm or alarms at suitable points when the safe is tampered with by thieves or unauthorized persons no matter what scheme of attack is employed though not interfering or brought into play when authorized persons seek entry, as through the legitimate use of the safe combination. The improvements are directed in part toward providing an audible alarm in the safe itself, an electrical line of communication to a distant station, such as police headquarters, thoroughly protected against cutting; toward the provision of a gas disseminating device effective to overcome a thieving operator upon the safe and toward the provision of a high frequency electrification of the strong box itself so that a person attempting to remove it is stunned thereby.

A further feature of the invention is the provision of a source of electrical current supply and actuating devices for the various instrumentalities wholly contained within the safe structure so that the operation of the safe instrumentalities is not dependent upon such service from outside that might fail or be cut as a preliminary measure to the attack upon the safe itself. To these and other ends, the invention resides in certain improvements and combinations of parts, all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of this specification.

In the drawings:

Fig. 1 is a front elevation of a safe structure fitted and constructed in accordance with my invention and constituting an embodiment thereof;

Fig. 2 is a top plan view of the base pedestal;

Fig. 3 is an enlarged substantially central vertical section therethrough, looking toward the front but with elements contained in the base shown in elevation;

Fig. 4 is a bottom plan view of the base;

Fig. 5 is an enlarged vertical sectional view through the base taken in the plane of one of its vertical walls;

Fig. 6 is a further enlarged top plan view of the base element;

Fig. 7 is a detail section on the line 7—7 of Fig. 6;

Fig. 8 is a view similar to Fig. 6 but with the flooring of the upper chamber removed;

Fig. 9 is an enlarged detail section on the line 9—9 of Fig. 8, and

Fig. 10 is a diagrammatic view, partly structural, of the circuit arrangements involved.

Similar reference numerals throughout the several views indicate the same parts.

To first give a general idea of the construction and mode of operation of the embodiment of the invention shown, in order that specific description with reference to the drawings can be more readily understood, I provide a strong box or safe proper which to outward appearances may resemble any ordinary safe and we assume for some purposes that it is a safe provided with the usual type of dial and knob combination with a bolt actuating handle, as shown in Fig. 1. This strong box rests upon a base, preferably of the same contour, which base in turn rests upon a pedestal that otherwise corresponds to an ordinary floor support, each of the elements so far mentioned being separable from the other.

The problem confronted is to prevent a thief or cracksman, as we may say, from successfully engaging in the following means of forcing the safe:

(1) Removing the strong box bodily from the premises so that it may be worked upon at leisure in a safe environment,

(2) Drilling the walls of the strong box,

(3) "Knocking" the combination, as it is called, and destroying that control over the bolt handle,

(4) Attacking any of the walls of the safe with an acetylene torch.

As before outlined and except for an exteriorly running connection for an additional type of alarm, agencies energized from a source of electric current, together with that source, are housed within the base section. These include an audible alarm signal, a high frequency generator connected to the outer metal shell of the strong box, one or more gas disseminating devices and a blower or similar medium for putting pressure behind the liberated gas. The base and strong box are sufficiently separated or provided with communicating passages so that the gas liberated from the base envelops the strong box and, according to its inherent nature, results in blinding or stupefying a person in touch with or immediately adjacent to the installation.

The first of the aforesaid methods of attack is met by the high frequency electrification primarily but also by the gas liberation and by the

fright of the alarm. The second and third are met by the gas liberation, probably by the electrification and also by the alarm, while the third is met similarly, the alarms being such that by any of these attacks electric circuits are closed that set off the entire program. Incidental, but nevertheless important to this, is the actuation of these devices through the medium of a relay in the circuit whereby, though the initial contact or short circuiting be instantaneous, these alarms and other manifestations continue until the energy of the source of electric supply is entirely exhausted which, with the instrumentalities shown in the present embodiment, may be made to extend through a number of hours. As to the fourth method of attack, a plurality of thermostat pyrometers are placed within the walls of the safe at suitable intervals that close the protective circuits when heat sufficient to effect entrance through the wall is applied thereto.

In the case of the one and only outside medium of protection, a conduit for the wires of the police communicating system is so constructed that if an attempt be made to cut it, the main operating circuit will still be closed and all of the agencies other than this one will go into operation anyway.

