

UNITED STATES PATENT OFFICE

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ALLOY.

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No Drawing.

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To all whom it may concern:

Be it known that I, JAMES W. DONNELL, a citizen of the United States, residing at Evanston, in the county of Cook and State of Illinois, have invented a certain new and useful Alloy, of which the following is a specification.

In the making of so-called "burglar proof" safes, vaults, and other depositories, various means and methods have been used to prevent surreptitious access to the interiors. The walls have been constructed of or had incorporated within them plates of steel having such a great degree of hardness that it resisted the action of metallic drills, chisels and other tools. To circumvent this means of protection the burglar has resorted to the electric carbon pencil, which, by the action of fusion, will quickly perforate the hardest steel. This use of the electric pencil was circumvented by safe makers by using electrically insulated metallic rods, plates, or other bodies incorporated in the walls of the safe so that, being insulated, when encountered by the electric pencil, they would interrupt the electric current and stop the burning. This the burglar met by the use of a blow-pipe or torch burning gases that produce a flame of intense heat, which required no electric circuit and operated by fusing, burning, or otherwise decomposing the material of which the safe was constructed. The problem now is to provide a safe of such construction that it will be "burglar proof" in the sense that it will resist all of the above mentioned methods and devices used by burglars, and particularly the torch, since this is now the means most frequently used and can do all that the other devices can do, and do it more expeditiously.

It is admitted that the wall of any safe, constructed of any material or materials whatever, and whatever may be the disposition or arrangement of said material or materials, may be perforated by some means or another if sufficient time be allowed for the operation, but it must be remembered that time is a very important factor in the successful carrying out of a burglary. A difference of a few minutes or even seconds may amount to the difference between failure and success of the attempt, and hence anything that even hinders, delays and retards the operation of surreptitiously gaining access to the interior of a safe, to say

nothing of altogether preventing it under the circumstances and within the available time, is of vast importance in safe construction.

The object of the present invention is, therefore, to provide an alloy from which to make plates to be used in the construction of the walls or other parts of safes, having such properties that the operation of perforating them, and especially by the use of a torch, will be hindered and delayed as much as possible, so as to make it practically impossible of accomplishment within the time ordinarily available under the circumstances of a burglary.

To this end the invention consists in the improved alloy to be used in the making of plates adapted to be used in constructing or making the door or the wall of a safe, or to be incorporated therein, that will resist destruction by the action of a torch or an electric carbon pencil to the extent indicated. In selecting the materials for the alloy forming the plate, the principal properties to be considered are fusibility, conductivity of heat and electricity and ductility, as the successful carrying out of the invention depends upon the resultant of these properties. More specifically stated the carrying out of the invention depends upon preventing the fusing or melting of the plate under the conditions available in a burglary.

As between, say, pure iron and copper, the iron is less fusible, *i. e.*, requires a more intense heat to fuse it, than the copper, and if this property only were considered the iron would be the preferable of the two, for the purposes of the invention, but the heat or electric conductivity of copper is much greater than that of iron—so much greater that in carrying out the invention, copper is more effective. This is because when the small flame of the torch is directed against a small localized spot of the plate, if the plate is wholly of iron the heat or electricity is conducted off very slowly and the fusing point of the iron at said spot is quickly reached and the plate destroyed, whereas if the plate is wholly of copper the heat of the torch or a current of electricity is conducted away so rapidly that the copper itself does not reach the fusing point, even at the small localized spot against which the flame or current plays. So it is with steel, instead of pure iron. But it is different with cast

iron, which is not an elementary material but a compound containing iron and other materials in a free state which are good conductors. Pure iron is difficultly fusible and a poor conductor of heat or electricity, but if it contains also a sufficient quantity of some other material that is a good conductor of heat, the compound—the cast iron—becomes a good conductor of heat as well as having a high fusing point. For example, white cast iron and gray cast iron containing graphitic carbon in a free state have been found to be effective in carrying out the invention, the necessary heat or electrical conductivity being due to the presence of free graphitic carbon in the cast iron. There are many materials known to possess these properties to a greater or less degree, and many of them could be used in carrying out the invention, but, of course, in order to be successful from a commercial point of view, the cost must be taken into consideration. There are many materials on the market that are suitable, but it is not necessary for the purpose of this application to attempt a recital of all of them. Suffice it to say that because of its low cost, its great resistance to fusion, and its good conductivity of heat, gray cast iron is the preferred material for making the plate.

In the preferred, practical carrying out of the invention the plates are made of an alloy containing about eighty per cent. of gray cast iron, about twenty per cent. of copper, which latter adds to the conductivity as well as the ductility of the plates, and a small proportion (say $\frac{1}{10}$ of 1 per cent.) of platinum, which still further adds to the conductivity and ductility of the alloy

and also to its resistance to fusion, and this alloy is worked up into plates of the desired thickness, which may be used in any desired manner in the construction of safes. They may be used for making the walls of the door, in whole or in part, or they may be incorporated in the walls or door of whatever construction. In fact the invention resides in the alloy itself and the plates made from it may be used in any manner desired by the builder.

I am aware that it has heretofore been proposed to make an alloy of cast iron or steel and copper, as a step in the processes of making alloys of iron or steel and copper, but I am not aware that it has ever been discovered that the wall of a safe or other depository having, in its construction, a plate or plates made of an alloy containing cast iron (being itself a compound containing iron and particles of free material which are good conductors of heat and electricity), copper and platinum will resist fusion, thereby making the safe burglar proof to this extent, and this discovery has never been applied, either practically or theoretically, in the making of safes burglar proof.

What I claim as new and desire to secure by Letters Patent is:

An alloy containing cast iron, copper, and platinum in the proportions of about eighty per cent. cast iron, about twenty per cent. copper and about eight-tenths of one per cent. platinum.

JAMES W. DONNELL.

Witnesses:

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