

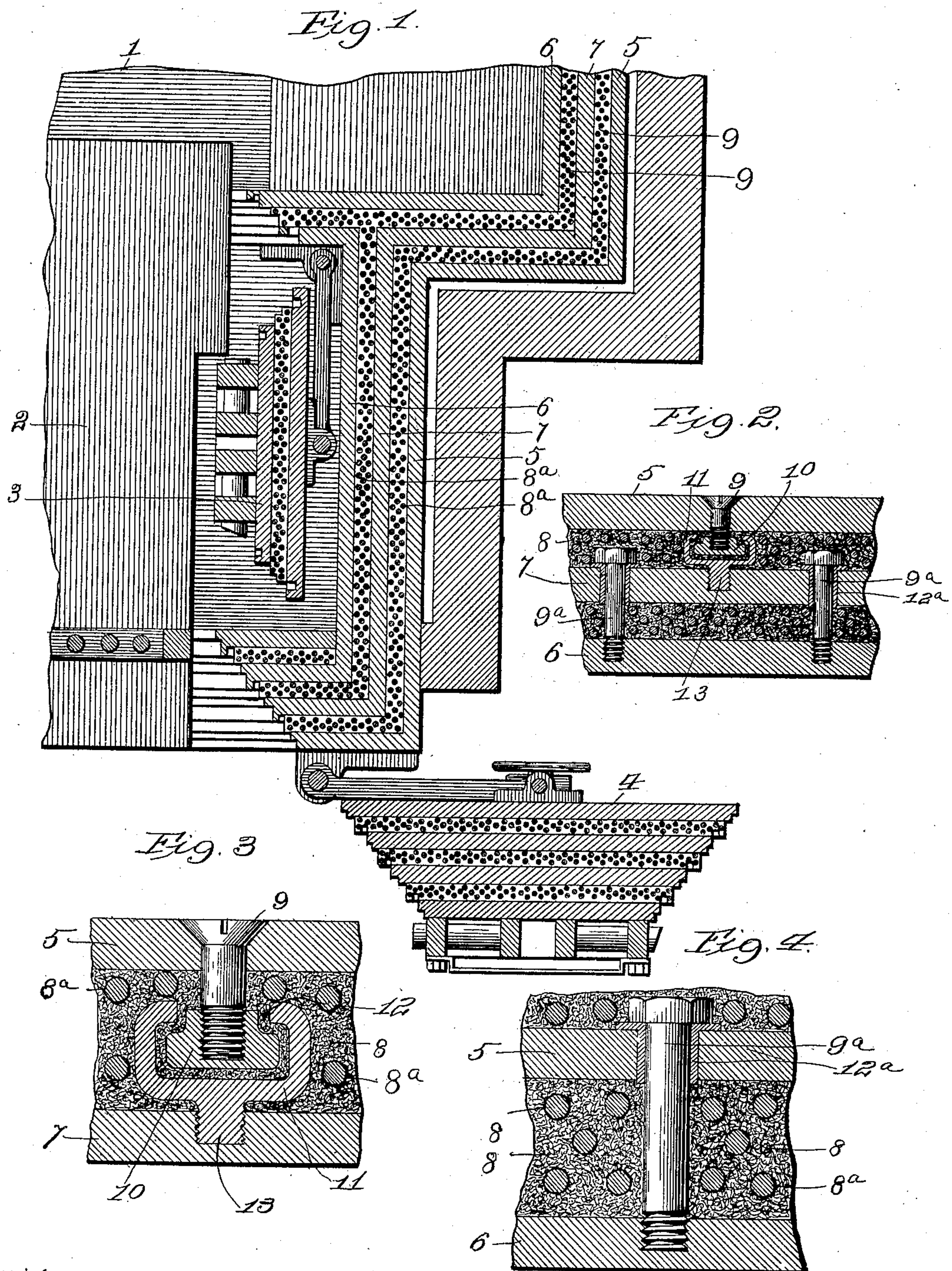
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F. S. HOLMES.
SAFE.

