

H. D. HIBBARD.
FASTENING FOR SAFE OR VAULT PLATES.

(Application filed Mar. 11, 1902.)

(No Model.)

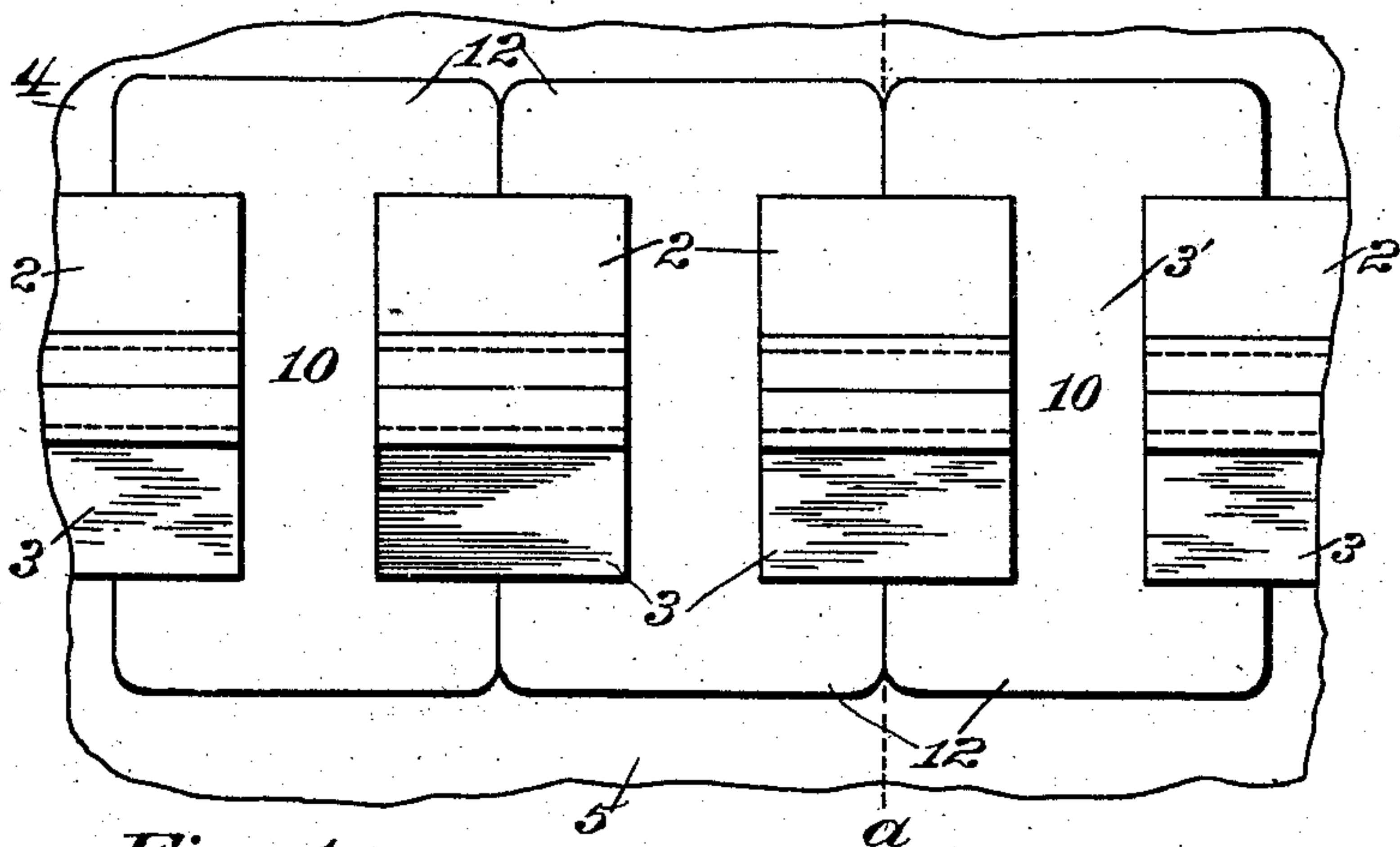


Fig. 1.

