

No. 662,431.

Patented Nov. 27, 1900.

H. D. HIBBARD.
PLATE FOR SAFES OR VAULTS.

(Application filed Mar. 9, 1900.)

(No Model.)

Fig. 1.

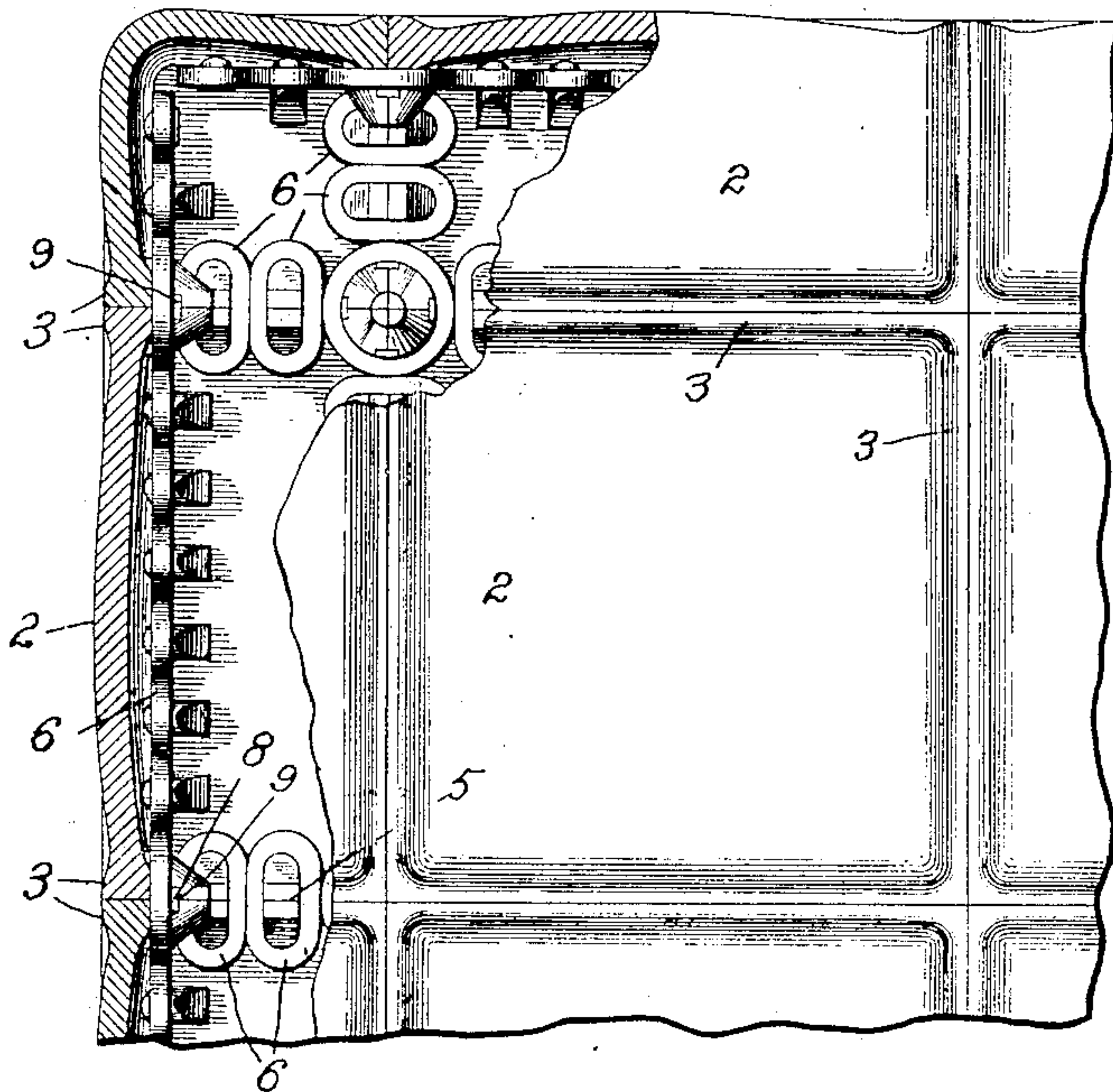


Fig. 2.