Referring more particularly to the drawings for a detailed description of the structure, S indicates generally a strong box or safe proper, B the base and P the pedestal upon which the latter rests. The strong box has the usual doors 1 hinged at 2 and provided with a combination consisting of a knob 3 and dial ring 4 controlling the bolt handle 5 that throws the bolts. The walls may be of any usual or preferred construction and are rather conventionally shown herein as comprising an outer shell 6 (Fig. 3), an inner shell 7 and an intervening packing 8 of fireproof material except that within the body of the wall is another lamination 9 of conducting material 10. The purpose of this arrangement is to close an electrical circuit between the inner element 9 and the outer shell 6 acting as a ground in case the wall of the safe is drilled, which circuit will be hereinafter explained.

The knob 3 and dial ring 4 are insulated from each other and on opposite sides of this same circuit so that if these elements of the combination are mutilated they will make contact and also close the circuit, but the details of this arrangement are described and claimed in a separate and copending application of mine, Serial No. 111,670, filed November 19, 1936.

Referring now more particularly to Figs. 3, 5 and 6, the base B similarly consists of an outer steel shell 11, an inner wall 12 and an inner conducting plate 13 protected by walls of insulation 14 so that if the base is drilled or sufficiently mutilated, it will also close the alarm circuit. This outer steel shell 11 extends above the inner wall 12, as indicated at 15, in the nature of a rim and within this rim the inner wall is provided with a seat 16 upon which the strong box S rests. At the four corners of the seat are arranged a familiar type of spring plunger double acting switch 17, the plunger 18 of which is on one side of the circuit and has a head 19 adapted to cooperate with a leaf contact 20 on the other side of the circuit. The strong box S rests upon the seat 16 and in doing so holds the plunger 18 depressed in the reverse of the full line position of Fig. 5 out of contact with leaf 20. If, however, the strong box is tilted or any attempt made to remove it from the base and deported the plungers are released, snapped to the full line position of Fig. 5 and make and break the circuit through the leaf. This instantaneous closing of the circuit is sufficient because there is a relay in the latter, as will be hereinafter explained.

A similarly acting system of switches or circuit closers is provided between the base B and the pedestal P, still referring to Fig. 5, other plunger switches 21 being provided at the four corners of the base having heads 22 adapted to cooperate with leaf contacts 23. The plungers are held normally retracted by their contact with the pedestal P, as shown, with the circuit broken, but, referring additionally to Fig. 2, the pedestal P is provided at each corner with segmental depressions 24. Therefore, if the base is raised bodily, the heads 22 of the switches will be forced downwardly to make the contacts with leaves 23 and, if, on the other hand, it is attempted to slide the base off of the pedestal in any direction, at least one of the plungers will fall into a depression 24 and effect the same result. It may be here explained that the pedestal is structurally combined with an ultimate foundation that persists as such for practical purposes so far as this consideration of the deportation of the safe is concerned.

Referring now more particularly to Figs. 3, 6 and 8, the interior of the base B is divided into a lower chamber 25 and an upper chamber 26 divided by a flooring in the latter, indicated at 27. In the lower chamber 25 are located batteries 28 and 29, a relay switch 30, a high frequency generator 31, a call box 32 and a blower 33 having a discharge mouth 34 driven by a motor 35. All of these instrumentalities have been conventionally shown for the sake of clearness and simplicity and constitute what may be termed the power unit of the apparatus. They are all well known devices in the art that do not require individual specific description, except that with reference to the call box 32 the operating lever 36 thereof has its self-contained spring motor so arranged that its tendency is to depress lever 36. When the latter is raised, the motor is energized and it is held raised by a cord 37 hereinafter referred to. When this cord is released, the escapement or buzzer is actuated with the usual results of any telegraphic call box.

The mouth 34 of the blower delivers into chamber 26 and according to the size of the installation, if the air in chamber 25 is not sufficient to supply it for the purposes hereinafter described before its vacuum capabilities are reached, a lateral intake 38 is provided in the pedestal P communicating with a port 39 extending through the bottom of the base and communicating with chamber 25 in which the blower is located.