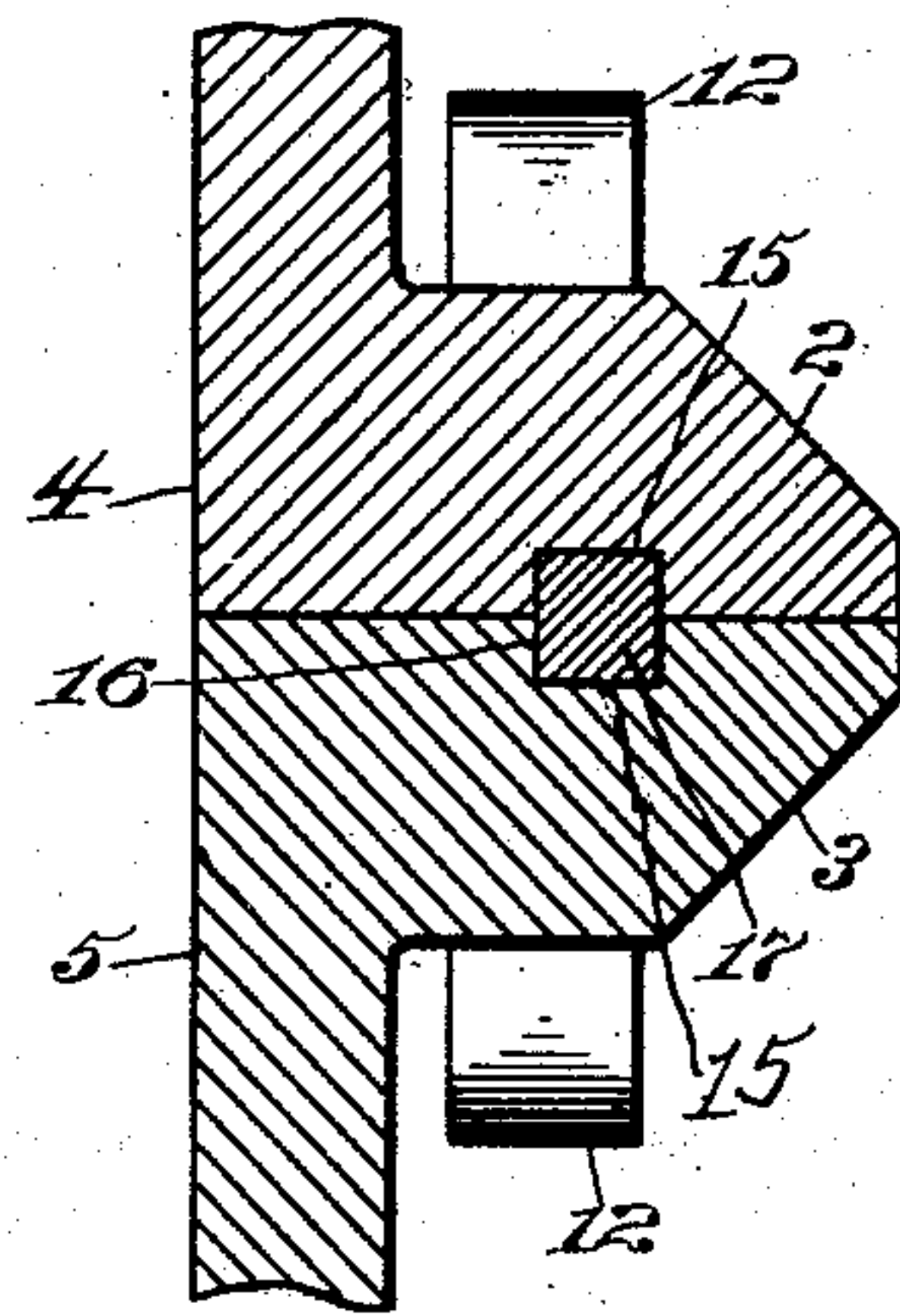


Fig. 2.

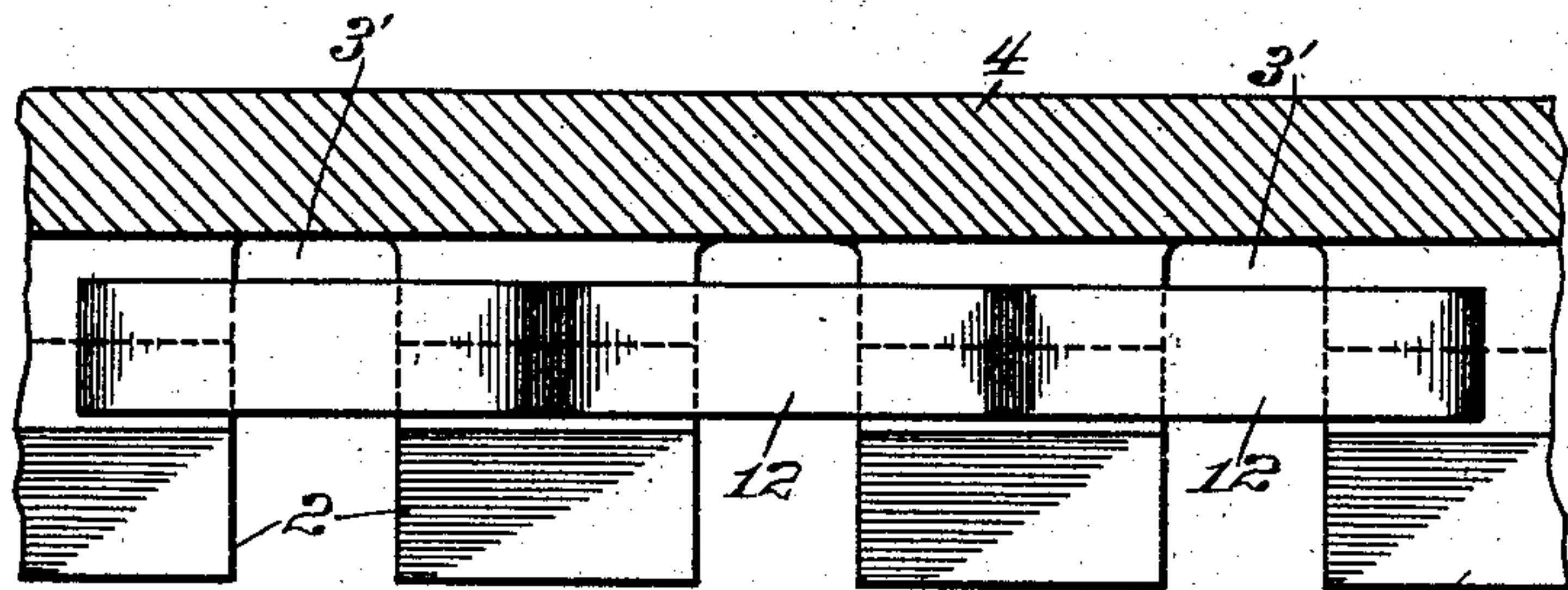


Fig. 3.

