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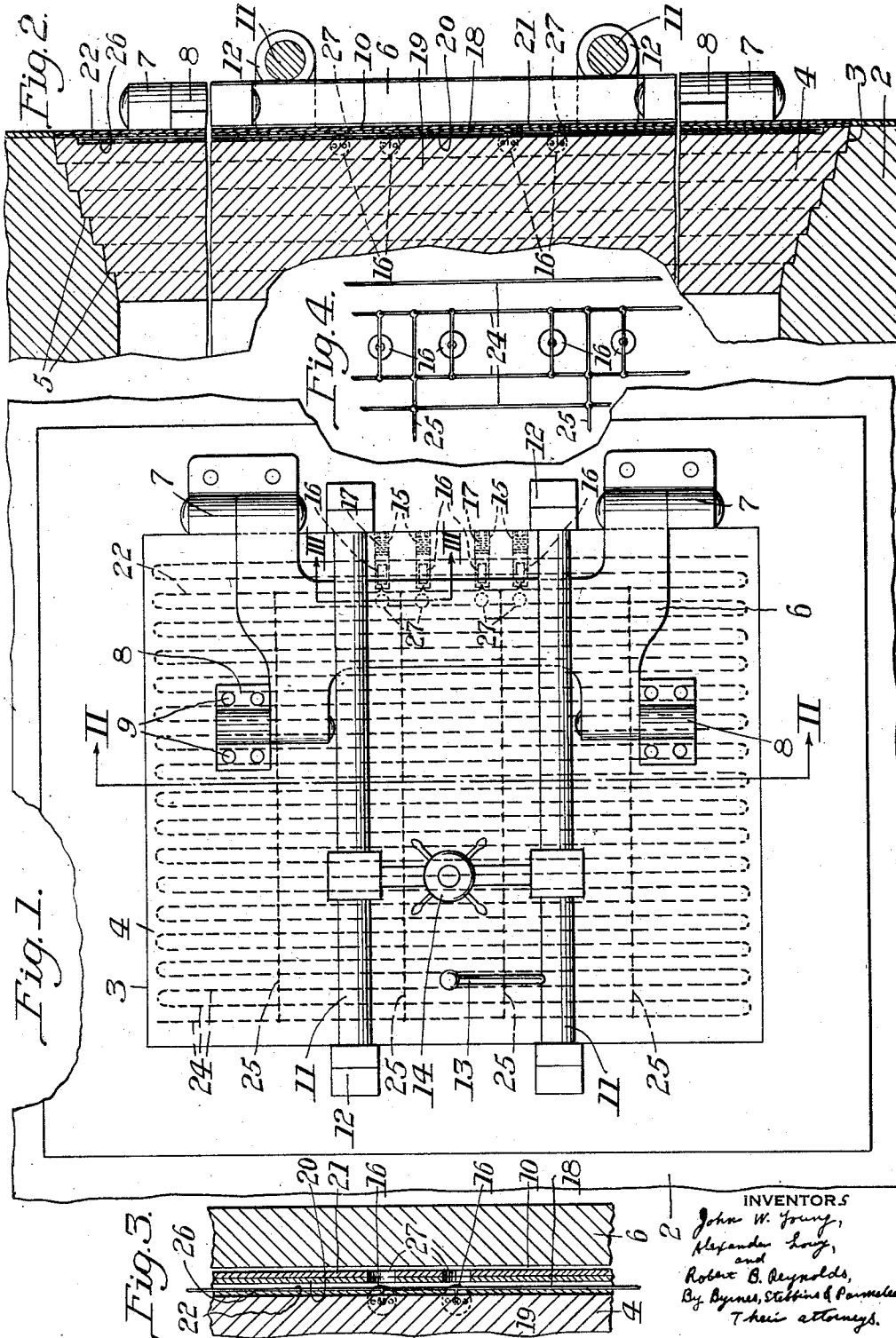
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GAS PROTECTED VAULT AND SAFE

