(No Model.)

T. M. BRINTNALL.

SAFE, VAULT, &c.

No. 456,690. Patented July 28, 1891.

Fig. 1.

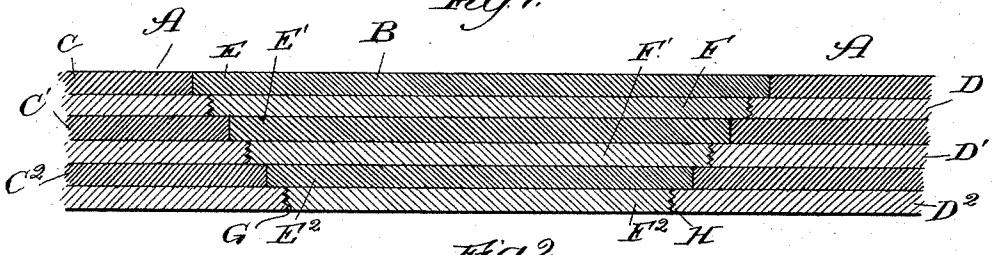


Fig. 2.

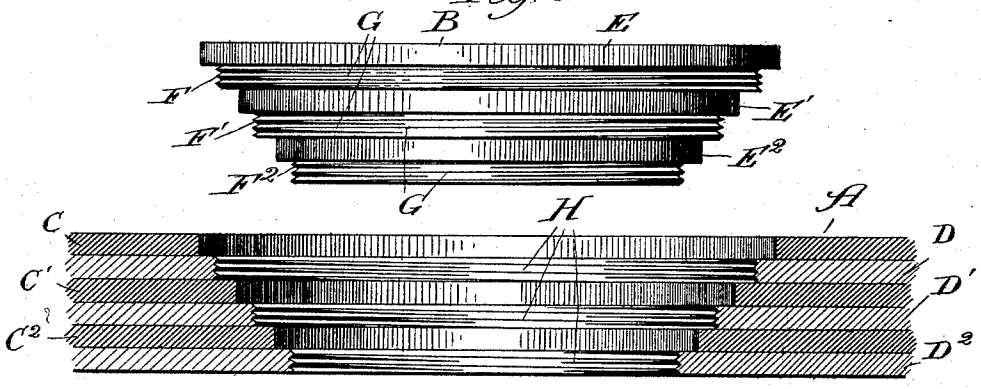


Fig. 3.

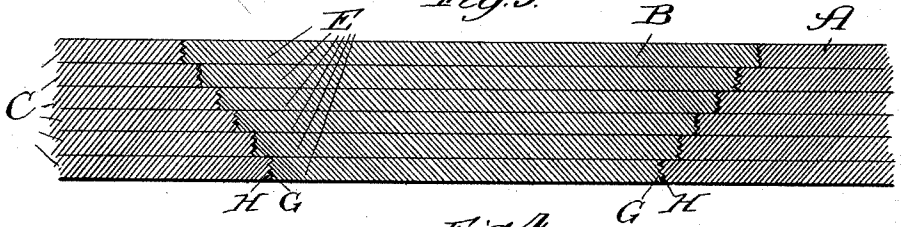


Fig. 4.

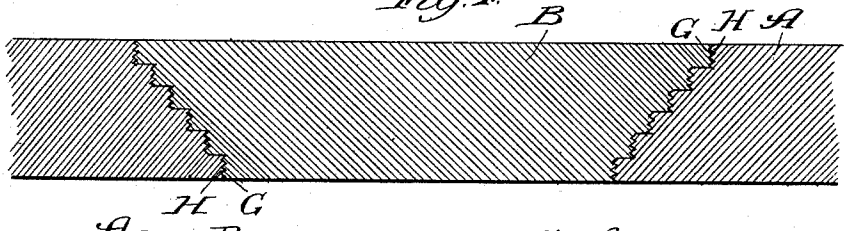


Fig. 5.

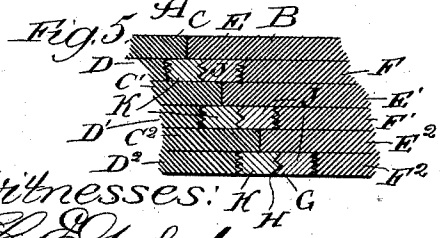
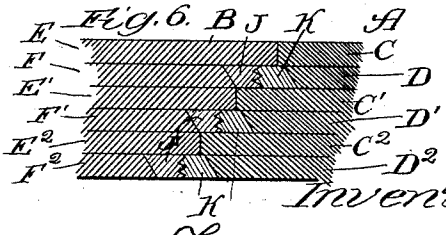


Fig. 6.



