(No Model.)

# W. CORLISS.

## FIREPROOF SAFE.

No. 508,207. Patented Nov. 7, 1893.

Fig. 1.

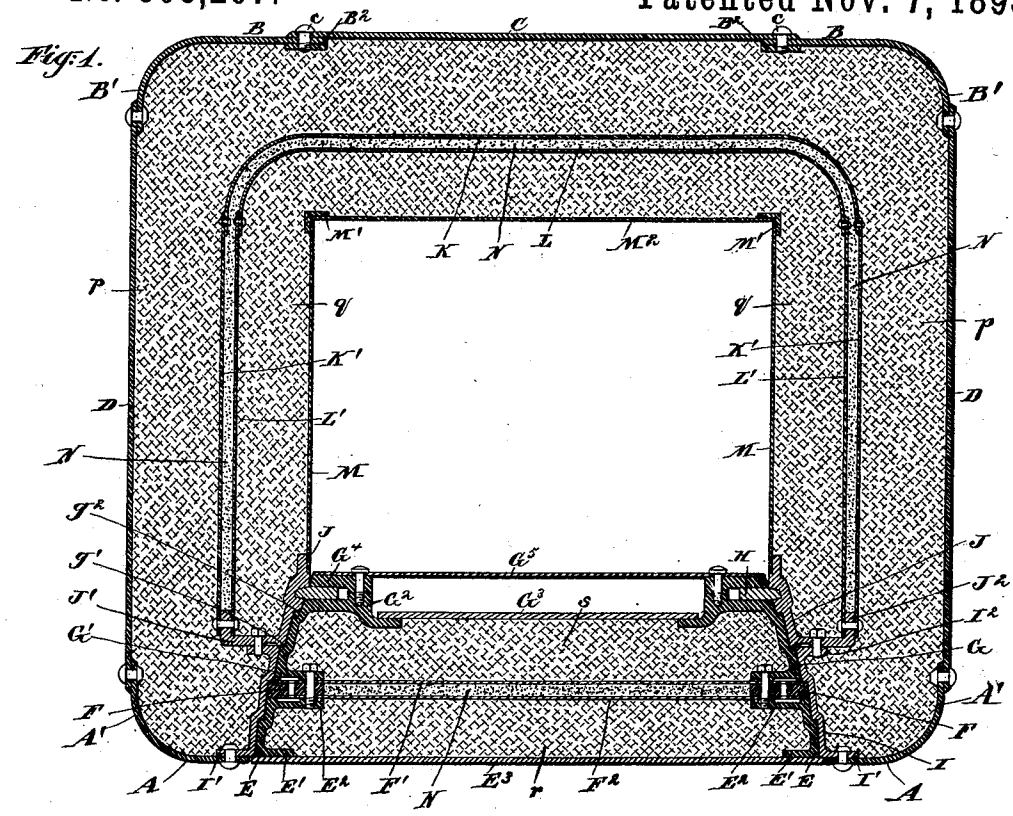


Fig. 2.

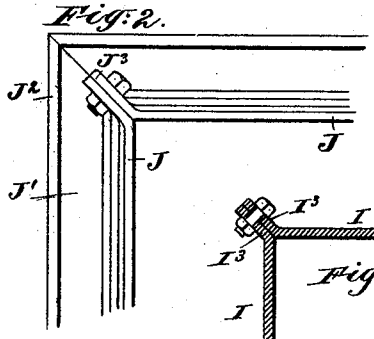
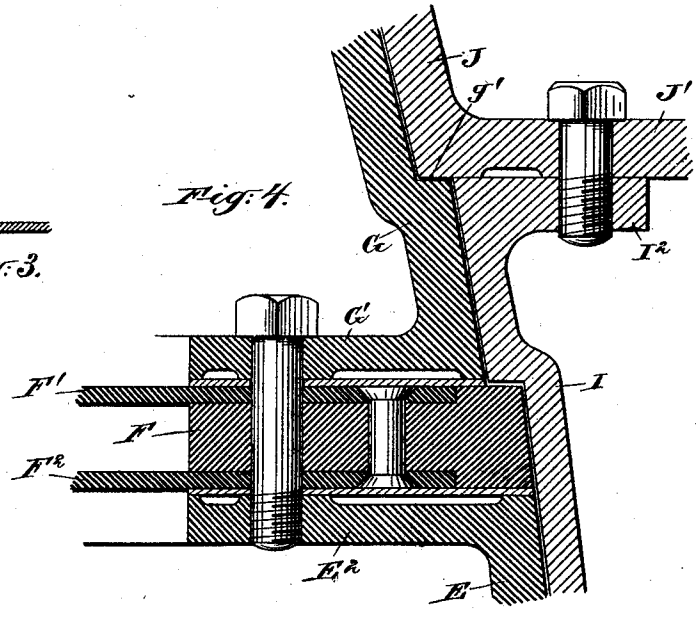