The purpose of the blower, as before indicated, is to occasion a forceful discharge of a stupefying gas that will envelop the strong box S and subdue the person who is tampering with the safe by any of the methods above outlined. The gas is liberated in chamber 26 and reaches the exterior through an arrangement of passages between the base B and the strong box S so universally and under such driving power from the blower that the envelopment aforesaid is continuous and effective. These passages, in the present instance, are furnished by providing depressions 40 in the strong box seat 16, which latter is thereby reduced to the four corners. Furthermore, the strong box is bound at its four corners, as indicated at 43 in Fig. 3, as usual so that, while it makes a fit with the base at these points, the intermediate depressed panels, indicated in dotted lines at 41 in Fig. 6, are actually

spaced from the upstanding rim 15 of the shell portion 11 of the base. The contents of chamber 26 under the influence of the blower may, therefore, be driven in a film up all sides of the strong box through the passages provided by the communicating depressions 40 and vertical slots 42 that occur as a result of this spacing of the panels 41 from the said flanges 15.

The gas containing and liberating means are best shown in Figs. 3 and 6. Mounted on the floor 27 of chamber 26 are clips 44 of the nature of those in which fuses are ordinarily held that detachably receive one or more metallic casings 45 provided with vents 46 and with openings 47 in one side. Mounted on a bracket 48 adjacent each casing is a hammer 49 turning on a pivot 50 and energized by a spring 51 coiled about the pivot and having a tendency to actuate the hammer through opening 47 of the casing. Within the casing is slipped a glass or other frangible tube 52 containing in highly concentrated form the stupefying gas previously referred to so that when the hammer 49 is released it will break the tube and liberate the gas. The hammer is normally restrained by a cord 53 attached thereto and which passes through a screw eye 54 acting as a pulley to an anchor plate 55. Intermediate the pulley and the anchor plate, the cord which is inflammable passes through and in intimate contact with an eye 56 in a resistance wire suitably supported on the floor board at 57. When the resistance wire is electrically energized, it will burn the cords 53 through practically instantaneously and release the hammers 49 for the purposes stated.

Connected to one of the cords 53 or otherwise running through the same fusible control is an inflammable cord 37 which runs down through the floor and is the cord that is connected to the lever 36 of the call box 32, as previously described. Thus, with the energizing of wire 56, the gas is liberated in chamber 26 and the call box goes into operation.

Referring to Fig. 3, which shows in elevation the inside of the door 1 of the strong box, the safe combination mechanism is partially shown beneath the cover plate 58 thereof. So far as this disclosure is concerned, this combination includes a bolt 59 reciprocated by proper and authorized operation through handle 5 which has a crank pin 60 thereon engaging in a slot in the bolt. The latter includes a cross head 61 on which are the actual locking bolts 62 that are projected and withdrawn through wall 63 of the safe door to engage wall 64 of the outer strong box. Actuated by bolt 59 is a cross head 65 having plungers 66 and 67 thereon. Plunger 66 constitutes a conductor and receives current from the main circuit for the purpose of establishing through a knife switch element 68 the aforesaid parallel circuit through the elements 3 and 4 of the combination in case the same is mutilated as aforesaid and in the manner previously referred to as constituting the subject matter of a separate application for patent. This lead wire 68 also goes to a protective inner positive plate (not shown) arranged in the safe door in exactly the same manner that plate 9 is arranged in the walls of the body of the safe. The other plunger 67 functions merely to keep closed a spring switch 69 in a circuit including wires 70 and 71 physically shown in the said Fig. 3.

Switch 69 is a master switch and its provision is attributable to the fact that obviously when the safe has once been opened through proper manipulation of its combination and is in use for the day, there must be no possibility of those having authorized entrance to it being subjected to the protective apparatus. Hence, in the general operation of withdrawing the bolts 62, cross head 65 is retracted, switch 69 remains open and nothing can happen through any circuit. Similarly, plunger 66 is withdrawn but this is not of so much moment to the general system of alarm as this merely constitutes an independent means for connecting up the door 1 in the same manner that the other walls of the strong box are connected up and renders the door no more vulnerable as to drilling and similar mutilation than any of the other walls.

It has been initially stated in this specification that an object of the invention is to construct a burglar resisting safe in which protective devices and their source of electric energy as well would be self-contained to avoid the possibility of their functioning being negative by cutting wires from an outside source, and the description so far has been consistent with this theory of operation. However, it is obvious that in running contact to a point so distant as a police headquarters, for instance, it becomes necessary to run a communication line out of the safe for this particular purpose. In the present embodiment, I run such a communication line exteriorly in order to complete the function of the call box 32 previously described but surround such line of communication with protective means of such a nature that even if it is cut and when it is cut a circuit is established that brings into operation the instrumentalities hereabove described.