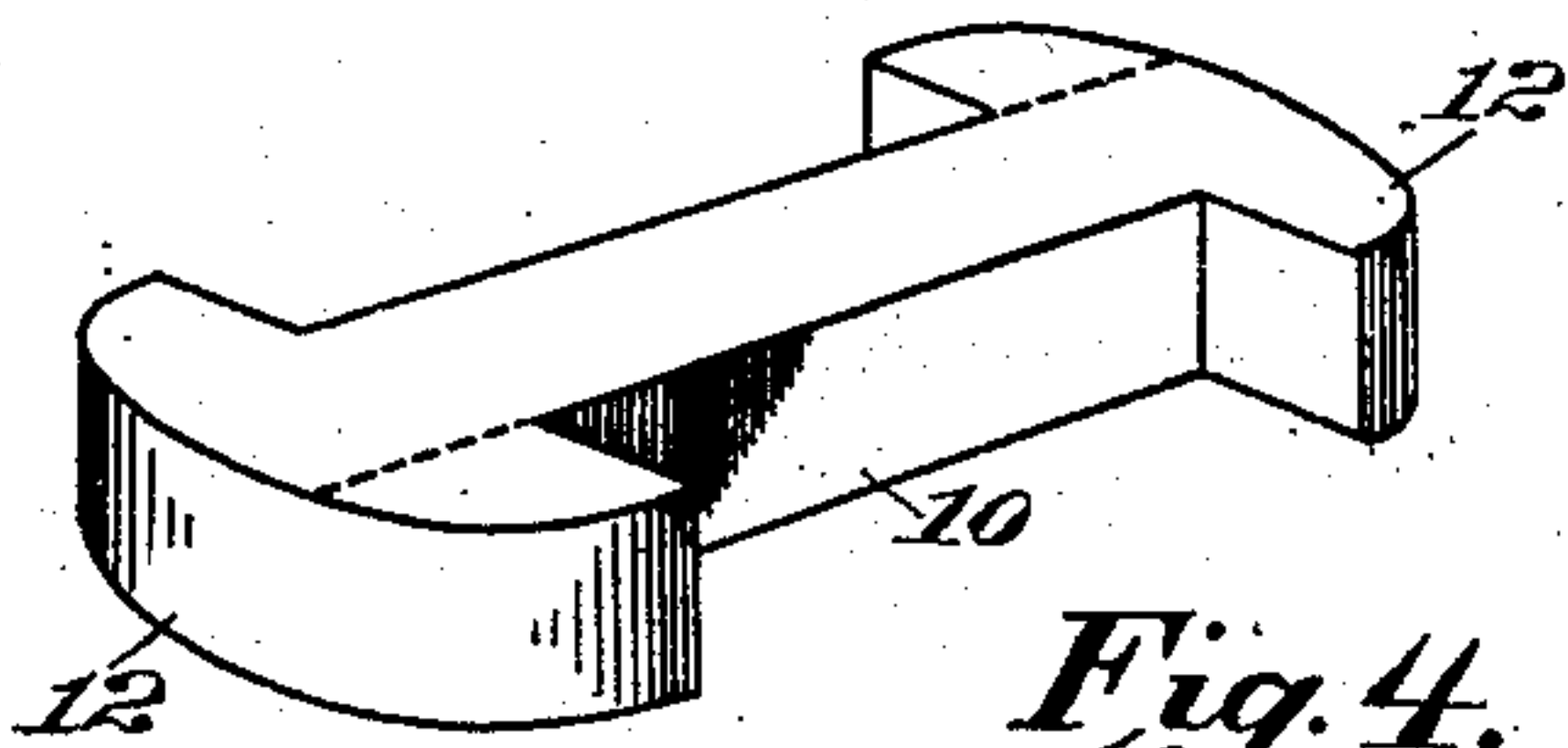


Fig. 4.

