July 28, 1925. 1,547,720

D. H. BELLAMORE

CONSTRUCTION OF SAFES, SAFE CABINETS, AND SIMILAR STRUCTURES

Filed June 7, 1923 2 Sheets-Sheet 1

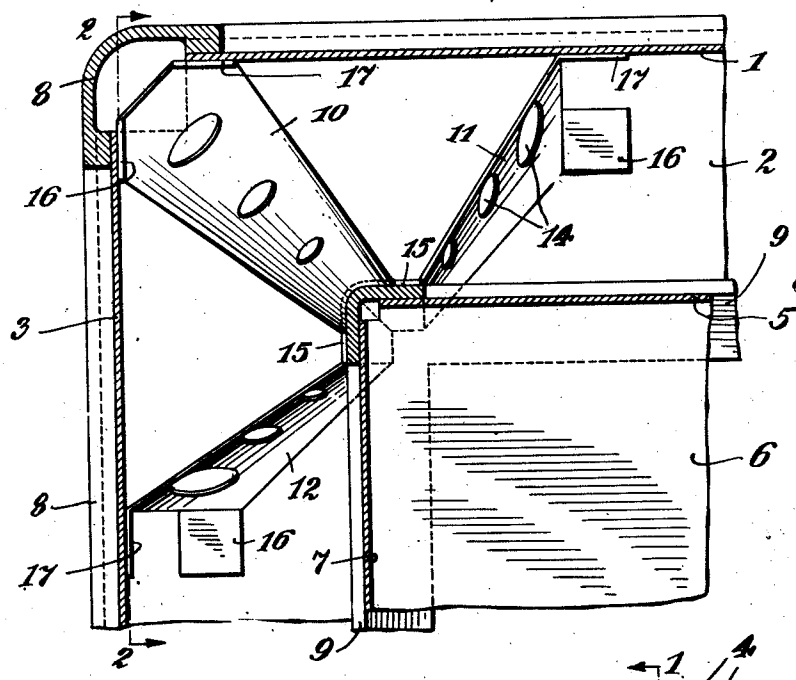

Fig. 1.

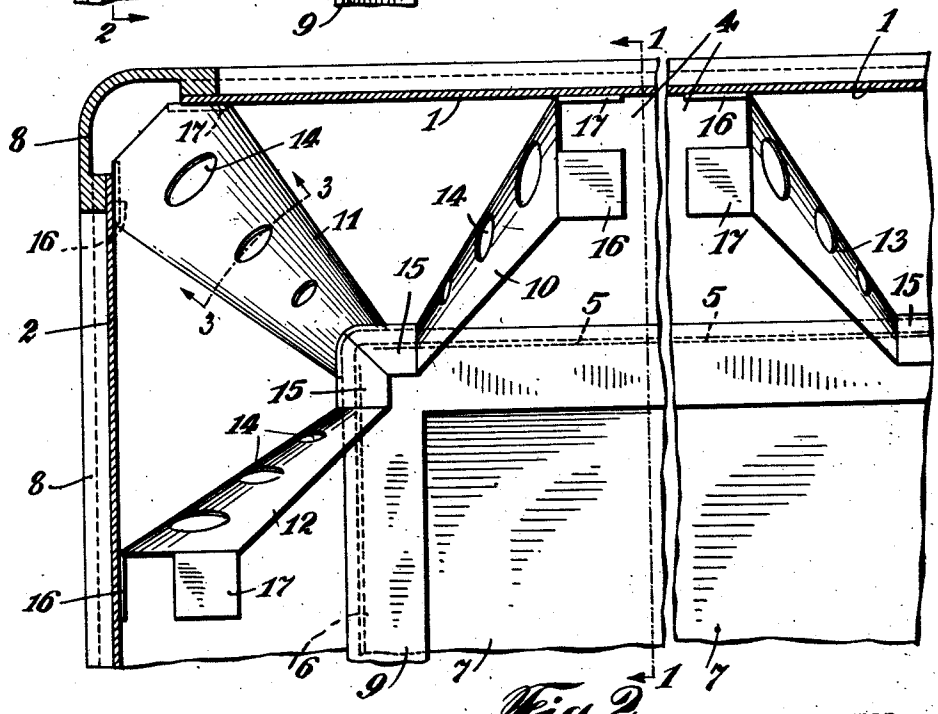

Fig. 2.