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2 Sheets-Sheet 1



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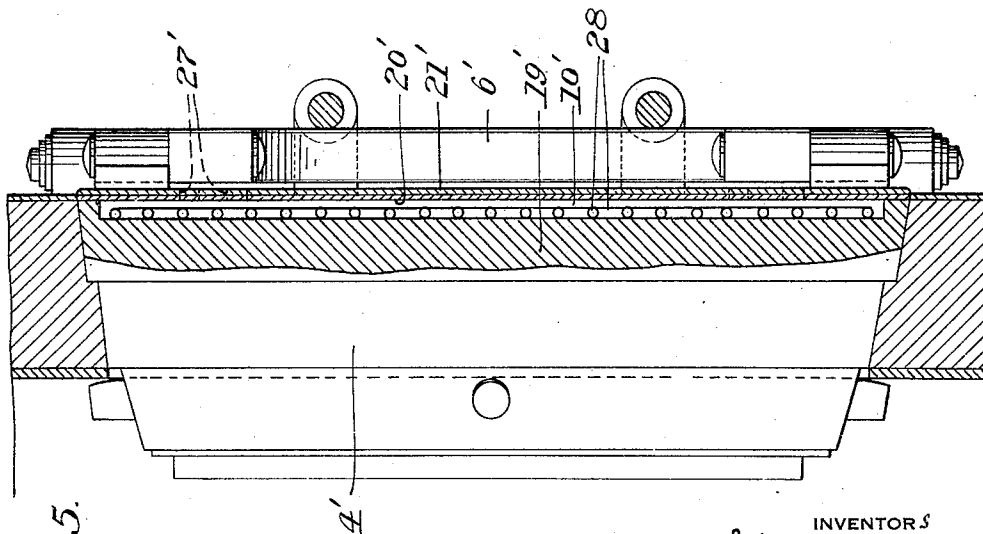
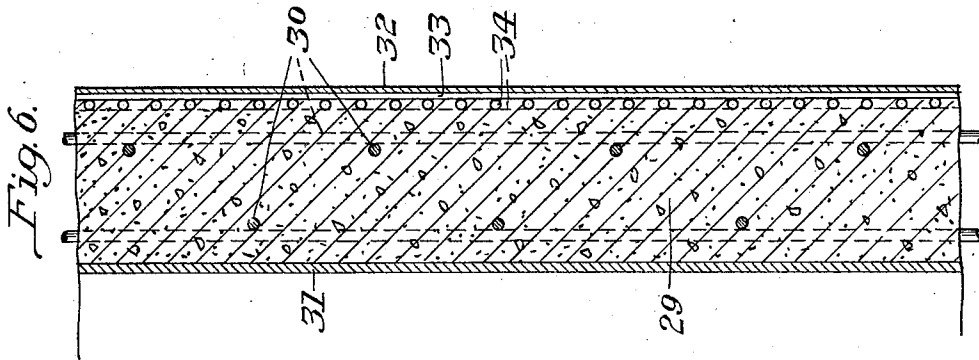
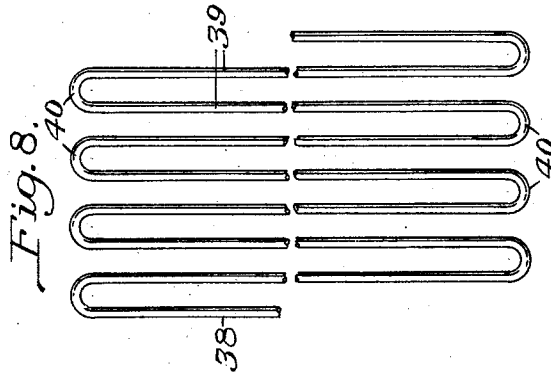
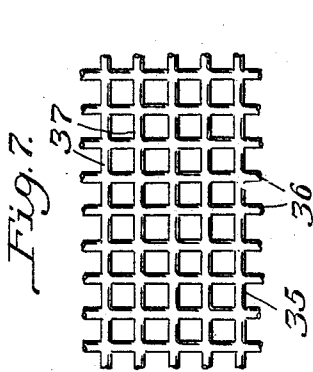
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GAS PROTECTED VAULT AND SAFE

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# UNITED STATES PATENT OFFICE

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## GAS-PROTECTED VAULT AND SAFE

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Our invention relates to vaults and safe constructions and more particularly to gas protected vaults and safes.

In constructing safe and vault doors it is customary to mount the doors on hinges carried by the body of the safe or vault. An outer plate on the door is made of a hardened metal to prevent the drilling of the safe for opening the door. The masonry constituting the other walls of safes and vaults is also frequently covered by hardened metal plates. Burglars frequently resort to heat for cutting such hardened plates on the different walls and doors of such safes and vaults.

We provide gas liberating protecting means behind such hardened plates so that upon the application of heat to the plate for cutting the same, gas is liberated. The liberated gas is discharged through the opening made by the cutting torch, or by previously prepared openings in the plate. The gas protecting means may be in the form of a fuse or powder train mounted in a space behind the plate and connected to a gas bomb, or the gas protecting means may be in the form of containers for gas under pressure, which are penetrated by the cutting heat used to penetrate the outer hardened plate. Where the protecting means are used on a door having the crane hinge, usually found in such doors, the escape openings for the gas may be hidden behind the crane hinge.

