No. 701,688. Patented June 3, 1902.

J. W. DONNELL.

VAULT.

(Application filed Sept. 9, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1

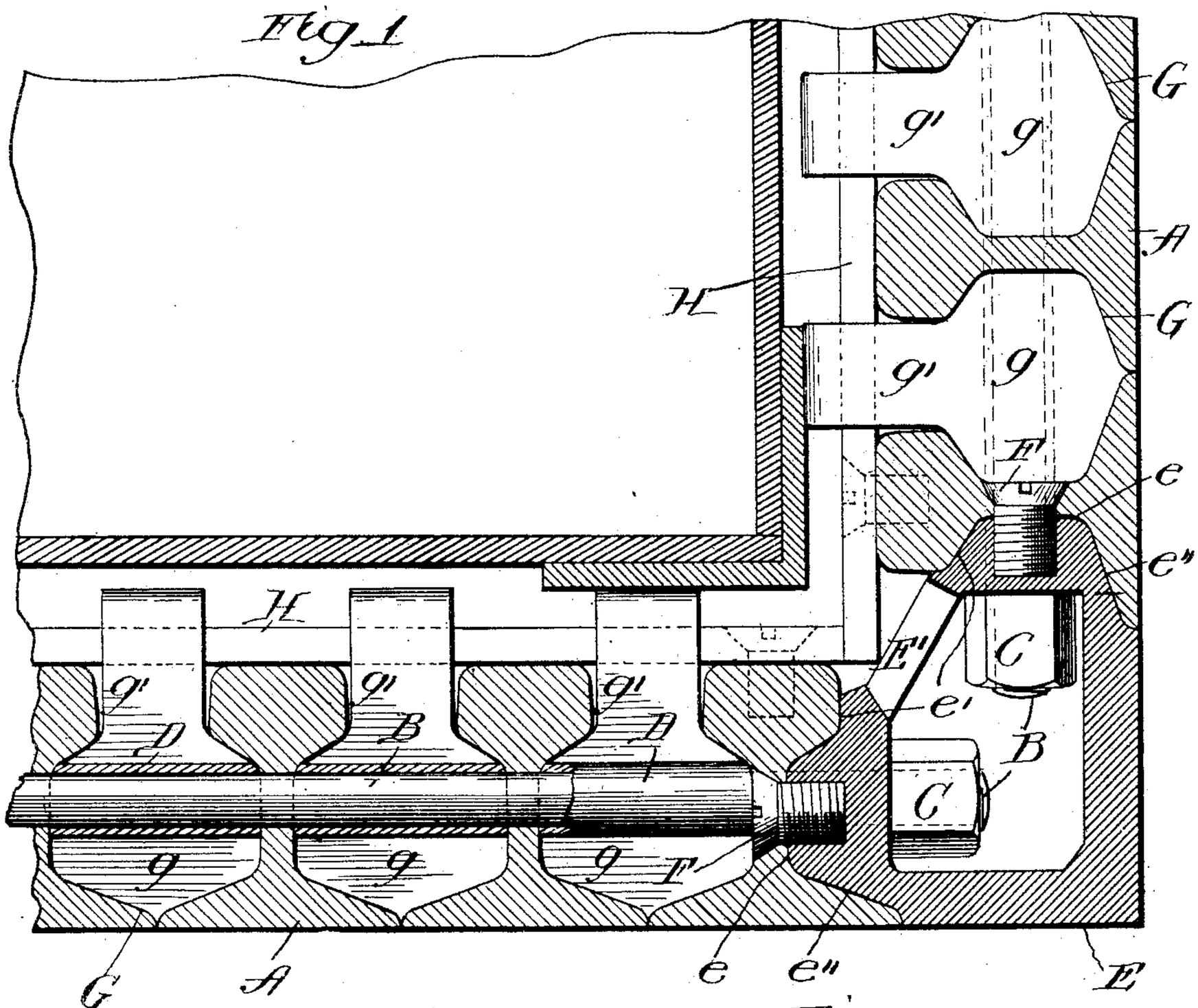

Fig. 2

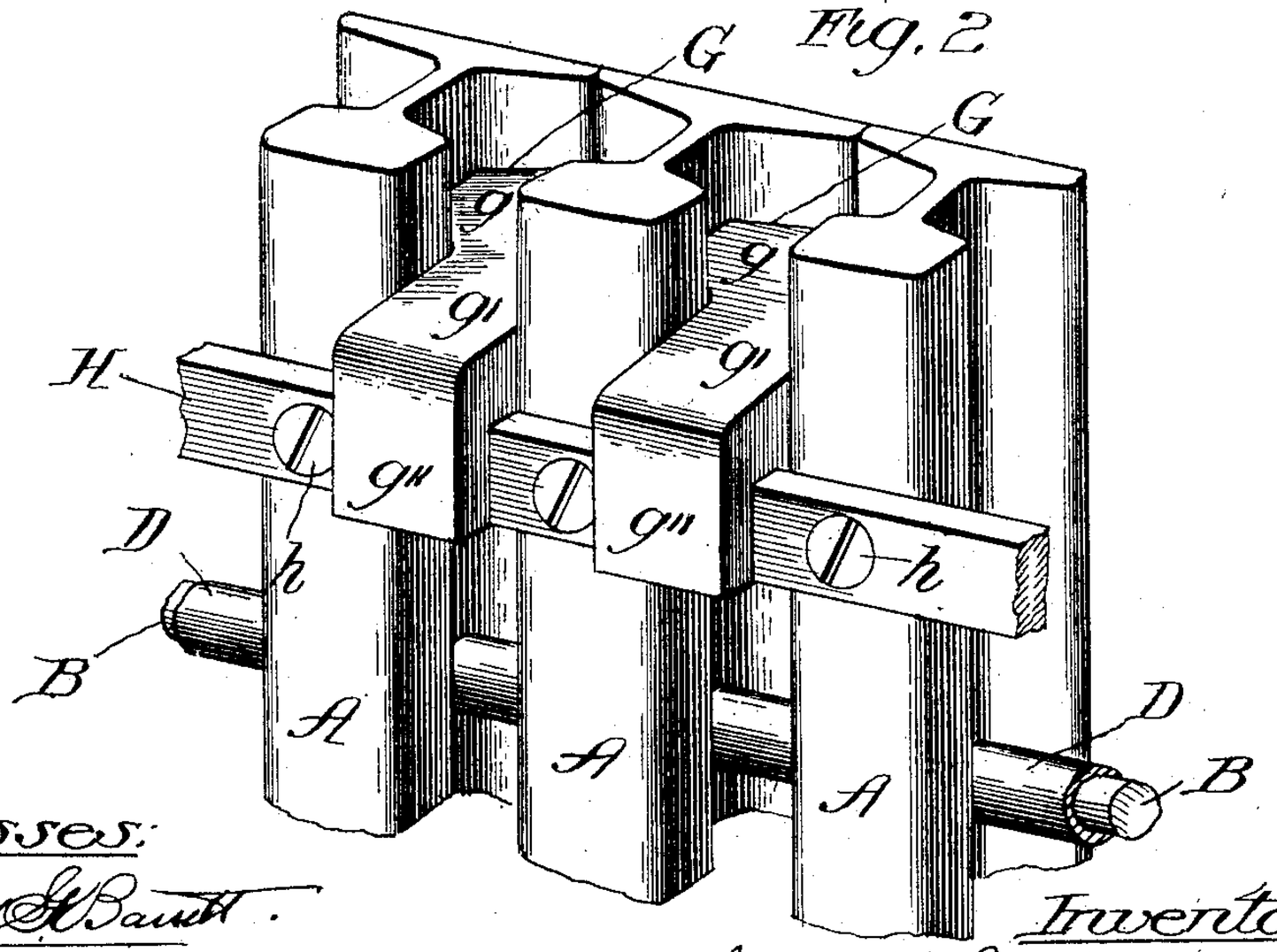

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Fig. 3

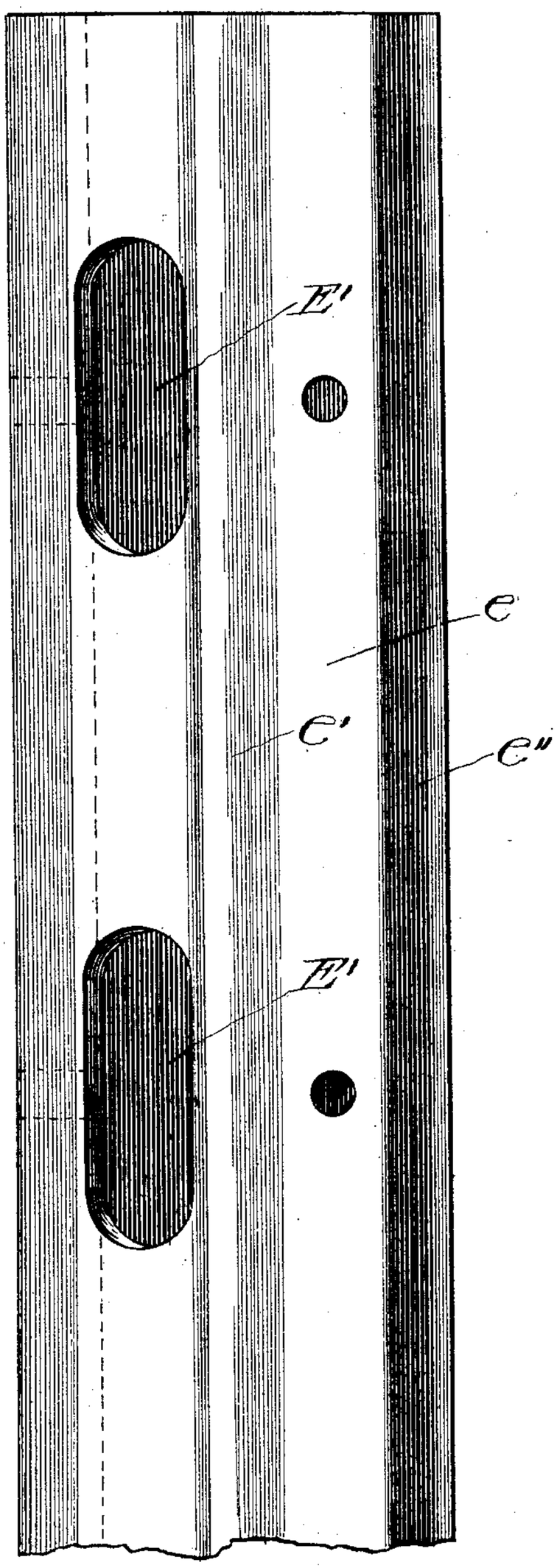


Fig. 4

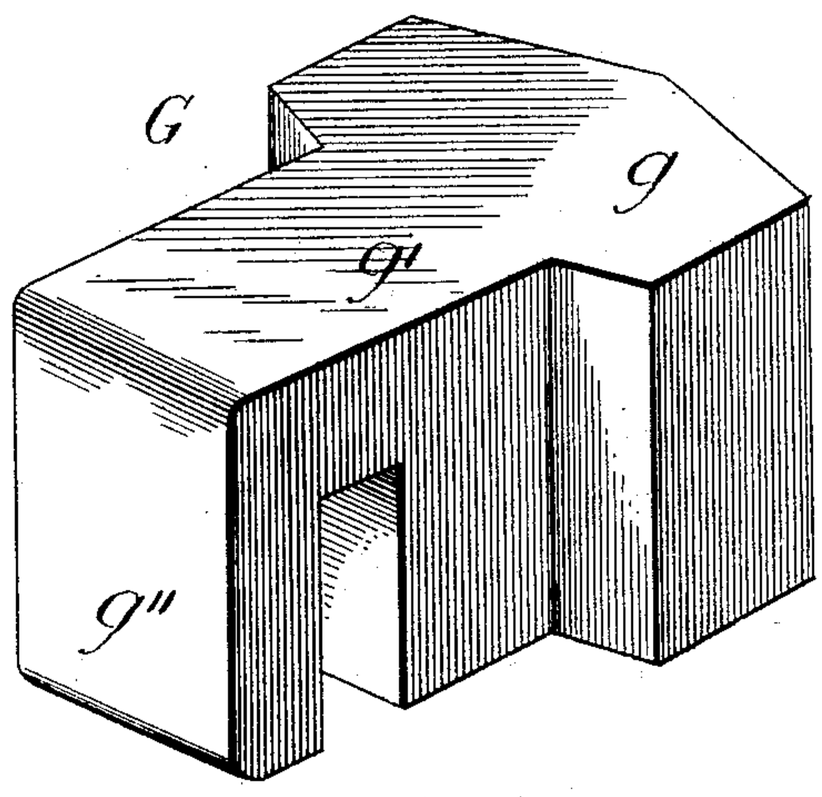
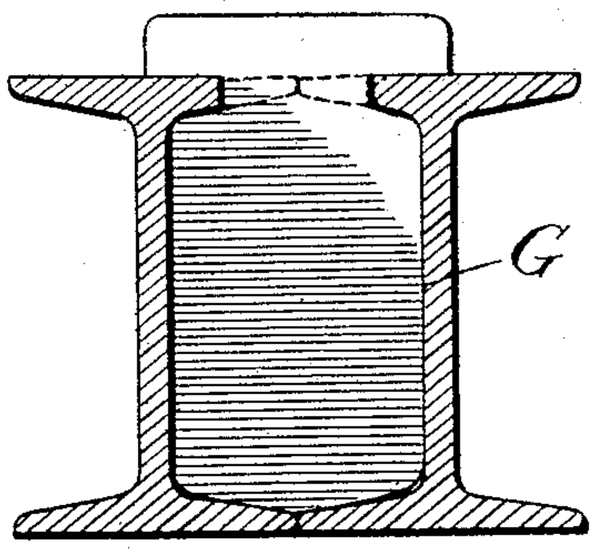


Fig. 5



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UNITED STATES PATENT OFFICE.

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VAULT.

SPECIFICATION forming part of Letters Patent No. 701,688, dated June 3, 1902.