Fig. 3.



Fig. 4.



Witnesses
Charles R. Searle.
M. F. Boyle.

Inventor
William Corliss
By his Attorney
Thomas Drew Stetson

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

# UNITED STATES PATENT OFFICE.

WILLIAM CORLISS, OF PROVIDENCE, RHODE ISLAND.

## FIREPROOF SAFE.

SPECIFICATION forming part of Letters Patent No. 508,207, dated November 7, 1893.

Application filed June 8, 1892. Serial No. 435,923. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM CORLISS, a citizen of the United States, residing in the city and county of Providence, in the State of Rhode Island, have invented a certain new and useful Improvement in Fireproof Safes, of which the following is a specification.

I make the safe substantially double, there being a continuous shell of fire-proof material constituting an outer safe, and within this a smaller continuous shell of fire-proof material, constituting an inner safe with a space between. The intermediate space may be simply air, or preferably occupied by porous earthen-ware, or analogous material, either in one piece or in many pieces. I will, for brevity, designate the two shells one within the other, as two safes, referring to one as the outer safe, and the other as the inner safe. Each has an outer and an inner face of metal and a filling of material especially adapted to resist fire. The outer face of the outer safe constitutes the exterior of the finished structure. I make it of stout plates of charcoal iron, formed in disks or otherwise, with corners rounded on a considerable radius. The safe, when finished, is rectangular, but with all its corners rounded. There are neither points nor angular edges on the exterior of the structure. The door frame or jamb surrounding the exterior of the door has the front and back in separate pieces, with provisions for retarding the conduction of heat from the exterior inward. The edges of the door and the inner faces of the door-frame are formed in steps with one of the steps near the interior of the safe finished to form a tight fit, the other steps being easy fits, but aiding to prevent the circulation of flame and hot gases in the joints. A peculiarly formed flange extends outward from about the mid-depth of the door frame, with a lip on its outer edge, which latter forms a support for the inner metal or lining of the outer safe and the outer metal or exterior shell of the inner safe. To facilitate the manufacture of the outer part and also of the inner part of the door frame, I produce each in four pieces, and mill or otherwise finish the interior surfaces before applying them together. These four bars are strongly joined at the corners. I employ a thin coating of asbestus, inserted and held in the firmament joints in the form of paper or woven fabric, to aid in retarding the conduction of heat from the exterior inward along the metallic parts in the edge of the door and in the door frame. Portions of the joining surfaces are cut away to further reduce the conduction of heat from one of the metallic parts to another.

The accompanying drawings form a part of this specification and represent what I consider the best means of carrying out the invention.

Figure 1 is a horizontal section of the entire safe. Fig. 2 is a rear elevation of a portion of the door-frame. Fig. 3 is a vertical section through a portion of the door-frame at and adjacent to the upper left-hand corner. It is in the plane of the door at about the mid-thickness thereof. Fig. 4 is a horizontal section through a portion of the door and door-frame on a larger scale.

Similar letters of reference indicate corresponding parts in all the figures where they appear.

A is the exterior front piece of the body of the safe, certain portions being designated when necessary, by additional marks as A′. This outside front piece may be of iron or soft steel of a quality capable of being flanged. A sufficiently large piece is raised to a high temperature and treated rapidly between two suitable dies operated by hydraulic press or otherwise, and the edge flanged on a curve, as indicated at A′. After this is completely formed a clean-cut rectangular hole is produced for the door. A similar treatment is adopted for the back plate B, except that a smaller hole is cut. This hole is mainly useful in introducing the filling of the outer safe. It is closed by a covering plate C, secured by bolts *c*. The other surfaces D, of the outer safe, namely, the right and left sides, and the top and bottom, are formed of iron or steel, which may be of the same thickness, either in one long piece extending quite around and bent at two points at the top and two at the bottom, or it can be in two or more pieces riveted or otherwise secured together. I will describe it as made of a single piece, D, riveted to the front piece A and back piece B, as shown in Fig. 1.