Referring more particularly to Fig. 8, the self-contained source of electrical energy in the circuit through the call box 32 comprises wires 74, 75, 76 and 77 collectively confined with proper insulation, as indicated in Fig. 9, in a cable or tube 78 in the form, in the present embodiment, of a woven or mesh casing. This casing with an interposed insulating covering 79 is in turn encased in a hardened steel conduit 80 suitably physically connected at 81 to the shell of the base B. It, therefore, joins the internal ground of such shell but the tube 78 has an electrical connection 82 with the protective positive plate 13 imbedded in the base wall and hence joins a circuit common with that plate. Therefore, a tamperer who attempts to saw through the outer hardened casing 80, even if successful, shorts a circuit between it and the positively connected cable 78 even before he reaches the wires 74 to 77 confined therein and connected to the batteries and other instrumentalities confined in the base in the manner clearly indicated in Fig. 8, the connections there being so plain that it is not believed necessary to further trace them and more specifically describe them.

It will not be attempted to designate other circuit wire connections physically appearing in Figs. 3 and 8 pending the explanation of the circuit diagram of Fig. 10, except with reference to Figs. 2 and 3, 72 indicates an outside ground wire that runs from the high frequency coil 31 down through the bottom of the base B to a copper plate 73 on the bottom of pedestal P that furnishes an absolute ground, it being obvious that a shocking electrification of the strong box S would not be produced without an outside ground though otherwise, and with respect to other circuits, the casings are themselves capable of acting as a ground on a contained circuit.

Proceeding now to an explanation of the cir-

cuit diagram of Fig. 10, the master switch 69 controlled by the combination and bolts and plunger 67 are shown closed because the strong box must be locked before the burglar resisting devices become operative at all, as previously explained. Also, in the diagram for convenience in layout the coil of the double relay 30 is shown at 30^a and the contacts on the two sides thereof generally at 30^b and 30^c respectively. Also, it is explained that the alarm 83 (Fig. 10) may obviously be placed either in the base B or outside of the safe unit, as, for instance, on the outside of the building that the safe occupies. In the present instance, the latter is contemplated and hence the wires 76 and 77, as shown in Fig. 8, accompany the wires 74 and 75 that run from the call box 32 from the battery 28 to the outside police alarm through cable 78 and casing 80.

Assuming first, according to the probable means of forcing the safe earlier enumerated, the attempt is made to remove the safe unit bodily. In this connection, while the duplicate circuit is not shown, it is obvious from the description of Fig. 5 that lifting the base B from the pedestal P effects the same results as lifting the strong box S from the base B. In other words, switches 18 and 21 act in the same way and in the diagram of Fig. 10 only switch 21 is designated with its contact member 23. Also, in Fig. 10, inasmuch as the head 22 is shown in lowered position, it is to be assumed that the base has actually been raised and the circuit closed at 21—23. In such instance, the circuit connections are as follows: from battery 28, positive wire 70, switch 69, wire 71, coil 30^a of the relay, wire 84, wire 85, wire 86, contact member 23, grounded head 22, wire 87 and thence through wire 88 back to the negative side of battery 28. This momentary circuit through energizing relay coil 30^a establishes a permanent circuit through the relay circuit closer 30^b directly back through wire 88 to the negative side of battery 28.

The other circuit closer 30^c of the relay is similarly actuated which on that side establishes the circuit from the positive side of the battery 29 through wires 89 and 90 back to the negative side of battery 29. On this circuit in parallel are the circuits 91, through the blower motor 35, a circuit 92 through the high frequency magneto 31, circuit 76—77 through the alarm 83 and a circuit 93 through the fuse or resistance wire 56 controlling the release of the gas. Inasmuch as the manner in which the circuit is made is the same whether the strong box tilting switches 17 or the base tilting switches 21 go into action for the sake of simplicity in the diagram, the wires to the latter only are indicated.