(Application filed Apr. 24, 1897.)

(No Model.)



Witnesses:
Herbert Bradley
Karl W. Fleming.

Inventor
Frederick S. Holmes
By *Knight Bros.*
Attys.

UNITED STATES PATENT OFFICE.

FREDERICK S. HOLMES, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO
WILLIAM H. HOLLAR, OF SAME PLACE.

SAFE.

SPECIFICATION forming part of Letters Patent No. 620,073, dated February 21, 1899.

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To all whom it may concern:

Be it known that I, FREDERICK S. HOLMES, a citizen of the United States, and a resident of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Burglar-Proof Safes, of which the following is a full, clear, and exact specification.

As so-called "burglar-proof" safes are now constructed it is possible to employ an electric current, usually conveniently obtainable where such structures are employed, to burn holes through the steelwork of the walls or doors of such structures. The mode of procedure is to use the incandescent or other obtainable electric current by connecting any metal portion of the vault or safe to one electric conductor, attaching to the other conductor a carbon provided with a shield or other convenient means for handling, and then forming and maintaining an electric arc between the carbon and the wall to be attacked until the metal is melted, and an opening (which may be made at about the rate of an inch a minute) is formed for the introduction of explosives to force an entrance.

It is the object of my present invention to avoid the possibility of thus forming holes in vaultwork within any length of time generally at the disposal of the burglar. I accomplish this object by combining with the safe or vault structure, between the metallic plates of which it is made, drill-resisting pieces which are suitably held in place in the vault structure, which supports them through the medium of insulating material, which electrically insulates the pieces from the rest of the structure and from one another. The pieces are called "drill-resisting" pieces because they are intended to be of some material which will resist or oppose an attempt to drill through this portion of the safe, and especially by the electric arc. They are preferably in the form of rods suitably arranged so as to not leave sufficient space in a direct line past them to permit an attack on the metallic plates beyond. They are preferably insulated by means of a filling of non-conductive material—such as cement, indurated fiber, and the like—occupying the entire space between the plates and by which the pieces or rods are embedded. As a further safeguard I prefer to arrange the several plates so that

there shall be no metallic connection between any two plates, the insulating filling being made to insulate and space apart said plates. I prefer, however, while maintaining such insulation not to leave the plates without some effective mechanical connection or tying between them, and for this purpose I employ at suitable intervals insulated tie-bolts of some suitable form, preferring to use a peculiar form of insulated tie-bolt forming part of my present invention. By employing a number of such insulating-sections with embedded bars it will be practically an impossibility to force an opening into the structure within any length of time which will ever be at a burglar's disposal.

I prefer to use as insulating material either indurated fiber, vulcanized fiber, or a suitable non-conducting vitreous substance or any equivalent.

My invention will be fully understood upon reference to the accompanying drawings, in which—

Figure 1 represents in horizontal section a portion of a safe or vault constructed in accordance with my present invention. Fig. 2 is an enlarged sectional detail view of a portion of the structure, and Figs. 3 and 4 are detail views of two forms of insulated tie-bolts.

1 represents the main body of the vault; 2, the vestibule; 3, the inner doors, and 4 the outer door, the walls, floor, and ceiling forming the main vault and vestibule or as many of such parts as may be desired, and both the inner and outer doors are formed of a new composite structure which is substantially the same in principle and constituency for each part and which may be described as follows:

5 represents an outer plate of any metal suitable for the construction of vault-work, and 6 is an inner plate of the same or some other suitable metal.

7 represents intermediate or inner plates of solid metal of any appropriate kind, of which there may be any desired number.

The plates 5, 6, and 7 may be what has been usually used for such purposes or what future experience may dictate to be desirable. Between each two of the metal plates I introduce a section made up of the insulated drill-resisting pieces, which section preferably ex-

tends completely around the vault or safe and through the doors (and may be employed as well at the bottom and top thereof) in such a manner that it will be impossible to get an electric circuit to pass from the outer wall of the structure to any inner part. These interposed pieces are preferably embedded in the insulating material, which may be of vulcanized or indurated fiber or some suitable form of cement or some vitreous material which is a non-conductor of electricity.