With this construction the application of sufficient heat to the hardened plate to destroy it results in the liberation of gas which may be of toxic, incapacitating, lachrymatory or sternutatory characteristics, as may be desired. The gas which escapes from behind the plate incapacitates the burglar attempting to enter the safe or vault.

The accompanying drawings illustrate certain present preferred embodiments of the invention, in which

Figure 1 is a face view of a portion of a vault wall with a door mounted therein,

Figure 2 is an enlarged partial sectional view of the door and vault taken along the section line II—II of Fig. 1,

Figure 3 is a sectional view of a detail of

the door taken along the section line III—III of Fig. 1,

Figure 4 is a modified form of connection for the gas bombs,

Figure 5 is a sectional view through a safe or vault door showing a modified form of gas protecting device, Figure 6 is a sectional view through a portion of a masonry safe or vault wall having gas protecting means embedded therein, and

Figures 7 and 8 are detail views of different forms of gas protecting grilles.

Referring to Figures 1 and 2, a wall 2, illustrative of the wall of a safe or vault, is provided with an opening 3 in which a door 4 is fitted. The walls of the opening 3 and the edges of the door 4 are provided with the customary series of shoulders 5. The door is carried by a crane hinge 6 supported by hinges 7 mounted on the wall 2. The crane hinge 6 is attached to the door 4 by hinges 8 which are secured by studs 9.

A space 10 is provided between the outer surface of the door and the inner surface of the crane hinge 6 between the hinges 8. The door is provided with pressure bars 11 which extend across the face of the door outside of the crane hinge 6 and cooperate with keepers 12 mounted on the wall 2. A locking mechanism indicated diagrammatically by a latch 13 and a hand wheel 14 control the movement of fastening bolts (not shown). As the details of the pressure bars 11, the keepers 12 and 13, and the hand wheel 14 do not constitute a part of the present invention, except insofar as they are necessary to describe the operation of the door 4, a detailed description and showing thereof have been omitted from the specification and drawings.

One or more openings 15 are formed in an edge of the door 4. A gas bomb 16 is embedded in each of the openings 15. The ends of the openings 15 are then filled by spanner nuts 17 having holes filled with metal to seal the openings and give the outer surface of the nuts and door a uniform appearance. By providing the nuts 17 it is possible to open any pocket 15 whenever it is desired to replace a gas bomb 16. The

openings 15 communicate with a space 18 formed between the body portion 19 of the door and a hardened plate 20 secured to the outer surface of the body portion 19. If desired, a surface plate 21 may be placed externally of the hardened plate 20.

By providing a hardened plate 20 near the outer surface of the door, it is difficult to drill an opening into or through the door 4. Accordingly, it is only possible to form an opening through the outer surface of the door by the application of sufficient heat to burn or melt the plate 20.

A fuse or powder train 22 is mounted in the opening 18. The fuse 22 comprises a plurality of vertically extending strands 24 and cross strands 25. The presence of the cross strands 25 insures better ignition of the gas bombs by the fuse 22, in case a remote part of the fuse initially becomes ignited, than would be secured were the flame compelled to travel the length of all of the strands 24. The strands 24 and 25 may be supported by a paper or other backing 26, or they may be glued directly to the plate 20 or body portion 19, as desired. Accordingly, upon the application of heat to destroy the plate 20, the fuse 22 is first ignited. Upon the ignition of the fuse 22 the flame travels along the vertically extending strands 24 and the cross strands 25 until the gas bombs are ignited.

In Figure 1 we have illustrated the gas bombs 16 as being connected in series along a strand 24. Upon the ignition of one or more bomb or bombs 16, the space 18 becomes filled with gas which escapes through openings 27 formed in the plates 20 and 21. The openings 27 are preferably behind the crane hinge 6 and communicate with the opening 10 so that the presence of gas bombs in the door construction is not readily detected from the outward appearance of the door. The gas liberated in the space 18 flows outwardly and incapacitates any one attempting to open the door. The gas used may be either a poisonous or an incapacitating gas, such as chlorine or tear gas, as desired.

It is to be understood that the gas bombs 16, fuse 22 and plate 20 may be mounted in a space in a wall of a safe or vault as well as in the door.

Referring to Figure 4, the gas bombs 16 may be connected in parallel between fuse strands 24, if desired, rather than in the series as shown in Figure 1.