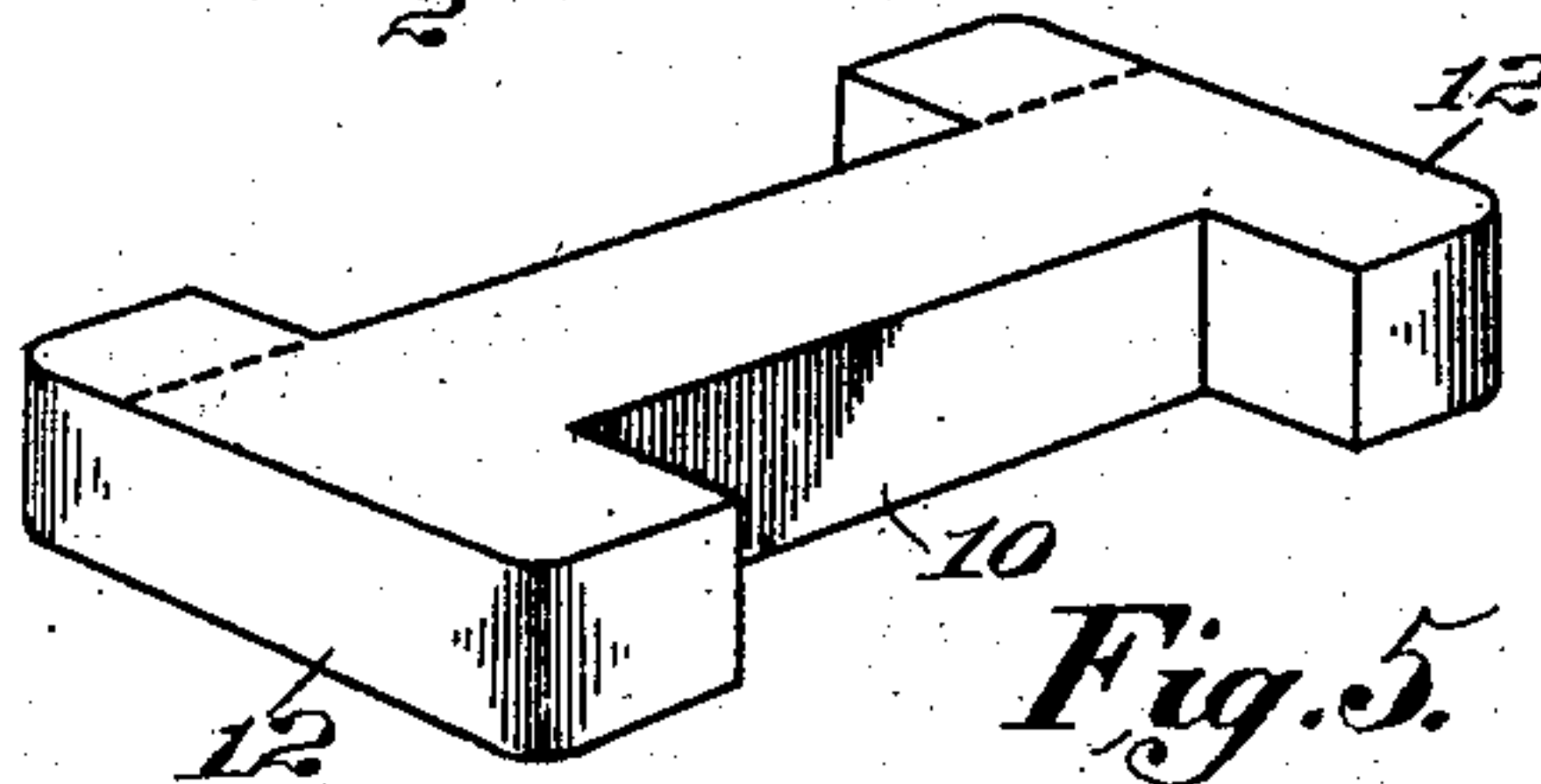


Fig. 5.

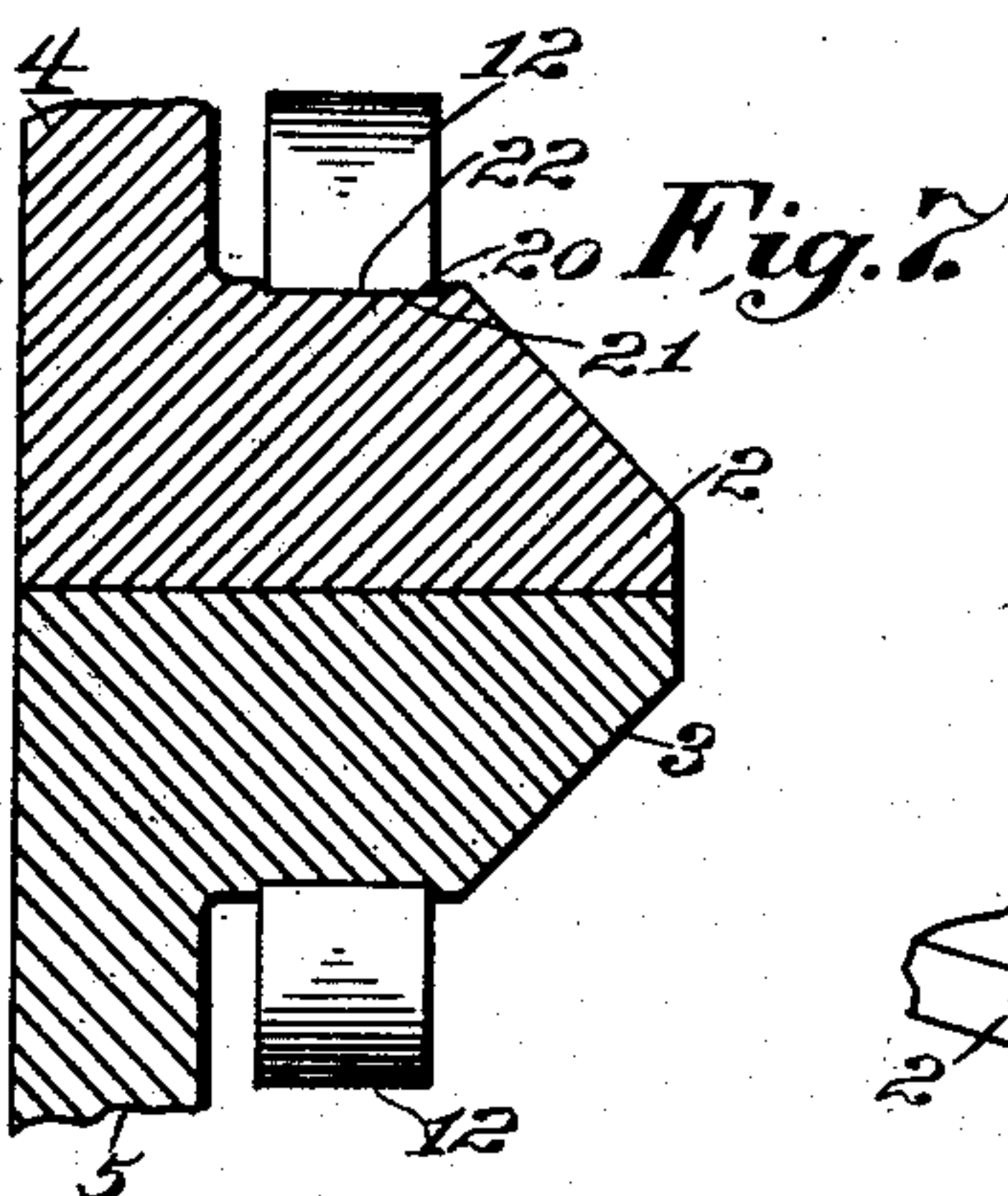


Fig. 6.