As shown in the detail Fig. 2, I prefer to employ as the drill-resisting pieces rods 8^a, which shall be spaced apart sufficient to avoid contact one with the other or with any other conducting-body and arranged in different rows or series in such a manner that the rods of one row will come opposite the spaces of another row and will make it impracticable to introduce an instrument past them. As the rods will be thoroughly embedded and insulated, it will be quite impossible to destroy them by the use of an electric arc, and each barred insulated section would offer sufficient resistance and consume such time in passing it that several such layers would entail more time in forcing an entrance than will ever be at the disposal of a burglar.

I do not limit myself to the use of rods or bars, as it is obvious that pieces of metal of any kind difficult to drill, cut, or blow may be employed instead of such bars.

The insulating material also spaces apart and insulates the respective plates from one another, so that when once through the outer plate 5 and through an insulating-section 8 no current would flow through the next inner plate 7.

A further object of my present invention relates to insulating the bolts or connections between the respective plates thus insulated. Two forms of such tie-bolts are shown in Figs. 3 and 4.

Referring to Fig. 3, 9 represents a screw countersunk in one of the inner plates—say 5—and having on its inner end a nut 10, within an insulating-socket 11, surrounded by insulation 12. The socket 11 is embedded in the insulating-layer of the structure and carries at its outer end means for attaching it to the next outer plate without penetrating said plate—such, for instance, as a threaded shank 13, which is tapped into the next metallic plate, which may be an intermediate plate 7 or an outer plate 6. By this means the plates may be securely bound together mechanically while maintaining their insulation electrically.

A modified construction of insulating connection or tie-bolt is shown in Fig. 4, wherein the screw 9 passes through the plate 5, through insulating-section 8, and into the next outer plate 6. The neck and head of said screw are surrounded by insulation 12^a, so as to avoid establishing electrical connection between the two plates.

A further advantage of my present invention arises from the fact that the insulating material offers ample protection against fire, and the massive and expensive masonry or fireproofing usually employed to surround a safe or vault is thus rendered entirely unnecessary.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. In a safe or vault, the combination of a supporting structure, drill-resisting metallic pieces, and insulating material which electrically insulates said pieces from said structure and from one another; substantially as explained.

2. In a safe or vault, the combination of a suitable supporting structure, drill-resisting metallic pieces, and non-conducting filling in which said pieces are embedded and by which they are electrically insulated from the rest of the structure and from one another; substantially as set forth.

3. In a safe or vault, the combination of a supporting structure, drill-resisting metallic rods, and an insulating-filling surrounding and embedding said rods, whereby they are electrically insulated from the rest of the structure and from one another in substantially the manner and for the purpose set forth.

4. In a safe or vault, the combination of a supporting structure, drill-resisting metallic rods, and insulating material which electrically insulates said rods from said structure and from one another, substantially as and for the purpose set forth.

5. In a vault or safe construction, the combination of inner and outer walls or plates, a non-conducting filling interposed between said walls or plates, spacing them apart, and electrically insulating one from the other, and insulated tie-bolts mechanically connecting the walls or plates together; substantially as and for the purpose set forth.

6. In a vault or safe construction, the combination of inner and outer insulated plates, and insulated tie-bolts inserted through the inner plate and into but not through the outer plate; substantially as and for the purpose set forth.

7. An insulating tie-bolt for mechanically connecting electrically-insulated plates in vault or safe construction, comprising a screw, a nut fitted to said screw, a socket holding said nut, insulation interposed between the socket and the nut for preventing flow of electricity between them, and means carried by said socket for attaching it to one of the plates to be connected; substantially as and for the purposes set forth.

FREDERICK S. HOLMES.

Witnesses:

C. E. COOKE,
K. E. HOLMES.