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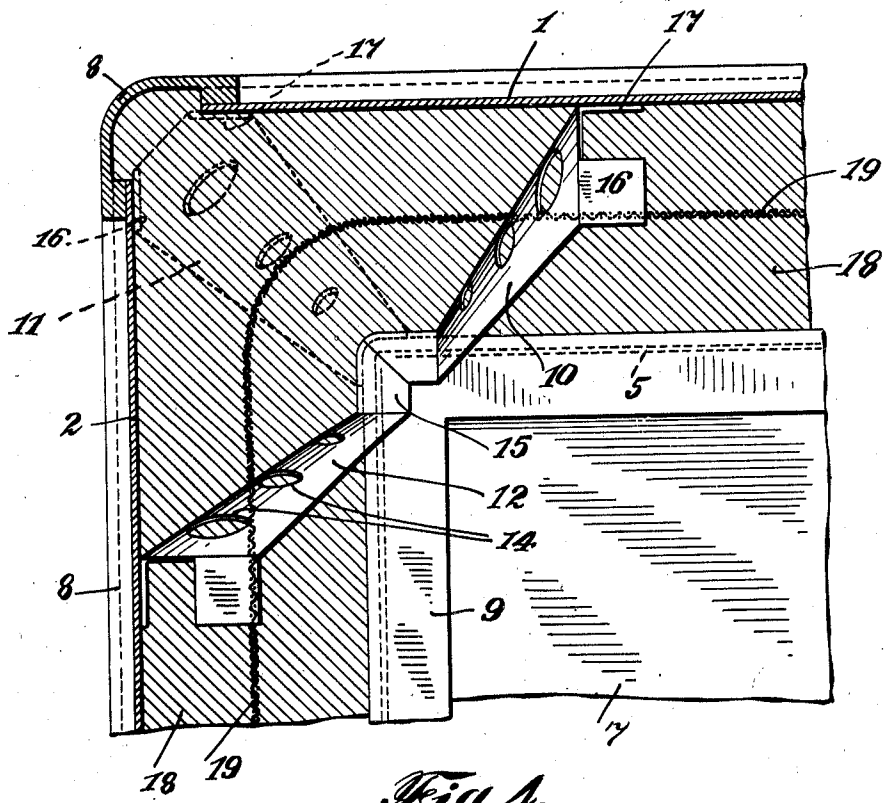

Fig. 4.

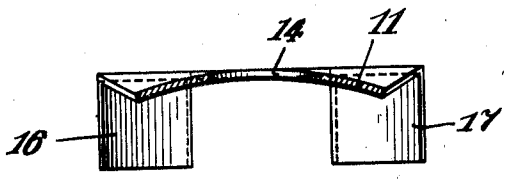

Fig. 3.

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UNITED STATES PATENT OFFICE.

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CONSTRUCTION OF SAFES, SAFE CABINETS, AND SIMILAR STRUCTURES.

Application filed June 7, 1923. Serial No. 643,835.

To all whom it may concern:

Be it known that I, DAVID H. BELLAMORE, a citizen of the United States, residing in the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Construction of Safes, Safe Cabinets, and Similar Structures, of which the following is a specification.

This invention relates to the construction of safes, safe cabinets and similar structures.

The metallic parts usually employed for the construction of safes, safe cabinets and similar structures lose structural strength and become warped when subjected to intense heat, and in proportion to the duration of such heat. Thus, when the metallic parts of the structure are of iron they will lose approximately 70 per cent of their structural strength when heated to a temperature of about 1000 degrees Fahrenheit. Also, under intense heat, the fillings usually employed for such structures lose structural strength and are apt to disintegrate and split open, and this is accelerated and accentuated by the tortional forces set up by the warping of the safe walls under the influence of the heat. When in such condition, the resistance of the structure to impact shocks and crushing strains (such as are apt to be set up by the falling of the structure or by the falling of weighty objects thereon) is usually lessened to such an extent that such shocks and strains disrupt the structure and destroy its structural unity and resistance to penetration by heat and fire.