K and L are plates flanged on a curve in

the same manner as the plates A and B. The innermost, L, is smaller than the outermost, K. Plates K′ and L′ are riveted to these back plates respectively, and to the flanges $J^2$ at the front of the safe. These plates K, K′, and L, L′, provide continuous air-spaces, separating from each other the inner and outer safes at the back, the sides, the top and the bottom of the safe.

The door is formed in two parts, one exterior to the other, with a space between.

E is the rectangular frame which forms the edge of the outer door. It is formed with an internal flange E′ on its front edge, and a still wider flange $E^2$ on its back edge. On the front is bolted a stout plane plate $E^3$, which may be hard iron or steel, secured by rivets. The exterior of the frame E, is formed with a step, as shown, adapted to match approximately to a corresponding step in the door frame.

F is a rectangular frame of iron or steel rabbeted, to which are riveted two plates F′, $F^2$, a little distance apart. The space between these two plates constitutes the dividing space between the outer and inner layers or parts of the door. The outer edge of this plate F, forms a step to match approximately to a corresponding step in the door frame.

G is the edge of what I term the inner door. It is formed with an internal flange G′, at its front edge, and with a still broader internal flange $G^2$, forming a portion of a back plate to the inner door. The aperture in the center of this back plate is closed by a steel plate $G^3$, secured by bolts, not shown. The exterior of the main part G, is formed with two steps $g'$, $g^2$, the former matched loosely and the innermost matched tightly, each to a corresponding step in the door frame.

It is difficult to maintain a tight joint at all the steps under the varying conditions attained when the safe is exposed to a hot fire and certain parts are more expanded by heat than others. My construction insures a tight joint at the inner edge under all conditions and so nearly close a joint at other points as to prevent the transportation of heat inward by any considerable circulation of air.

$G^4$ is a rectangular frame, and $G^5$ is a continuous plate extending across the whole inner face of the door. These are bolted to the part $G^2$, and the considerable rabbet shown between them accommodates the locking bolt H.

The door frame or jamb is formed in eight parts, four parts I, being mitered together to constitute the outer portion of the door frame, and four parts J, being mitered together to constitute the inner portion of the door frame. The front edge of each part I has a flange I′, which is riveted to the front part A. The back or inner edge of each part I has a flange $I^2$. Each end of each part I has a flange $I^3$ extending outward at an angle of forty-five degrees and strongly secured to the corresponding flanges of the adjacent parts I by bolts or rivets. The front edge of each part J has a wide flange J′ the outer edge of which is itself flanged as indicated by $J^2$. The flange J′ at the outer edge of the inner door frame J, is united to the flange $I^2$, which forms the back edge of the front part of the door frame, by bolts, as shown. Each end of each part J has a flange $J^3$ at an angle of twenty-five degrees each strongly bolted to a corresponding flange on the adjacent part J, thus making a unit of the inner part of the door frame, in the same manner as the outer parts constitute a unit.

The inner parts, J, of the door frame extend inward somewhat beyond the inner face of the door. To these extensions are riveted plates M, the back edges of which are riveted to corner pieces M′, to which latter is riveted a back piece $M^2$. These plates M and $M^2$ constitute the inner metallic shell of the safe. There may be within this a lining of mahogany or other suitable wood, not shown. Provisions are made for retarding the conduction of heat between these parts. These provisions are of two kinds either of which may be used with some advantage alone, but I prefer to use both; first, large portions of the bearing surfaces are excavated, leaving only a small amount of bearing along the edge adjacent to the door, and around the several holding bolts; and second, a thin but continuous layer of asbestus paper is applied between these parts, so that the bolts alone constitute the principal means by which heat can traverse from the exterior part I to the interior part J of the permanently united parts I. J. of the jamb.