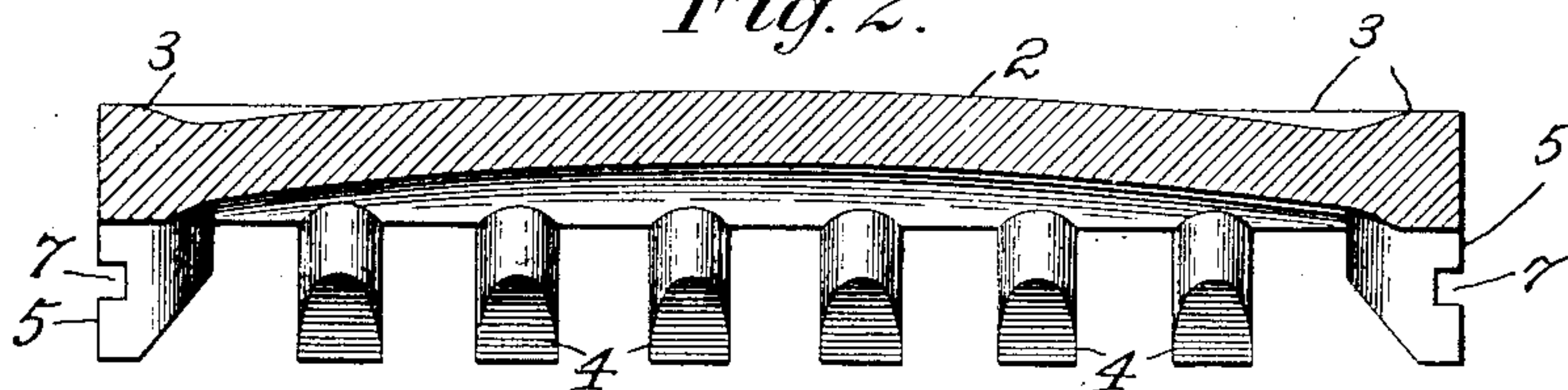


Fig. 3.

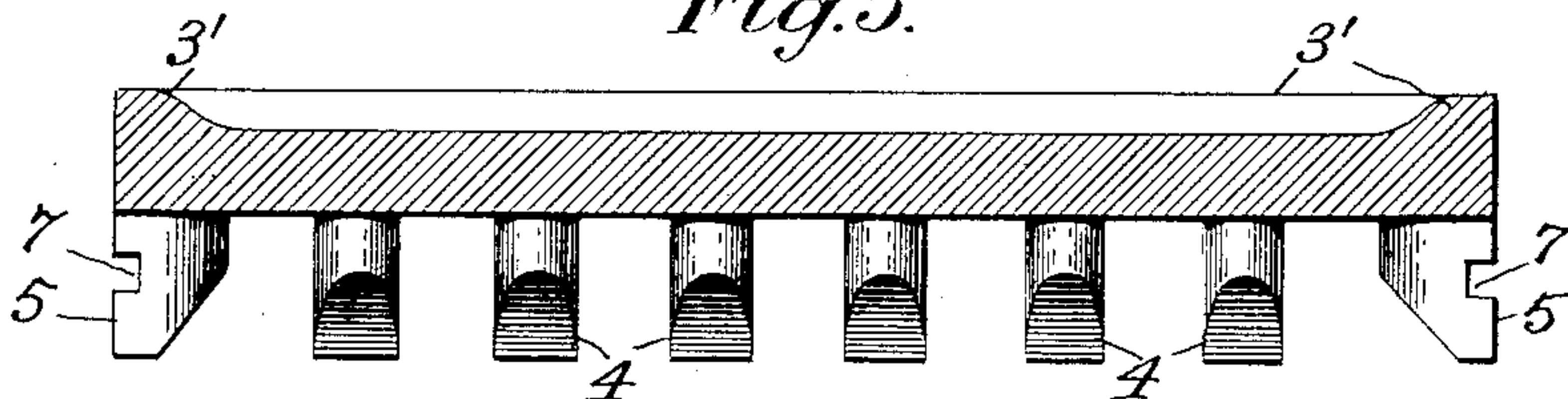
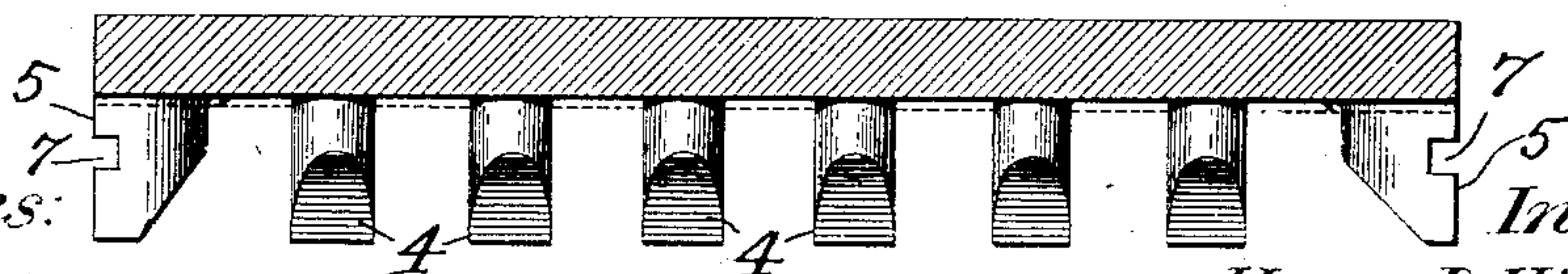