The principal object of my invention is to provide a construction of safe, safe cabinet and similar structures, which will stand up under such conditions and under such strains, which the usual construction is unable to resist. Another object of my invention is to provide a construction having increased structural strength and offering increased resistance to distortional forces set up therein or applied thereto. Another object of this invention is to provide a construction which will possess great structural strength and will be highly resistant to tortional and crushing strains when subjected to intense heat, and a construction which will maintain such strength and resistance while subjected to intense heat for a protracted period of time. A further object of my invention is to provide a structure of the above character in which the various elements and parts are so inter-related and inter-connected that the structural strength of the structure as a whole is developed to its maximum, and wherein the various structural parts and elements mutually reenforce and brace each other. Other objects will be in part obvious and in part pointed out hereinafter.

In accordance with my invention, the construction comprises an outer metallic box or shell, such as the outer walls of a safe, a metallic inner box or shell spaced from said outer shell, such as the inner walls of a safe, an insulating filling in the space between said shells, and members, preferably embedded in the filling, so as to be protected thereby, and joined thereto and also to the outer and inner shells, whereby all these various elements and parts of the structure are brought into such mutual inter-connection that a maximum of structural strength is developed in the structure as a whole, and in such a way that the entire structural strength of the inner shell functions to reenforce and to brace the filling and the outer shell, and the entire structural strength of the outer shell functions to reenforce and to brace the filling and the inner shell, and the entire structural strength of the filling functions to reenforce and brace both shells. As one manner of so connecting said elements and parts I may provide a plurality of rigid strained resisting and distributing reenforcing members of expanded metal lath or heavy wire netting rigidly connected to both said shells, preferably adjacent corners thereof. The arrangement of said members is such that whenever strain is set up in or applied to the structure all the members and the various parts of both shells are brought into coaction to resist any distortional effects of the strain, irrespective of the place where such strain is set up or applied. If reenforced filling is present between the shells, said members are embedded therein to join the structural strength of such filling to the inner and outer shells.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereinafter set forth and the scope of the application of which will be indicated in the following claims.

In order that a clearer understanding of my invention may be had, attention is hereby directed to the accompanying drawings, forming a part of this application and illustrating one possible embodiment of my invention. Referring to the drawings, Fig. 1 is a sectional view of a fragmentary portion of a structure embodying my invention, and is taken on the line 1—1 of Fig. 2; Fig. 2 is a sectional view of the same looking from the opposite direction, and is taken on the line 2—2 of Fig. 1; and includes another fragmentary portion of the structure showing a reenforcing member mounted in a location removed from the corners of the structure; Fig. 3 is a sectional view of a strain resisting and distributing reenforcing member, and is taken on the line 3—3 of Fig. 2; and Fig. 4 is a sectional view of a fragmentary portion of a structure having reenforced filling and reenforcing and strengthening members associated therewith. Similar reference characters refer to similar parts throughout the several views of the drawings.

The drawings are merely illustrative and are not to be considered as being accurate either as to proportion of parts or as to any particular scale.

Referring to the drawings there is shown a fragment of a safe, safe cabinet or other structure having outer top wall 1, outer rear wall 2, and outer side walls 3 and 4, forming an outer box or shell, and inner top wall 5, inner rear wall 6, and inner side wall 7, forming an inner box or shell, the inner box being spaced from the outer box. Adjacent outer walls are held together by angle irons 8, and adjacent inner walls are held together by angle irons 9. Such is a usual construction of safes, safe cabinets or the like, the walls being usually metallic.