Assuming next that the second attack is made, namely, drilling the walls of the strong box or of the base, the circuit established is as follows: the positive side of battery 28, wire 70, master switch 69, wire 71, relay coil 30^a, wire 84, wire 85, wire 94, to the protective plate 13 in case the drilling is being conducted there. Otherwise, the current will continue along wire 85 to the point 95 where it is similarly connected to the plates 9. Or in case the door is being drilled, it will continue to contact 68 where the lock plunger takes off the current for the latter purpose. In any instance, the drill establishing a ground to the outside casing, the current returns to the negative side of the battery, as in the first instance, through wires 87, 88.

On the right side of the circuit, in Fig. 10, the ground from the high tension magneto coil 31 is indicated at 72, it being obvious that one attempting to lift the strong box S while standing on the floor himself supplies the conductor in order to effect the shocking result.

The thermostat pyrometers connecting the outer shells and the inner protective plates of the walls of the safe are indicated at 98 on the diagrammatic view in conventional style, it being understood that they are concealed in the interior filling of the wall. A torch applied to the shell or outer casing in an effort to burn an opening through would so heat the interior as to close the thermostat closest to the point of application, and the effect would be the same as closing the circuit by drilling, and it is, therefore, not necessary to trace that circuit again.

If it is attempted to saw through the outside connection in the conduit which is itself a ground, indicated in the diagram by wire 96, as soon as the saw makes contact with the inner cable 78 it connects with the positive side of the circuit as represented at 82 and as previously explained it does this long before the enclosed wires 74 to 77 are reached and severed.

The three wires 85, 70 and 71 are broken at a plug and socket connection 97 in the floor 19 so that they may be disconnected and the safe lifted off when authorized persons desire to do so.

I claim as my invention:

1. In a burglar resisting safe, the combination with a strong box having a wall embodying outer and inner electrical conductance mediums protecting the wall the outer medium being constituted by an outside steel shell for the box and an electrical circuit including such mediums, of a chamber structurally connected with the strong box a gas disseminating device arranged in the chamber, there being passages leading from such chamber delivering to the exterior walls of the strong box, and means in such circuit for liberating gas from said device when the circuit is closed by electrically connecting the mediums.

2. In a burglar resisting safe, the combination with a base and a strong box connected thereto and having gas conducting passages delivering to the exterior all around the strong box leading to the exterior thereof through which passages liberated gases will tend to envelop the strong box, of a gas disseminating device arranged within the base, means including a source of electrical supply arranged entirely within the base for liberating gas from the gas disseminating device when the strong box is tampered with, and separate means for thereafter forcefully driving the liberated gas through the passages.

3. In a burglar resisting safe, the combination with a base and a strong box connected thereto and having gas conducting passages leading to the exterior thereof through which liberated gases will tend to envelop the strong box, of a gas disseminating device arranged within the base, means including a source of electrical supply arranged entirely within the base for liberating gas from the gas disseminating device when the strong box is tampered with, and a blower arranged within the base for forcefully driving the liberated gas through the passages, said blower being provided with a motor energized by the same source of electrical supply.

4. In a burglar resisting safe, the combination with a base and a strong box connected thereto and having gas conducting passages leading to the exterior thereof delivering to the exterior all around the strong box through which passages liberated gases will tend to envelop the strong

box, of a gas disseminating device arranged within the base, electrically operated means for liberating gas therefrom, a source of electrical current supply having a circuit furnishing said means, and inner and outer conductance mediums separated by a relatively thin, sheet-like layer of electrical insulating material, said medium being included in said circuit arranged in and protecting a wall of one of said first mentioned elements through which a drill penetrating the wall would pass to close said circuit.

5. In a burglar resisting safe, the combination with a strong box and a source of electrical current supply, of a gas disseminating device arranged in a similarly protected chamber adjacent to said strong box, there being passages leading from said chamber to the exterior of the walls of the strong box, and means including the circuit of said electrical current supply for liberating gas from said device when the strong box is penetrated.

6. In a burglar resisting safe, the combination with a strong box and a source of electrical current supply, of a gas disseminating device arranged in a similarly protected chamber adjacent to said strong box, there being passages leading from said chamber to the exterior of the walls of the strong box, and means including the circuit of said electrical current supply for liberating gas from said device when the strong box is moved bodily.

7. In a burglar resisting safe, the combination with a strong box and a similarly protected chamber structurally associated therewith, there being gas conducting passages delivering to the exterior of the strong box through which passages liberated gases will tend to envelop the strong box, of a gas disseminating device arranged within the chamber, and means for liberating gas therefrom when a vulnerable element of the strong box is distorted.

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