Application filed September 9, 1901. Serial No. 74,825. (No model.)

To all whom it may concern:

Be it known that I, JAMES W. DONNELL, a citizen of the United States, residing at Evanston, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Vaults, of which the following is a specification.

The present invention relates exclusively to that class of vaults in which flanged rails or beams (hereinafter called "rails" for the sake of brevity) are used in the construction of the walls.

One of its objects is to provide an improved corner-post through the medium of which the end rails of each series going to make up each wall of the vault are united.

Another of its objects is to provide improved means for keying together the several rails going to make up each wall, so that no one of said rails can be forced outward laterally independently of those adjacent to it.

In the accompanying drawings, which are made a part of this specification, Figure 1 is a horizontal section of one corner of a vault embodying the invention, the section being taken in different horizontal planes. Fig. 2 is a perspective view of a portion of one of the walls viewed from the interior, the inner steel lining being omitted. Fig. 3 is an elevation of a portion of one of the corner-posts. Fig. 4 is a perspective view of one of the keys. Fig. 5 is a horizontal section showing the use of I-beams instead of so-called T-rails.

The side walls of a vault of the class in question are preferably made up principally of a number of T-rails A, stood on end and placed with their bases outward and in contact with each other and suitable means for securing them together. It is in this securing means that the present invention resides. As shown in the drawings, the webs of the rails are perforated, and through these perforations pass rods B, threaded at their ends to receive tightening-nuts C, spacing-sleeves D being slipped onto the rods between each rail and the next in order to hold them in proper position—*i. e.*, with their bases in contact and their webs parallel. This is an old and familiar construction.