The space between the outer shell A A′, B B′, D, and the inner shell K K′, is filled with a non-conducting material P. This may be plaster-of-paris, the earthy material remaining from the product of soda-water, clay, a mixture of clay and alum, or any other material adapted to promote the fire-proof qualities of the safe and not liable to introduce other difficulties. Plaster-of-paris made from ordinary sulphate of lime, calcined and mixed with water and poured in in a fluid condition, forms a good fire-proof defense for the contents of the safe, but is objectionable from its liability to give out moisture and make the contents of the safe damp. The success of my invention depends on no special character of filling; I can use any filling that is found suitable to serve in other fire-proof safes. The space between the casing L L′, which is the innermost of the intermediate casings and the inner or lining casing M M′ $M^2$, is filled with the same or a different filling. This space is marked *q*. So also the space in the door between the front plate $E^3$ and the outermost intermediate plate $F^2$ is filled with a good fire-proof filling marked *r*. The space between the plate F′, the innermost of the intermediate plates of the door, and the flange $G^2$, and the plate $G^3$, is filled with similar fire-proof material marked *s*. It will be understood that the innermost space in the door, that between the plate $G^3$ and the

plate $G^5$, is intended mainly to accommodate the locks, levers, &c., for operating the bolts.

The thin space between the intermediate plates F' $F^2$, in the door, is filled or nearly filled, with a more or less continuous plate of highly porous earthen-ware N. The space in the main body between the plates K K', and L, L', is similarly filled or nearly filled with porous earthen-ware correspondingly lettered. Such filling contributes to the strength, and constitutes a barrier to the radiation of heat. It is a good non-conductor. Such porous brick or earthen-ware is preferable to empty space, forbidding the transmission of heat by radiation, and also forbidding the transmission of heat by "convection," both of which modes of conveying heat from the exterior of the safe to the interior are liable to obtain when air alone is inclosed.

Making the back plate C removable facilitates the introduction of the filling. It is joined by bolts *c*, which are inserted through holes in the plates C and B, and are tapped into a frame $B^2$, which is mounted on the inside of the back plate B, and serves as a reinforce for its inner edge. This plate is of sufficient thickness to receive and strongly hold the bolts.

It will be understood that the safe may have all the ordinary accessories; for example, it is mounted on small wheels, the door is provided with stout hinges and with one or more shafts leading inward from the exterior to operate the locking and bolting mechanism.

I claim as my invention—

1. In a double fire-proof safe, having two separate thicknesses of fire-proof material, arranged one within the other, with an interval between them, guarded by thin metallic sheets K and L, the porous earthen-ware N introduced in such interval and adapted to retard the circulation of the air and consequently the convection of heat across such interval, all substantially as herein specified.

2. In a double fire-proof safe, having two separate thicknesses of fire-proof material, each supported independently at the front, with an interval between them, the metallic sheets K, L, forming respectively the inner face of the outer thickness and the outer face of the inner thickness, and the porous earthen-ware N interposed in the space or interval between these sheets, all arranged for joint operation substantially as herein specified.

3. In a fire-proof safe, the door having a front portion E, formed in a separate piece from the rear portion G, and firmly united by bolts and flanges, with a space between such flanges to reduce transmission of heat by conduction, as herein specified.

4. In a fire-proof safe, in combination with the safe filling in two nearly independent structures, arranged one within the other, with a space between, and with shells K, K', L, L', bounding and defining such space, the mid-flange J' on the exterior of the door-frame, and the lip $J^2$ on such flange, said shells being supported on such lip, as herein specified.

5. In a fire-proof safe, the door-frame or jamb I, J, in two separate constructions, flanged together with portions of the joining surfaces of the flanges $I^2$, J', cut out or sunk to avoid contact, and reduce the transmission of heat, as herein specified.

6. In a fire-proof safe, having the metal parts connecting the exterior and interior, in separately formed pieces, the spaces in the joining flanges to reduce the conduction of heat, and also the combination therewith of asbestus paper or analogous incombustible and approximately non-conducting material inclosed in the joint, as herein specified.

In testimony that I claim the invention above set forth I affix my signature in presence of two witnesses.

WILLIAM CORLISS.

Witnesses:

THOMAS F. I. MCDONNELL,

C. FRANK PARKHURST.