For use in connection with structures so constituted I provide one or more members such as 10, 11, 12 and 13, which may be called braces, each of which is adapted for attachment to both the said outer shell and inner shell so as to extend across the space between the shells and to act as reenforcing and strengthening means and as strain resisting and distributing means for said shells and the parts thereof, and consequently for the entire structure. Said members are preferably so constructed that they are sturdy and highly resistant to strain. Each of these members or braces may consist of a metallic plate or strip, preferably slightly curved in transverse cross-section, to increase resistance to distortion or breakage under strain, and may be perforated at suitable places, such as 14, for the sake of eliminating superfluous weight and for securing a better bond with the filling. One end, the inner end 15, of each brace is adapted to fit against and to be securely attached to the inner shell, preferably adjacent an edge thereof, and for such purpose the inner ends of each brace is angle-shaped in transverse cross-section so that it may fit against and be welded or otherwise secured to the two faces of the inner shell at or near an edge thereof. Such ends 15 of the brace members are preferably secured to the two faces of an edge of angle irons 9 of the inner shell. The body of each brace member extends from its inner end 15 at an obtuse angle, and the outer end of each brace is preferably provided with two tabs or projections 16 and 17, disposed at appropriate angles to each other, and adapted to fit against, and to be welded or otherwise to be securely attached to the inner surface of two different walls of the outer shell, at or near the meeting edge of such two walls. Obviously, if the inner or outer shell walls meet at other than right angles the inner and outer ends of the braces will be modified accordingly. Obviously, also, such brace members may be placed at any suitable points in the structure. They may be placed at one or more of the corners of the inner shell, at any points along one or more of its edges between the corners, as well as at other places. If three such braces are mounted at the same corner of the inner shell, and each brace is attached to two different sides of the shell at said corner, the three braces will form an equilateral tripod extending to the outer shell, and the outer end of each brace may be welded or otherwise secured to two different walls of the outer shell, thus forming at such corner a very strong reenforcement and brace, which not only is itself highly resistant to strain, but also so transmits and distributes strains and distortional forces to and among the various parts of the outer and inner shells that all such parts are brought into mutual co-action to reenforce each other and to resist such strains and forces. Each single brace along an edge of the inner shell, whether at a corner thereof or removed therefrom, may be joined to two different walls of the inner shell and to two different walls of the outer shell, or each such brace may be joined only to a single wall of either of the shells and to either one or two walls of the other shell. In any event each such brace joins the inner and outer shells together in such manner that the structural strength of both shells are utilized and brought into co-action to resist and oppose mutually any strains or other distortional forces set up in or applied to the structure. If a filling, shown at 18, Fig. 4, is present between the inner and outer shells, the brace members may be so incorporated therein that they will serve to tie such filling to the inner and outer

shells, thereby joining the structural strength of the filling to the shells and to the braces, and increasing the strain resistance and strength of the structure. If the filling is reenforced, as at 19, Fig. 4, the structure is even stronger and more resistant to strains.

As shown in the drawing, end 15 of member 10 lies against and is welded to the two surfaces of angle iron 9 which connects inner walls 5 and 7, while at the outer end of member 10, tab 16 is welded to outer wall 3 and tab 17 is welded to outer wall 1. End 15 of member 11 lies upon and is welded to angle iron 9, which connects adjacent inner walls 5 and 6, while tab 16 of member 11 is welded to outer wall 2 and tab 17 of this member is welded to outer wall 1. The end 15 of member 12 lies against and is welded to angle member 9, which connects adjacent inner walls 6 and 7, while at the outer end of member 12 tab 16 lies against and is welded to outer wall 2, and tab 17 lies against and is welded to outer wall 3. The brace 13, which is illustrated as being situated on the inner shell at a place removed from a corner thereof, has its angle shaped inner end secured to the two surfaces of angle member 9 which connects walls 5 and 7, and has tab 16 of its outer end secured to outer shell wall 1 and its other tab 17 is adapted to be secured to outer shell wall 3.

Although the above description refers to a single corner portion of a structure, it is preferable that the construction be duplicated at other corners of a structure. For instance, in the ordinary construction of a safe, safe cabinet or the like, I provide a similar construction at each rear corner of the structure, the provision of such construction at the front being unnecessary on account of the usual jamb construction present at the front, although the corner construction described may be repeated at the front corners of the structure, if so desired.