One feature of the present invention resides in the corner-posts, one of which is shown at E. This post is hollow, and its outer faces are by preference continuous (unbroken) throughout and at right angles to each other. It has also two faces, each of which is complementary to the side of one of the rails entering into the construction of the vault—that is to say, it has a surface *e*, adapted to fit against the side of the web of the rail, a surface *e'*, adapted to fit against the head of the rail, and a surface *e''*, adapted to fit against the base of the rail. The tie-rods B pass through those sides of the posts E that contact with the end rails, and the nuts C are located within the posts, the latter being provided with openings E' of sufficient size to admit a wrench for turning the nuts. In addition to this means for uniting the posts and end rails screws F are passed through openings in the webs of the end rails and into the posts.

Another feature of the invention resides in the keys G, by which the rails are keyed together, so that no one of them can be displaced outward laterally without displacing the others adjacent thereto. Each of these keys in the preferred form of the invention is of substantially T shape—that is to say, it has a head *g*, which is adapted to engage the under sides of the heads of two adjacent rails, and a shank *g'*, which passes inward between the said heads and engages a bar H, which bears against the heads of the rails and by which the key is supported, the bar being in turn supported by screws *h*, passing through it and into the rails. The purpose of these keys is to key all of the rails together, so that no one of them can be displaced laterally outward independently of the others, and this purpose is best accomplished by making the heads of the keys complementary to the adjacent faces of the webs, bases, and heads of two adjacent rails, and it is further subserved by providing the shank of each key with an overhanging tongue or hook *g''*, which engages the bar H, through the medium of which it bears upon the tops of the heads of two adjacent rails, so that the bar not only supports the key, but by its contact with the heads of the rails also serves to prevent it from moving outward. One or more of these keys is interposed between each rail and the next.

I prefer to use two between each rail and the next, one located near the top and the other near the bottom of the rails; but the number is not essential and more or less may be used, as the judgment of the builder dictates.

It is manifest that any key the head of which engages the under sides of the heads of two adjacent rails and the shank of which bears against the tops of said heads either immediately or through the interposition of another part, such as the bar H, will key the rails together within the spirit of this invention. It is also manifest that even without the shank if the head of the key be made complementary to the bases, webs, and under sides of the heads of the rails, or if not "complementary" then of such shape that it will engage these parts of the rails it will key the rails one to another and prevent any one of them from being displaced laterally without displacing those adjacent to it. It is also manifest that I-beams substituted for the so-called T-rails of the conventional cross-section usually employed for railways would answer the purpose and might be keyed together by keys interposed between them, as shown in Fig. 5. I desire to have it understood, therefore, that my invention is not limited to a key of the precise form shown in the drawings, although that form is preferred, but comprehends a key of any form interposed between the flanged rails of a vault and serving to key said rails together in the manner and for the purpose described.

In Fig. 5 the key is of approximately I shape rather than T shape. One of its "heads" engages the bases, webs, and under sides of the heads of the rails, while its other head engages the crowns of the heads of the rails, thus dispensing with the bar H. The heads of the rails may be notched, as indicated, to receive the shanks of the keys.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. In a vault, the combination of flanged rails entering into the construction of the walls, corner-posts having faces contacting with the bases, webs, and heads of the end rails of the two series of rails entering into the construction of contiguous walls, and means for securing said rails and posts together, substantially as described.

2. In a vault, the combination of flanged rails entering into the construction of the walls, corner-posts engaging the end rails of the two series of rails entering into the construction of contiguous walls, tie-rods passing through said rails and through openings in the post, and nuts turned onto the tie-rods, substantially as described.

3. In a vault, the combination of flanged rails entering into the construction of the walls, hollow corner-posts engaging the end rails of the two series of rails entering into the construction of contiguous walls, tie-rods passing through said rails and the adjacent walls of the posts, and nuts within the posts, turned onto said tie-rods, substantially as described.