Referring to Figure 5, a safe door 4' is provided with a crane hinge 6', a space 10', a body portion 19', a hardened plate 20', and a surface plate 21', corresponding to the corresponding parts in the form of our invention illustrated in Figs. 1 and 2. In the space 10' a grille 28 of pipe-work is inserted instead of a fuse or powder train such as is used in the form of the invention shown in Figs. 1

and 2. The pipes constituting the grille 28 are made relatively thin and contain gas under pressure. Upon the application of sufficient heat to the hardened plate 20' to penetrate it, an opening is made in one or more of the pipe sections constituting the grille, and gas is released, which gas escapes through the opening cut in the plate 20' and through openings 27' previously formed in the plates 20' and 21'.

Referring to Fig. 6, a masonry wall 29 of a safe or vault comprises a body of concrete in which reinforcing bars 30 are embedded. The inner surface of the wall is covered by a plate 31 and the outer surface is covered by a hardened plate 32. A space 33 is provided between the inner surface of the plate 32 and the outer surface of the concrete. A pipe grille 34 containing gas under pressure is embedded in the outer surface of the concrete wall. Upon the application of a burning heat to the plate 32, one or more of the pipe sections constituting the grille 34 is penetrated and gas is liberated into the space 33 which escapes from any openings existing in the plate 32 and incapacitates any one attempting to gain entrance to the safe or vault through the wall.

Referring to Fig. 7, we have illustrated a form of pipe grille 35 which may be used in the modification of our invention illustrated in Figs. 5 and 6. In the grille, vertically extending pipes 36 are connected at short intervals by horizontally extending pipes 37. The pipes 36 and 37 are interconnected and are made of relatively thin material having a low melting point, so that upon the application of cutting heat to any pipe area, the gas held under pressure in all of the pipe sections is permitted to escape from the opening so made.

Referring to Fig. 8, we have illustrated a pipe grille 38 in the form of parallel extending pipes 39 alternately connected to adjacent pipes at their opposite ends by return bends 40. The pipes 39 are made of relatively thin material having a low melting point and are filled with gas under pressure.

While we have shown and illustrated certain present preferred embodiments of the invention, it is to be understood that certain changes may be made in the embodiments thereof without departing from the spirit of the invention or the scope of the appended claims.

We claim:

1. A door construction comprising a supporting hinge, a plate interior to said hinge, a door body portion at least in part spaced from said plate, a gas bomb mounted in said door in communication with the space between the plate and the body portion, said plate having an opening communicating with said space, and a fuse mounted in said space

for releasing gas from said bomb, whereby, upon the application of a destructive heat to said plate, gas from said bomb is liberated externally of said plate.

- 5 2. A door construction comprising a supporting hinge, a plate interior to said hinge and in part spaced therefrom, a door body portion at least in part spaced from said plate, a gas bomb mounted in said door in communication with the space between the plate and the body portion, said plate having an opening communicating between the space in the door and the space between the plate and hinge, and a fuse mounted in the space in the door for releasing gas from said bomb, whereby, upon the application of a destructive heat to said plate, gas from said bomb is liberated externally of said plate beneath said hinge. 70
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- 15 3. A door comprising a hardened plate disposed in the outer portion thereof, a body portion defining a space interiorly of said plate, said body portion having a bomb receiving opening accessible from the outside of the door for replacing a bomb when the door is open, but inaccessible when the door is closed, a bomb in the opening, means for closing one end of the opening, and a fuse in said space for igniting said bomb. 75
- 20 4. A safe or vault structure comprising a wall having an opening leading to the outside of the structure, means in the opening adapted to liberate incapacitating gas when the structure is heated, and protecting means disposed over the outlet of said opening but spaced therefrom, whereby gas can escape from the outlet but the outlet cannot readily be detected or plugged. 80
- 25 5. A safe or vault door having an opening therein leading to the outside of the door, means in the opening adapted to liberate incapacitating gas when the door is heated, and a door hinge disposed over the outlet of said opening but spaced therefrom, whereby gas can escape from the outlet but the outlet cannot readily be detected or plugged. 85
- 30 6. A safe or vault door having an opening therein leading to the outside of the door, a gas bomb connected by fuses disposed in the opening and adapted to liberate incapacitating gas when the door is heated, and a door hinge disposed over the outlet of said opening but spaced therefrom, whereby gas can escape from the outlet but the outlet cannot readily be detected or plugged. 90
- 35 7. A safe or vault door having a recess formed in and occupying the major part of the outer surface of the door, a hardened plate covering the recess, said plate having an opening extending therethrough, a gas bomb mounted in an opening in the door and in communication with said recess, the bomb when heated being adapted to burn slowly and liberate incapacitating gas, and a fuse disposed throughout substantially the whole 95
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