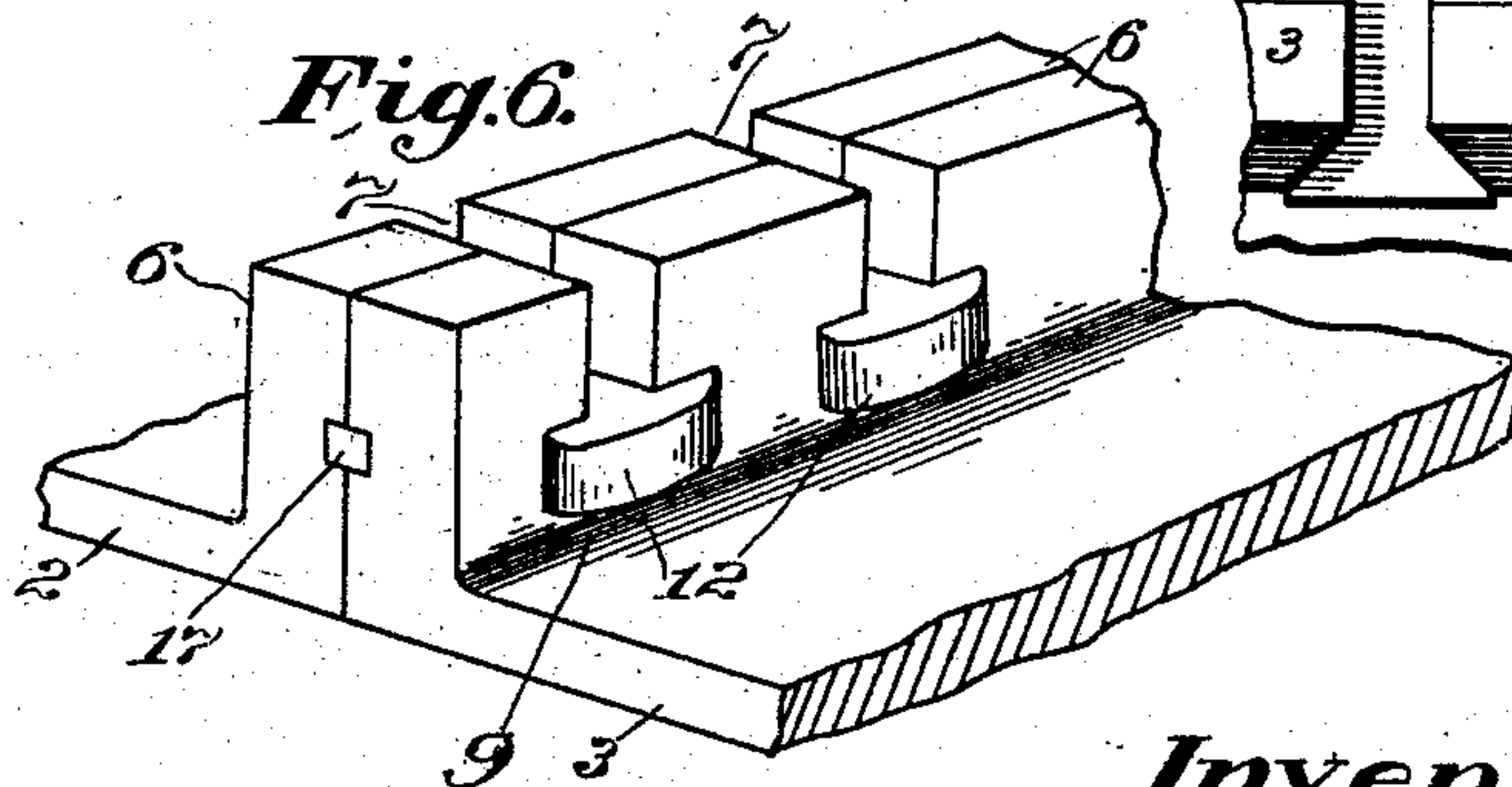


Fig. 7.