4. In a vault, the combination of flanged rails entering into the construction of the walls, hollow corner-posts engaging the end rails of the two series of rails entering into the construction of contiguous walls, tie-rods passing through said rails and the adjacent walls of the posts, and nuts, within the posts, turned onto said rods, the posts being provided opposite the nuts, with openings for the admission of a wrench, substantially as described.

5. In a vault, the combination of flanged rails entering into the construction of the walls, hollow corner-posts having faces complementary to the faces of the end rails of the two series of rails entering into the construction of contiguous walls, tie-rods passing through said rails and the adjacent walls of the posts and nuts, within the posts, turned onto said rods, substantially as described.

6. A hollow post for use in vault construction having two faces each complementary to one side of the base, web and head of a flanged rail, substantially as described.

7. A hollow post for use in vault construction having two faces each complementary to the side of a flanged rail, and having, through said faces, openings for the passage of fastening devices and having, also, between said faces, openings for the admission of a wrench, substantially as described.

8. In a vault, the combination of a course of flanged rails arranged side by side, base to base, and entering into the construction of a wall, and keys disposed between adjacent rails, each of said keys engaging the base of one and the head of the next adjacent rail, substantially as described.

9. In a vault, the combination of flanged rails entering into the construction of a wall, and keys disposed between said rails, each key engaging the upper sides of the bases and the under sides of the heads of two adjacent rails, substantially as described.

10. In a vault, the combination of flanged rails entering into the construction of a wall, and keys disposed between said rails, each of said keys having parts engaging the under sides of the heads of two adjacent rails, and means through which said keys bear upon the tops of the heads of said rails, substantially as described.

11. In a vault, the combination of flanged rails entering into the construction of a wall, and keys disposed between said rails, each of said keys filling the space between the bases, webs and heads of two adjacent rails, substantially as described.

12. In a vault, the combination of flanged rails arranged side by side and entering into the construction of a wall, and means engaging adjacent rails for bracing each rail against lateral movement either inward or outward relatively to the next rail, said bracing means

having engagement with both the top and the under sides of the heads of adjacent rails, substantially as described.

13. In a vault, the combination of flanged rails arranged side by side and entering into the construction of a wall, and means for bracing each rail against lateral movement either inward or outward relatively to the next rail, said bracing means having keys disposed between said rails, each of said keys having contact with the upper side of the base of one rail and the under side of the head of the next adjacent rail, substantially as described.

14. In a vault, the combination of flanged rails entering into the construction of the walls, and keys disposed between said rails and having parts engaging the upper sides of the bases and the under sides of the heads of adjacent rails, and means through which said keys bear upon the tops of the heads of said rails, substantially as described.

15. In a vault, the combination of flanged rails entering into the construction of the walls, and keys disposed between said rails and engaging the under sides of the heads of adjacent rails, said keys having shanks extending between the heads of said adjacent rails, and means through which said shanks bear upon the tops of the heads of said rails, substantially as described.

16. In a vault, the combination of flanged rails entering into the construction of the walls and arranged base to base, and keys disposed between said rails and having parts engaging the under sides of the heads of adjacent rails, shanks extending between the heads of adjacent rails, and means through which the shanks bear upon the tops of the heads of said rails, substantially as set forth.

17. In a vault, the combination of flanged rails arranged base to base, entering into the construction of the walls, and keys disposed between said rails and having parts engaging the under sides of the heads of adjacent rails, shanks extending between the heads of said adjacent rails and means engaging the shanks and bearing upon the tops of the rails, substantially as described.

18. In a vault, the combination of flanged rails, entering into the construction of the walls and keys disposed between said rails and engaging the under sides of the heads of said rails, said keys having heads complementary to the bases, webs and heads of the rails and shanks extending between said heads, and means through which said shanks bear upon the tops of the heads of said rails, substantially as described.

19. In a vault, the combination of flanged rails, entering into the construction of the walls, and keys disposed between said rails and engaging them, said keys having shanks extending between said heads, hooks on said shanks, and bars supported by the rails and engaged by said hooks, whereby the keys are supported substantially as set forth.

JAMES W. DONNELL.

Witnesses:
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L. M. HOPKINS.