Fig. 4.



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UNITED STATES PATENT OFFICE.

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PLATE FOR SAFES OR VAULTS.

SPECIFICATION forming part of Letters Patent No. 662,431, dated November 27, 1900.

Application filed March 9, 1900. Serial No. 7,968. (No model.)

To all whom it may concern:

Be it known that I, HENRY D. HIBBARD, a citizen of the United States, residing in Plainfield, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in the Construction of Plates for Vaults or Safes, of which the following is a specification.

This invention relates to the manufacture of plate or wall components especially adapted for use in the construction or the building of safes, strong boxes, vaults, or other analogous receptacles; and one object of the invention is to provide an improved plate particularly adapted for such use.

A further object of the invention is to provide an improved plate of a construction adapted to facilitate the heat treatment of such plate.

A further object of the invention is to provide a plate having means located at one side thereof and along its edges to permit the assemblage of the plate with its companion plates.

In the drawings accompanying and forming part of this specification, Figure 1 is a side partly-sectional view of one portion of a safe or vault, showing the manner of assembling the improved plates to form the body. Fig. 2 is a sectional view of one form of this improved plate. Fig. 3 is a sectional view of another form of plate, and Fig. 4 is a sectional view of still another form of plate.

Similar characters of reference designate corresponding parts in all the figures of the drawings.

It has been found that "manganese steel," by which is meant the steel produced and treated in accordance with the Hadfield patented processes, is particularly adapted for use in the building of safes and vaults; but since this character of metal is not subject in a practical way to tool treatment other than a grinding one it follows that when the body of the safe or vault is formed of a plurality of wall components comprised of manganese steel or other unmachinable metal it is necessary that some means be provided whereby one component may be united with another without requiring any tool treatment of the plate other than a grinding one and without

requiring the integrity of the plate to be impaired. To this end I have provided an improved plate having means formed rigid or integral therewith, whereby a plurality of plates may be assembled in such manner that to all intents and purposes the structure is an integral one.