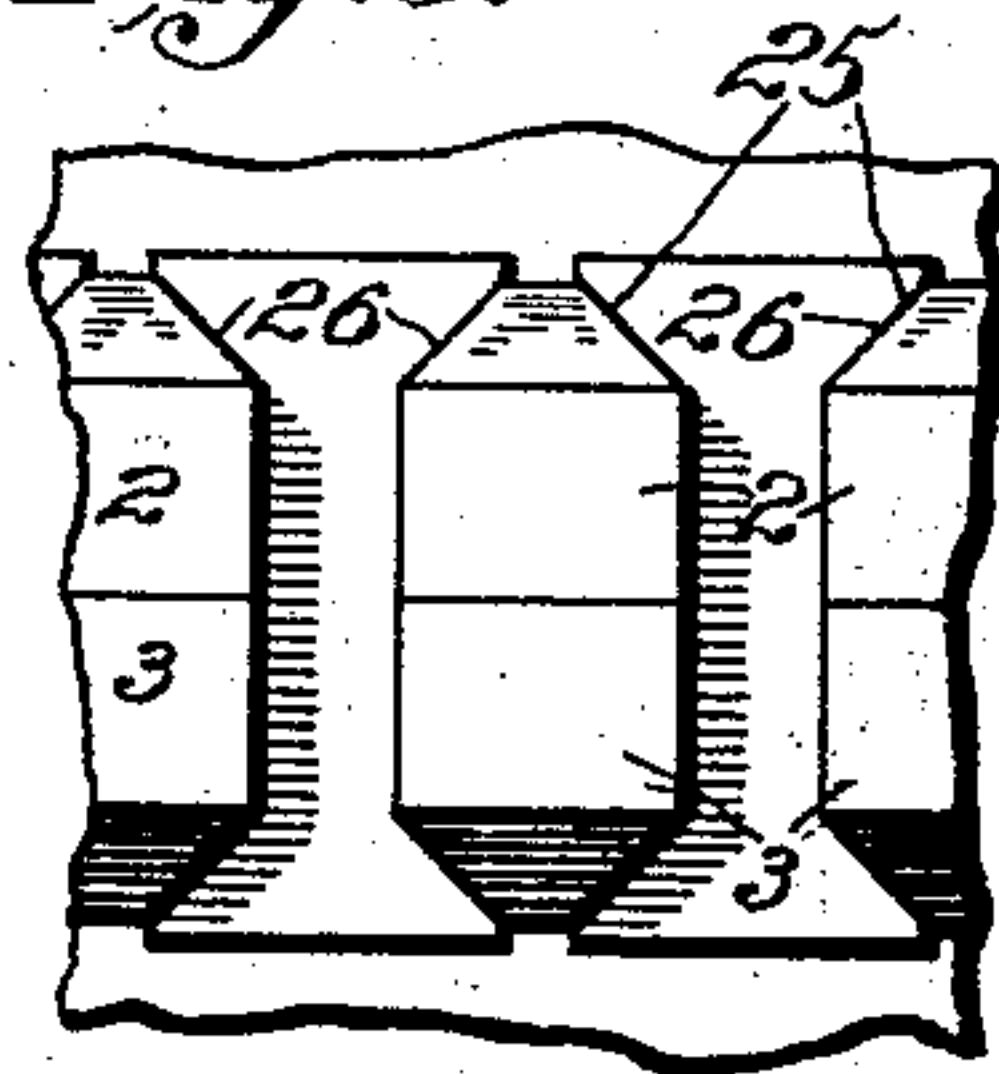


Fig. 8.

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UNITED STATES PATENT OFFICE.

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FASTENING FOR SAFE OR VAULT PLATES.

SPECIFICATION forming part of Letters Patent No. 713,881, dated November 18, 1902.

Application filed March 11, 1902. Serial No. 97,689. (No model.)

To all whom it may concern:

Be it known that I, HENRY DEMING 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 Fastenings for Safe or Vault Plates, of which the following is a specification.

This invention relates to fastenings for safe or vault wall components or plates, the object of the invention being to provide a fastening which may be used with what is ordinarily understood to be "unmachineable" metal plates—that is, plates such, for instance, as manganese-steel plates—which it is not practicable to drill or cut to form bolt-openings for the reception of bolts or other forms of fastening means necessary to be inserted through holes formed by such tools and by means of which fastening the wall components or plates will have their contiguous faces or edges brought together under high tension, thereby obtaining a high initial resistance, which must be first overcome before such plates can be separated.

In the drawings accompanying and forming a part of this specification, Figure 1 is a view of a series of fastening devices connecting a pair of members or plates. Fig. 2 is a cross-sectional view taken in line *a a*, Fig. 1. Fig. 3 is a top view of the fastenings shown in Fig. 1. Figs. 4 and 5 are perspective views of the fastening devices. Fig. 6 is a view of a different form of plates secured together by this improved fastening means. Fig. 7 is a cross-sectional view showing the fastening means so located that it will also prevent the disalignment of the plates, and Fig. 8 is a view of a somewhat-different form of fastening means.

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

In practice any desired number of these improved fastenings may be used, according to the size and character of the members or plates to be united. It will be understood that the fastenings may be used to connect various kinds and formations of plates and

also different parts of a safe or vault. In my Patent No. 662,433, dated November 27, 1900, I have shown plates connected by links shrunk onto projections of such plates. In the present instance in place of the links I use retaining members, which are likewise shrunk onto the projections of the plates; but these retaining members are in the form of tie-bolts, and in the preferred form thereof, herein shown and described, they are in the form of I-shaped tie-bolts. Other shapes, however, may be used.

This fastening comprises a plurality of projections 2 and 3, shown in the present instance as a pair thereof, rigid or integral with a pair of safe or vault members or plates 4 and 5 to be secured together. In the form shown each plate is provided with one or more projections 2 or 3, located at the inner side and adjacent to the edge thereof and in position to register with corresponding projections carried by the other member or plate. The projections may be of any desired shape. For instance, instead of forming them as separate and independent the plates may be provided with flanges 6, (see Fig. 6,) having transverse recesses 7 formed therein at intervals during the casting of the plates for the reception of the fastening devices. The projections 2 and 3 of the plates likewise form intermediate recesses 3', similar to the recesses 7, except that they are usually of somewhat greater depth, since the projections of each plate have no connecting-webs similar to the webs 9 of the flanges. To unite the projections together under sufficient tension to resist the opening of the joint, a retaining device is provided, which in the form shown comprises an angle member or tie-bolt 10, inserted between each two sets of projections 2 and 3 with parts thereof overlapping one or more pairs of projections. In the main form shown this tie-bolt resembles an I-bolt, and when this form of bolt is inserted in position each transverse portion 12 overlaps a pair of projections of the same plate, each bolt thus holding in position two sets of projections. In the present instance the bolts are so located relatively to each other that each two

of such bolts will completely surround a pair of projections; but this could be otherwise, if desired. For instance, instead of forming the bolts I-shaped they could be E-shaped by omitting the parts shown at the left of the dotted lines, Fig. 5, the two remaining heads or transverse portions being of the same length or of a length to completely overlap the faces of the projections, or, if preferred for any reason, a portion of each head of the tie-bolt could be dispensed with, as indicated by dotted lines, Fig. 4, so that the bolt would be somewhat S-shaped, one head overlapping a projection of one set, while the other head overlaps a projection of another set. The preferable form, however, is the I-shaped bolt, since the strain on this form of bolt comes equally on all parts thereof and is transmitted to the perpendicular portion thereof from duplex parts at each side of the bolt, while at the same time a pair of bolts of this form completely surrounds a pair of projections. In practice these tie-bolts having been first heated are inserted in the recesses between the projections and shrunk thereon, whereby the joints are formed under high pressure—that is to say, the edge faces of the plates or members are drawn together with great force and under high tension—thereby obtaining high initial resistance, which, as will be readily seen, must be first overcome before such members or plates can be separated to effect an entrance into the joint. By this organization safes, vaults, and strong boxes may be made of highly resistant material and of a composite construction and which will be for all practicable purposes as strong as an integral structure, since the fastening devices, being shrunk on, become to a certain extent integral with the projections.