Witnesses:
Chas. Gaylord.
Clifford P. White.

Inventor:
Thomas M. Brintnall
By Walter N. Chamberlin
Atty

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

THOMAS M. BRINTNALL, OF CHICAGO, ILLINOIS.

SAFE, VAULT, &c.

SPECIFICATION forming part of Letters Patent No. 456,690, dated July 28, 1891.

Application filed January 12, 1891. Serial No. 377,437. (No model.)

To all whom it may concern:

Be it known that I, THOMAS M. BRINTNALL, a citizen of the United States, residing at Chicago, county of Cook, State of Illinois, have invented a certain new and useful Improvement in Safes, Vaults, &c.; and I declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention has for its object the provision of an improved screw connection between the door and door frame or jamb of a safe, vault, or other strong room where the door is circular and its periphery flanged or "stepped," whereby the door has a direct screw connection with the frame; and it consists in the several features hereinafter described and claimed.

In the drawings, Figure 1 is a horizontal section through the upright frame and door of a safe embodying my invention. Fig. 2 is a similar view with the door disengaged from the frame. Figs. 3 and 4 illustrate variations. Figs. 5 and 6 illustrate constructions where suitable rings are placed on the edges of the plates in which to cut the threads.

In the construction of safes, vaults, and other strong rooms where the walls and door are formed of plates of iron or steel various methods of construction are employed. Sometimes the walls or door-frame and door are formed entirely of plates of hardened steel, and again they are formed of alternate plates of hardened steel and soft steel or iron. When this latter construction is used, the hard or drill-proof plates are sometimes formed from steel which is naturally or inherently hard, and again the plates are all originally soft and are fitted together, and then those plates which it is desired to have hardened are taken out and put through the necessary process to bring them to the desired state. This latter manner of construction has always been the case heretofore where the door of the safe has a screw engagement with the jamb or frame, since it is impracticable to cut screw-threads in the hardened steel, the usual custom being to first put the plates together, dress them down to a proper fit, and cut the threads. Then the plates to be hardened are taken out, put through the process, and replaced; but when these plates are returned the screw-threads on their peripheries never correspond with or properly join the threads on the soft plates. Hence the continuity of the thread is broken and a smooth and close fit, which is so essential in this class of work, is prevented. This is particularly true where, as is now almost universally the case, the plates are composed of laminæ of steel, since the thread running from one layer to the next is apt to be slightly broken and a corner thus formed. One remedy has been to make a loose thread; but this again obviously prevents the desired perfection of joint between the door and jamb. Again, when the plates are put together as just described and the continuity of the thread broken by corners, however slight, the hard-steel corner, striking the soft metal, wears a groove or cuts a gouge therein, thus soon rendering the safe unfit for use. To obviate these various difficulties and at the same time produce a close-fitting and perfect screw engagement between the door and jamb, and to secure the further advantage of a quick-acting screw engagement to throw the door to its seat with a comparatively short movement, I form the door and jamb of alternate plates of hard and soft metal, making each successive plate in the door of a smaller diameter and each successive plate in the jamb shaped to leave an opening of a correspondingly-smaller diameter. The plates are then dressed to the proper size and fit, the soft metal plates being left a slightly larger diameter than is desired. The screw-threads are then cut in the periphery of each soft-metal plate, while the hard plates are left smooth and unbroken on their edges and ground to a finished fit.

The construction will be better understood by reference to the accompanying drawings, in which—

A represents the frame or wall of a safe, vault, or other strong room, and B the door of the same.

C C′ C^2 represent the plates of hard metal in the frame, there being one of these plates upon the exterior.

D D′ D² represent the plates of soft metal in the frame, E E′ E² the hard plates in the door, and F F′ F² the soft-metal plates therein.

G are the screw-threads on the peripheries of the door plates or steps, and H are those in the jamb or frame.