In the use of manganese steel as well as other metal for the production of plates for use in the construction of safes and vaults such material must be heat-treated in order to possess the best properties for resisting the drill and wedge and the effect of high explosives, and by which is meant the process of heating the plate, preferably slowly, to a certain temperature and then cooling it, preferably rapidly, thereby to give it certain desired properties or to increase those which it already possesses, thereby to increase the resisting qualities of the plate. This heat treatment in one form thereof may consist in slowly heating the plate, after it is cast, in a furnace to the desired temperature and then withdrawing and immersing it suddenly in water to permit it to cool faster than it would otherwise cool in the open air in the usual way; but in order to permit this heat treatment without rupture or the production of strains within the plate it is necessary that all parts of such plates shall be heated equally and cooled in as uniform a manner as possible. This is not always practicable where the plate is of the same thickness throughout, since the edge portion cools or heats more rapidly than the intermediate portion, since such edge presents three surfaces—namely, the inner and outer faces of the plate and the edge thereof—to be effected by the heating or cooling medium, while the intermediate or web portion of the plate only presents two—namely, the outer and inner faces thereof—so that consequently such edge portions become more quickly heated or cooled, as the case may be, than the intermediate or web part thereof, which irregularity in the heating or cooling of the plate frequently results in strains or ruptures during such operation, since the parts that are heated first expand first, with the result that strains are set up within the plate. A very slow rate of heating will of course tend to do away with this

danger during the heating of the plate; but it is necessary in most heat treatment that the rate of cooling be rapid. Consequently the plate must be so constructed that it will cool
 5 in as uniform a manner as possible. To this end I have provided an improved plate in one form of which it comprises a web or intermediate portion 2, having a heat-retaining edge comprising an enlarged reinforced
 10 or built-up edge 3, which enlargement may be either at its inner or outer side, the latter being shown in Fig. 3, or both on its outer and inner sides, as shown in Fig. 2. The web 2 of the plate in one form thereof may be
 15 curved, which feature also facilitates the heat treatment, while at the same time giving the plate superior resisting qualities over a flat plate.

In the form shown in Fig. 2 the plate is
 20 shown as a curved one, preferably substantially concavo-convex, the web 2 of which is provided with an enlarged, reinforced, or built-up edge, whereby it is of greater thickness in cross-section than the web or inter-
 25 mediate portion of such plate, such edge in this form of plate projecting both at the inner and outer faces of the plate.

In the form shown in Fig. 3 the plate is illustrated as a relatively flat plate likewise having an enlarged built-up or reinforced edge
 30 3' of greater width or thickness in cross-section than the web or intermediate portion of the plate, the edge, however, being raised only at the outer side of the plate. By providing this additional thickness of metal
 35 around the edge of the plate a heat-retaining portion is furnished, so that the uniform heating and cooling there is facilitated, since, as hereinbefore stated, the edge of the plate in
 40 heating or cooling presents three surfaces to the heating or cooling medium, while the web or intermediate portion of the plate presents only two. Consequently by forming the edge of the plate enlarged, as compared with the
 45 thickness of the web portion of the plate, it requires a longer time for such edge to heat or cool than would otherwise be the case, so that the cooling and heating of the edge will be substantially uniform with the cooling or
 50 heating of the web portion thereof, thereby avoiding irregularity in the heating and cooling of the plate and the ruptures or strains which would result. By curving the plate the web thereof may give a little in any di-
 55 rection, so as to relieve the strains which might not be wholly eliminated within the mass by the formation of an enlarged edge, so that if the strains cause tension in the edge portion of the plate the web may bulge
 60 a little, or if such edge portions are in edge compression then such web will straighten slightly to compensate for the same. Moreover, by forming the plate curved it also reinforces the plate and enables it more thor-
 65 oughly to resist attack by presenting an arched surface to the exterior.

To provide for the assemblage of each plate

or component with its companion plates, the plate is provided with a plurality of projec-
 70 tions 4, extending at an angle thereto and located at one side thereof along its edges. In the form shown herein each edge is provided with a plurality of such projections, rigid or integral therewith, and which projections may be located at any desired distances apart.
 75 In the form shown each projection has a flat outer face 5, while its opposite face is curved. Each of these projections 4 is located in position to register or cooperate with a similar projection of a companion plate, each pair or
 80 plurality of registering or cooperating projections being secured together by suitable coupling means—such, for instance, as a link 6, which is shrunk thereon, as shown in Fig. 1, and also in my contemporaneously-pending
 85 applications, filed March 9, 1900, Serial Nos. 7,967 and 7,969, and March 28, 1900, Serial No. 10,471.