When the plates are large and heavy, it will be seen that by providing a number of these fastenings located side by side at the desired intervals it will not be practicable to separate the plates, even by the use of high explosives, especially when such plates are formed of manganese steel or other unmachineable metal, since the edges of the plates being drawn together with great force and it being impracticable, as is well known, to drill into plates of this character sufficiently to permit the entrance of nitroglycerin, it follows that it is not practicable in any known manner to separate the plates at the joint when connected in the manner specified. Moreover, by means of this improved fastening the necessity of impairing the integrity of the plates for the insertion of bolts or connecting the plates by the use of threads is avoided.

The projections formed in the manner herein shown and described constitute levers, the ends of which form fulcrums and to which levers the fastening devices are usually applied substantially midway of their length,

considering the outer face of the plates as a part thereof. In this way an effective means is obtained for reducing the tendency of any force applied at the outside of the plates at the joint thereof to turn the levers within the fastening devices, and thus permit the joint to open.

For locating the projections, and thereby the members or plates rigid therewith, in a fixed position or alinement relative to each other and preventing the forcing of one plate inwardly independent of its companion plate means cooperating with recessed walls of the projections is provided. In one form thereof this means may be independent of the tie-bolt, and in this instance each of the projections is shown provided in its inner face with a recess or slot 15, which when in communication with a similar recess or slot of a companion registering projection forms a keyway 16 for the reception of a key 17, by means of which the projections and the members or plates formed as a part thereof or rigid therewith may be located in proper alinement and in fixed position relative to each other, so that the forcing of one plate inwardly independent of its companion plate is prevented. In some structures this same result may be accomplished by providing the projections with exteriorly-located transversely-extending recesses 20, (see Fig. 7,) into which the I-bolts shrink after they have been heated and located in proper position, so that the surfaces 21 in engagement with the faces 22 of such bolts prevent the forcing of one plate inwardly independent of its companion plates, such tie-bolts thus acting as keys.

In the form of fastening shown in Fig. 8 the tie-bolts, while of I-shaped formation, have their heads provided with inclined side faces 25, the projections 23 being formed with complementary inclined faces 26. Thus the bolts are in the nature of wedges and when shrunk into position on the wedge-shaped faces of the projections will act in a very effective manner to not only clamp but wedge the plates together.

By the provision of the present fastening means it will be seen that the necessity of forming the plates or components of material which it is practicable to drill or work by cutting or boring tools is avoided, as the tie-bolts are located on the exterior of the projections. Consequently the plates may be of such a tough character that it is impracticable to drill, work, or machine them other than by grinding operations.

The term "plate" as used herein and in the claims is to be interpreted to include when the fastening is used to assemble the various parts of a vault or safe or analogous structure a front or other part of such structure, whether the same is formed as an ordinary flat or curved plate or as a member formed of one or more parts.

Having described my invention, I claim—

1. A safe or vault wall component or plate fastening comprising, in combination with a plurality of safe or vault plates or wall components set edge to edge, parts or projections rigid with each of such plates and located on the interior of the safe or vault when the plates are assembled, and a tie-bolt located between two sets of projections and overlapping a pair of projections of each set for drawing or clamping the edge faces of such plates together with great force, thereby to hold said plates under high initial resistance, and which initial resistance must be first overcome before said plates can be separated at the joint formed at such edges.

2. A safe or vault wall component or plate fastening comprising, in combination with a plurality of safe or vault plates or wall components set edge to edge, parts or projections rigid with each of such plates and located on the interior of the safe or vault when the plates are assembled, and a tie-bolt located between two sets of projections and shrunk onto portions of a pair of projections of each set for drawing or clamping the edge faces of such plates together with great force, thereby to hold said plates under high initial resistance, and which initial resistance must be first overcome before said plates can be separated at the joint formed at such edges.

3. A safe or vault wall component or plate fastening comprising, in combination with a plurality of safe or vault plates or wall components set edge to edge, a part or projection rigid with each of said plates and located on the interior of the safe or vault when said plates are assembled in such structure, said registering parts having a recess, and a tie-bolt located in said recess and overlapping portions of said parts or projections.

4. A fastening comprising in combination with a pair of plates having registering projections, tie-bolts located between the sets of registering projections and engaging the exterior thereof for clamping the plates together.

5. A fastening comprising in combination with a pair of plates having registering projections, tie-bolts located between the sets of registering projections and shrunk on the exterior thereof for clamping the plates together.

6. A fastening comprising in combination with a pair of plates having registering projections, means located between and partially surrounding sets of registering projections for clamping the plates together.

7. A fastening comprising in combination with a pair of plates having registering projections, shrunk-on means located between and partially surrounding sets of registering projections for clamping the plates together.

8. A fastening comprising in combination with a pair of plates having two sets of beveled projections, a tie-bolt having beveled faces engaging the beveled faces of said projections for clamping the plates together.

9. A fastening comprising in combination

with a pair of plates having two sets of registering projections, a wedge-shaped tie-bolt located between such sets of projections for clamping the plates together.

10. A fastening comprising in combination with a pair of plates having two sets of registering projections a wedge-shaped tie-bolt located between said sets of projections and shrunk into engagement therewith, for clamping the plates together.

11. A safe or vault wall component or plate fastening comprising, in combination with a plurality of safe or vault plates or wall components set edge to edge, a part or projection rigid with each of said plates and located on the interior of the safe or vault when said plates are assembled in such structure, said registering parts having a recess, and a tie-bolt located in said recess and shrunk onto said parts or projections.