From the above description it will be readily apparent to those skilled in the art that members 10, 11, 12 and 13 will not only individually and mutually act to resist all strains of compression, tension and torsion set up in or applied to the structure at any point, but also that by the manner in which these members are joined to the several parts of the structure, all such strains will be opposed by the various parts of the structure being brought into coaction by means of these members. For instance, should the safe fall in such a way that the inner shell tends to draw downwardly inside of the outer shell, then, considering the drawings to show an upper corner of the structure, members 10 and 11 will be put under tension and member 12 will be put under compression. The tension on members 10 and 11 will be resisted by the walls 1, 2 and 3 of the outer shell to which these members are attached, and the force of compression on member 12 will be resisted by walls 2 and 3 of the outer shell. Meanwhile, if a similar construction is present at the lower corners of the safe (an illustration of which may be had by merely turning Figs 1 and 2 upsidedown,) then the upwardly extending member (12) will be put under tension and the downwardly extending members (10 and 11) will be put under compression. These members connect the various outer walls together in a manner exactly similar to the members described as being located at the upper corner of the structure, and bring the various several parts into coaction to resist downward movement of the inner shell relative to the outer shell as a result of the fall. The various directions of the lines of force resulting from strains set up in or applied to the structure may be readily worked out, and it will be found that no matter where such forces are set up or applied, the members 10, 11 and 12 will always act to resist such forces and at the same time will act to distribute the forces among the various parts of the structure in such a way that the parts will be brought into mutual coaction to resist any distortional effects of said strains. On account of the rigidness of such a structure the tendency of the structure to become distorted by reason of standing upon an irregular or slanting floor or base will be counteracted.

As many changes could be made in the above construction and as many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limitating sense.

What I claim is:—

1. In a structure of the character described, the combination with an inner shell having an edge, and an outer shell spaced from the inner shell and having an edge parallel with said inner shell edge, of an elongated bracing leg extending in the direction of its length from said inner shell edge to said outer shell edge and secured at one end to said inner shell adjacent its said edge, and secured at its other end to said outer shell adjacent its said edge.

2. In a structure of the character described, the combination with an inner shell having an edge, and an outer shell spaced from the inner shell and having an edge parallel with said inner shell edge, of an elongated bracing leg extending in the direction of its length and at an acute angle

to said shell edges, from said inner shell edge to said outer shell edge and secured at one end to said inner shell adjacent its said edge, and secured at its other end to said outer shell adjacent its said edge.

3. In a structure of the character described, the combination with an inner shell having an edge and a corner, and an outer shell spaced from the inner shell and having an edge parallel with said inner shell edge and a corner, of an elongated bracing leg extending in the direction of its length from said inner shell edge to said outer shell edge and secured at one end to said inner shell adjacent its said edge and corner, and secured at its other end to said outer shell adjacent its said edge at a place removed from its said corner.

4. In a structure of the character described, in combination, an inner shell, an outer shell spaced from the inner shell, said shells having corresponding parallel edges, and an elongated bracing leg extending in the direction of its length in a plane passing through said parallel shell edges, said leg being secured at one end to said inner shell, and secured at its other end to said outer shell, said leg being relatively wide with respect to its thickness and being disposed in the direction of its width at an angle to said plane passing through the shell edges.

5. In a structure of the character described, in combination, an inner shell, an outer shell spaced from the inner shell, said shells having corresponding parallel edges, and an elongated bracing leg extending in the direction of its length in a plane passing through said parallel shell edges, said leg being secured at one end to said inner shell, and secured at its other end to said outer shell, said leg being relatively wide with respect to its thickness and being disposed in the direction of its width at an angle to said plane passing through the shell edges, and said leg having transverse curvature in the direction of its width.

6. In a structure of the character described, in combination, an inner shell having an edge, an outer shell spaced from the inner shell and having two walls meeting at an edge, an elongated bracing leg extending in the direction of its length from one shell to the other and secured at one end to said inner shell adjacent its said edge, the other end of said leg being forked and secured to both said outer shell walls adjacent its said edge.

7. In a structure of the character described, in combination, an inner shell having an edge, an outer shell spaced from the inner shell and having two walls meeting at an edge, an elongated bracing leg extending in the direction of its length from one shell to the other and secured at one end to said inner shell adjacent its said edge, the other end of said leg being forked and having a flange at the end of each fork, the flange at one fork being parallel with and secured to one of said outer shell walls, and the flange at the other fork being parallel with and secured to the other of said outer shell walls.