In constructing the safe the hard plates may be either originally of hard or drill-proof steel or they may be hardened after being fitted, since the screw-threads are cut only on the soft metal, (and preferably after the plates have been permanently put together,) although I would have it understood that I do not limit my invention to a construction in which the soft metal is used, since it is also applicable where the door and jamb are constructed entirely of plates which are in a hardened state when the safe is completed, as illustrated in Fig. 3, or in which the door and jamb are made of cast metal, as in Fig. 4. This is true, since the thread on each step in the door engages only with its corresponding thread in the frame, and the continuity of neither is broken, since there are no joints whatever in them, because of the steps.

The method of supporting or hinging the door or of locking and unlocking the same is entirely immaterial, since any desired form may be used. Hence I have omitted from the drawings these unnecessary details and have shown only those parts necessary to illustrate my invention.

While I have herein shown and described the door and frame formed of six plates and screw-threads on three of them, yet I would have it understood that the number of plates might be varied and also the number of threaded steps be varied. So, also, I would have it understood that I have used the term "soft metal" in contradistinction to the hardened or drill or burglar proof plates and not in its literal sense.

As the rolled plates of which the safe is composed have a grain running the way the metal is rolled, great difficulty is sometimes encountered in properly cutting the threads on the edge of the soft steel. To obviate this, I may, if desired, provide the peripheries of the soft plates in the door with wrought, malleable, or cast metal rings, such as shown in Figs. 5 and 6, in which J represents the rings which are engaged to the periphery of each of the plates F F′ F².

K are similar rings which are engaged to the edge of the plates D D′ D² in the frame. These rings may be engaged to their respective plates in any suitable manner, as by the screw engagement illustrated in Fig. 5 or by a beveled joint, as shown in Fig. 6; or, if desired, they may be simply slipped into place and keyed there in any suitable manner. I would have it understood that while the provision of these rings is desirable in some constructions, yet I do not limit myself to their use.

What I claim is—

1. In a safe, vault, or other strong room, the combination, with the door having its periphery flanged or stepped, and the frame having its edge correspondingly flanged or stepped, of screw-threads on two or more steps of the door, adapted to engage corresponding threads on the frame, substantially as described.

2. In a safe, vault, or other strong room, the combination, with the door formed of plates of increasing diameter, and the frame formed of plates shaped to leave openings of correspondingly-increasing diameter, of screw-threads on two or more steps of the door, adapted to engage corresponding threads on the frame, substantially as described.

3. In a safe, vault, or other strong room, the combination, with the door formed of plates of alternate hard and soft metal of increasing diameter, and the frame formed of similar plates shaped to form openings of correspondingly-increasing diameter, of screw-threads on one or more of the soft plates in the door, adapted to engage corresponding threads in the frame, substantially as described.

4. In a safe, vault, or other strong room, the combination, with the door having its periphery flanged or stepped, and the frame correspondingly flanged or stepped, of a suitable metal ring or rings on the periphery of the door and the adjacent edge of the frame, in which the screw-threads for engaging the door and frame together are cut, said rings being located between the door and frame, substantially as described.

5. In a safe, vault, or other strong room, the combination, with the door composed of plates of metal, and the frame similarly constructed, of one or more metallic rings on the periphery of the door, and similar rings in the frame, in which the screw-threads for engaging the two together are cut, said rings being located between the door and frame, substantially as described.

6. In a safe, vault, or other strong room, the combination, with the door composed of plates of alternate hard and soft metal, and the frame similarly constructed, of rings on the peripheries of the soft plates in the door and the edges of the soft plates in the frame, in which the screw-threads for engaging the two are cut, and means for engaging the rings in place, substantially as described.

7. In a safe, vault, or other strong room, the combination, with the door composed of alternate hard and soft metal plates of increasing diameter, and the frame correspondingly constructed, of metallic rings on the edges of the soft plates, in which the screw-threads for engaging the parts together are cut, and means for engaging the rings in place, substantially as described.

8. The method herein described of manufacturing screw-doors for safes, consisting in first permanently building the door of alternate plates of hard and soft metal of increas-

ing diameter, the soft-metal plates on which it is desired to place the screw-threads being left a slightly larger diameter than is desired, then grinding the peirpheries of the hard plates to a close fit, and then cutting the screw-threads on the peripheries of those soft plates whose diameter has been left abnormally large, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

THOMAS M. BRINTNALL.

Witnesses:
JOHN R. PRESTON,
W. H. CHAMBERLIN.