Since it is desirable to provide some means for locating the plates in fixed position or
 90 alinement relatively to each other independently of the links which may be used for coupling the projections together, each of the projections is shown provided on its flat face 5 with a recess or slot 7, whereby when it reg-
 95 isters with the slot or recess of a companion projection a keyway 8 is formed for the reception of a key 9, which is maintained in position by the link. In practice the projection at each corner of a plate is so formed that it
 100 will cooperate with a plurality of projections of a plurality of companion plates. In some instances it may be formed as a quarter-section—such, for instance, as shown and de-
 105 scribed in my companion applications above referred to.

When it is desired to use a flat plate and construct the vault or safe unprovided with heat-retaining edges on its exterior face, such
 110 edges may be formed on its interior face, as shown in dotted lines, Fig. 4; but by the provision of the projections 4, extending at intervals along the edges of the plate, it will be seen that these projections to a certain extent
 115 accomplish the same result that is obtained by the formation of a raised edge on the plate, since the projections being formed as a part of the plate increase the thickness of the plate at its edge portion, so that the heating and cooling at such edge are retarded when
 120 in contact with the heating or cooling medium and a substantially uniform treatment of the plate thereby obtained.

In conclusion, it will be seen that by forming the plate in the manner herein shown and
 125 described it facilitates the heat treatment of such plate, which increases its resisting qualities, while it also reinforces the plate at its edges and gives increased bearing-surfaces on its companion plates, so that the shock of
 130 a heavy charge of explosive will be transmitted without injury to the joint. Moreover, by the provision of a plate having projections extending at an angle thereto I am

enabled to assemble the plate without the use of bolts or other independent fastening means requiring the integrity of the plate to be impaired, while at the same time by providing means which will enable the plates to be united by the shrinkage of links on the projections thereof I provide a structure which to all practical purposes is an integral one, since after the shrinkage of the links on the projections they practically constitute an integral part of such projections.

I claim as my invention—

1. A curved safe or vault plate or component adapted to be assembled with others of its kind to form a safe or vault, and having at one side at each edge thereof a projection extending at an angle to said plate, and each separated from, and free of juncture with, its companion projections whereby each can be encircled by a clamping device or link, each of said projections being adapted to register with similar projections of companion plates.

2. A concavo-convex safe or vault plate adapted to be assembled with others of its kind to form a safe or vault, and having at one side thereof along each of its edges a plurality of projections extending at an angle to said plate, each of said projections being adapted to register with similar projections of companion plates.

3. A curved safe or vault plate adapted to be assembled with others of its kind to form a safe or vault, and having at one side thereof along each of its edges a plurality of projections extending at an angle to said plate, each of said projections having a slot or recess and adapted to register with similar projections of companion plates.

4. A safe or vault plate adapted to be assembled with others of its kind to form a safe or vault, and having each of its edges of greater area in cross-section than the web of such plate, and provided at each such edge at one side of said plate with a projection extending at an angle to said plate and each separated from, and free of juncture with,

its companion projections, whereby each can be encircled by a clamping device or link, each of said projections being adapted to register with similar projections of companion plates.

5. A safe or vault plate adapted to be assembled with others of its kind to form a safe or vault and having each of its edges of greater area in cross-section than the web of such plate, and provided at one side, along each such edge, with a plurality of projections extending at an angle to said plate, each of said projections being adapted to register with similar projections of companion plates.

6. A safe or vault plate adapted to be assembled with others of its kind to form a safe or vault, and having each of its edges of greater area in cross-section than the web of such plate, and provided at one side along each such edge with a plurality of projections extending at an angle to said plate, each of said projections having a slot or recess and adapted to register with similar projections of companion plates.

7. A curved safe or vault plate adapted to be assembled with others of its kind to form a safe or vault, and having each of its edges of greater area in cross-section than the web of such plate, and provided at one side along each such edge with a plurality of projections extending at an angle to said plate, each of said projections being adapted to register with similar projections of companion plates.

8. A curved safe or vault plate adapted to be assembled with others of its kind to form a safe or vault, and having each of its edges of greater area in cross-section than the web of such plate, and provided at one side along each such edge with a plurality of projections extending at an angle to said plate, each of said projections having a slot or recess and adapted to register with similar projections of companion plates.

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