8. In a structure of the character described, the combination with an inner shell having a corner, and an outer shell spaced from the inner shell and having two edges, of a tying device secured to both shells, and including a pair of elongated, rigid legs, one extending in the direction of its length from said inner shell corner to one of said outer shell edges, and the other leg extending in the direction of its length from said inner shell corner to the other outer shell edge, for tying said shells together to mutually resist with the strength inherent to both shells, strains applied to or set up in the structure.

9. In a structure of the character described, the combination with an inner shell having a corner, and an outer shell spaced from the inner shell and having two edges meeting at a corner, of a tying device secured to both shells, and including a pair of elongated, rigid legs, one extending in the direction of its length from said inner shell corner to one of said outer shell edges at a point removed from said corner, and the other leg extending in the direction of its length from said inner shell corner to the other outer shell edge at a point removed from said corner, for tying said shells together to mutually resist with the strength inherent to both shells, strains applied or set up in the structure.

10. In a structure of the character described, in combination, an inner shell having a corner, an outer shell spaced from the inner shell and having walls in three different planes meeting at a corner corresponding to said inner shell corner, a tying device including three rigid legs arranged in the form of a tripod, said legs at the apex of the tripod being secured to said inner shell corner and extending therefrom in different directions and secured to said three outer shell walls, whereby the shells are tied together to mutually resist with their combined inherent strengths, strains applied to or set up in the structure.

11. In a structure of the character described, in combination, an inner shell having a corner, an outer shell spaced from the inner shell and having walls in three different planes meeting at a corner corresponding to said inner shell corner, a tying device including three rigid legs arranged in the form of a tripod, said legs at the apex of the tripod being secured to said inner shell corner and extending therefrom in different

directions and secured to said three outer shell walls at places spaced from said corner thereof, whereby the shells are tied together to mutually resist with their combined inherent strengths, strains applied to or set up in the structure.

12. In a structure of the character described, in combination, an inner shell having a corner, an outer shell spaced from the inner shell and having walls in three different planes meeting at a corner corresponding to said inner shell corner, a tying device including three rigid legs arranged in the form of a tripod, said legs at the apex of the tripod being secured to said inner shell corner and extending therefrom in different directions and secured to said three outer shell walls at places spaced equidistantly from said corner thereof, whereby the shells are tied together to mutually resist with their combined inherent strengths, strains applied to or set up in the structure.

13. In a structure of the character described, in combination, an inner shell having a corner, an outer shell spaced from the inner shell and having walls in three different planes meeting at a corner corresponding to said inner shell corner, a tying device including three rigid legs arranged in the form of a tripod, said legs at the apex of the tripod being secured to said inner shell corner and extending therefrom in different directions and secured to said three outer shell walls, whereby the shells are tied together to mutually resist with their combined inherent strengths, strains applied to or set up in the structure, each of said legs being forked at the outer shell and abutting and secured to two of said outer shell walls.

14. In a structure of the character described, in combination, an inner shell having a corner, an outer shell having three walls mutually at right angles to each other, and means, comprising reenforcing members extending from the corner of said inner shell and each engaging two of said walls, for resisting strains set up in or applied to the structure and for bringing said inner shell and outer shell walls into mutual coaction to resist said strains.

15. In a structure of the character described, in combination, an inner shell having three edges meeting at a corner, an outer shell having three walls forming three edges and a corner, reenforcing members attached to said inner shell corner and each extending outwardly from a different one of said edges to said outer shell and each secured to two of said outer shell walls adjacent a different edge of said outer shell, at places removed from the corner thereof.

16. In a structure of the character described, in combination, an inner shell having a corner, an outer shell having three walls mutually at right angles to each other, and means, comprising three reenforcing members extending from the corner of said inner shell and each engaging two of said walls, for resisting strains set up in or applied to the structure and for bringing said inner shell and outer shell walls into mutual coaction to resist said strains.

17. In a structure of the character described, in combination, an inner shell having three edges meeting at a corner, an outer shell having three walls forming three edges and a corner, three reenforcing members attached to said inner shell corner and each extending outwardly along the line of a different one of said edges to said outer shell and each secured to two of said outer shell walls adjacent a different edge of said outer shell, at places removed from the corner thereof.

This specification signed this 24 day of May, 1923.

DAVID H. BELLAMORE.