12. A safe or vault wall component or plate fastening comprising, in combination with a plurality of safe or vault plates or wall components set edge to edge, a part or projection rigid with each of said plates and located on the interior of the safe or vault when said plates are assembled in such structure, and a tie-bolt having transversely - extending heads overlapping said projections.

13. A safe or vault wall component or plate fastening comprising, in combination with a plurality of safe or vault plates or wall components set edge to edge, a part or projection rigid with each of said plates and located on the interior of the safe or vault when said plates are assembled in such structure, and a tie-bolt having heads shrunk onto such projections.

14. A safe or vault wall component or plate fastening comprising, in combination with a plurality of safe or vault plates or wall components set edge to edge, parts or projections rigid with each of said plates and located on the interior of the safe or vault when said plates are assembled in such structure, and an I-shaped tie-bolt shrunk onto two sets of projections.

15. A safe or vault wall component or plate fastening comprising a plurality of projections rigid with each plate of a pair, the projections of one plate registering with those of another, and a plurality of fastening devices, each inserted between each two sets of such projections and having a part overlapping a projection of each pair.

16. A safe or vault wall component or plate fastening comprising a plurality of projections rigid with each plate of a pair, the projections of one plate registering with those of another, and a plurality of fastening devices, each inserted between each two sets of such projections and having parts overlapping both projections of each pair.

17. A safe or vault wall component or plate fastening comprising a plurality of projections rigid with each plate of a pair, the pro-

jections of one plate registering with those of another, and a plurality of fastening devices, each inserted between each two sets of such projections and having parts overlapping both projections of each pair, the overlapping portions of one device being in juxtaposition to overlapping portions of another device, whereby each pair of fastening devices completely surrounds a pair of projections.

18. A safe or vault wall component or plate fastening comprising, in combination with a plurality of safe or vault plates or wall components set edge to edge and having inwardly extending projections, means fitting into a recess formed in such projections, and having portions shrunk on such projections.

19. A safe or vault wall component or plate fastening comprising, in combination with a plurality of safe or vault plates or wall components set edge to edge, parts or projections rigid with each of such plates and located on the interior of the safe or vault when the plates are assembled, and a tie-bolt located between two sets of projections and overlapping a pair of projections of each set for drawing or clamping the edge faces of such plates together with great force, thereby to hold said plates under high initial resistance, and which initial resistance must be first overcome before said plates can be separated at the joint formed at such edges; and means for locating said plates in fixed position or alinement relative to each other.

20. A safe or vault wall component or plate fastening comprising, in combination with a plurality of safe or vault plates or wall components set edge to edge, parts or projections rigid with each of such plates and located on the interior of the safe or vault when the plates are assembled, a tie-bolt located between two sets of projections and shrunk onto portions of a pair of projections of each set for drawing or clamping the edge faces of such plates together with great force, thereby to hold said plates under high initial resistance, and which initial resistance must be first overcome before said plates can be separated at the joint formed at such edges, and means for locating said plates in fixed position or alinement relative to each other.

21. A safe or vault wall component or plate fastening comprising, in combination with a plurality of safe or vault plates or wall components set edge to edge, a part or projection rigid with each of said plates and located on the interior of the safe or vault when said plates are assembled in such structure, said registering parts having a recess, a tie-bolt located in said recess and shrunk onto said parts or projections, and means for locating said plates in fixed position or alinement relative to each other.

22. A safe or vault wall component or plate fastening comprising, in combination with a plurality of safe or vault plates or wall com-

ponents set edge to edge, projections rigid with each of said plates and located on the interior of the safe or vault when said plates are assembled in such structure; a key located in a keyway formed by each pair of registering projections, and I-bolts shrunk onto such projections and fastening two pairs thereof together.

23. A safe or vault wall component or plate fastening comprising, in combination with a plurality of safe or vault plates or wall components set edge to edge, a part or projection rigid with each of said plates and located on the interior of said safe or vault when said plates are assembled in such structure, and a tie-bolt overlapping each of said projections, said fastening having means for preventing the disalignment of such plates relatively to each other.

24. A safe or vault wall component or plate fastening comprising, in combination with a plurality of safe or vault plates or wall components set edge to edge, a part or projection rigid with each of said plates and located on the interior of said safe or vault when said plates are assembled in such structure, and a tie-bolt shrunk on said projections, said fastening having means for preventing the disalignment of such plates relatively to each other.

25. A safe or vault wall component or plate fastening comprising, in combination with a plurality of safe or vault plates or wall components set edge to edge, parts or projections rigid with each of said plates and located on the interior of the safe or vault when said plates are assembled in such structure, and tie-bolts located between each two sets of projections and having parts overlapping the projections of each pair, said fastening having means for preventing the disalignment of the plates.

26. A safe or vault wall component or plate fastening comprising, in combination with a plurality of safe or vault plates or wall components set edge to edge, parts or projections rigid with each of said plates and located on the interior of the safe or vault when said plates are assembled in such structure, and tie-bolts located between each two sets of projections and shrunk thereon, said fastening having means for preventing the disalignment of the plates.

27. A fastening comprising, in combination with a plurality of safe or vault plates or components set edge to edge, a part or projection rigid with each of said plates, and means located in position to partially surround said projections, whereby a pair of such means may be used to clamp each set of projections.

28. A fastening comprising, in combination with a plurality of safe or vault plates or components set edge to edge, a part or projection rigid with each of said plates, and means located in position to partially surround said projections, whereby a pair of such means

may be used to clamp each set of projections and shrunk thereon.

29. A fastening comprising, in combination with a plurality of safe or vault plates or wall components set edge to edge, a part or projection rigid with each of said plates, means located in position to partially surround said projections, whereby a pair of such means

may be used to clamp each set of projections and shrunk thereon, said fastening having means for preventing the disalignment of the plates.

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