(No Model.) 2 Sheets—Sheet 1.

R. GRAY.

METALLIC COLUMN OR PILE.

No. 520,047. Patented May 22, 1894.

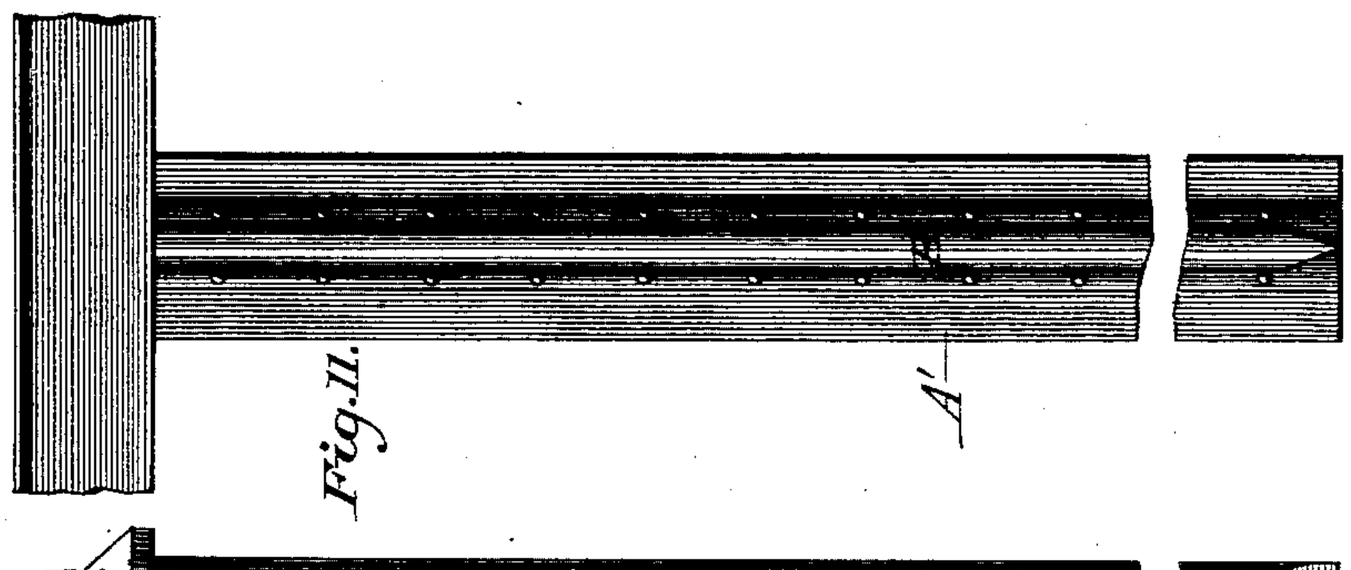
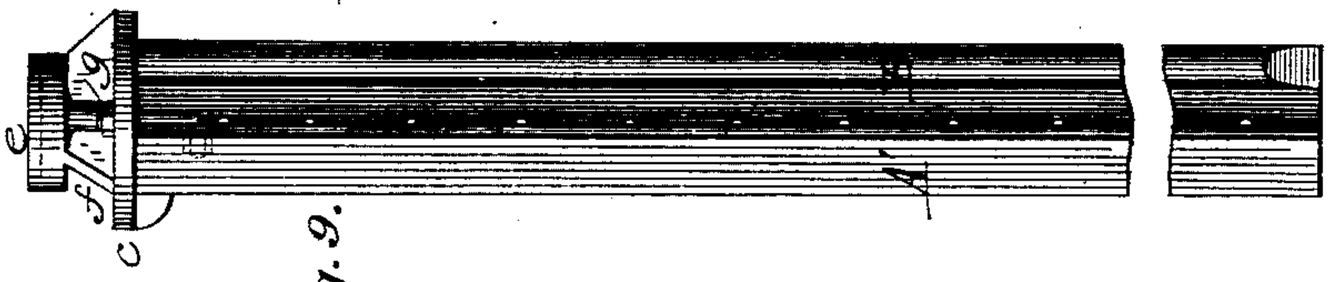


Fig. 11.



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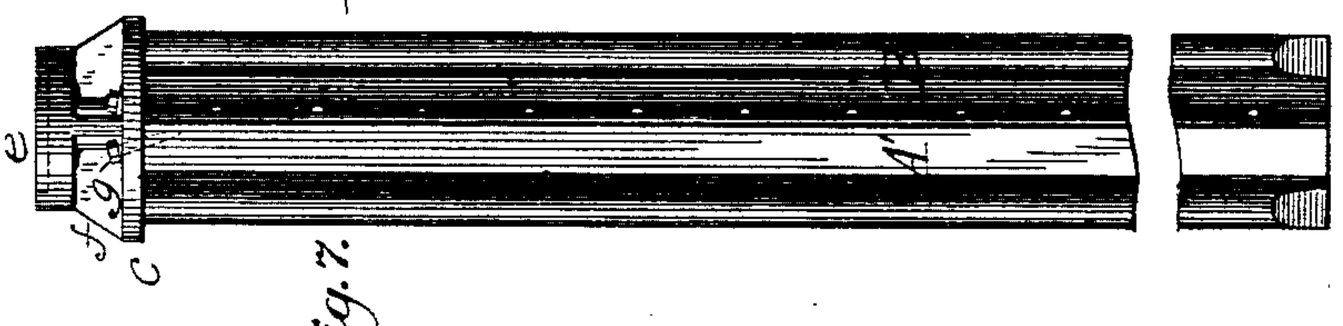

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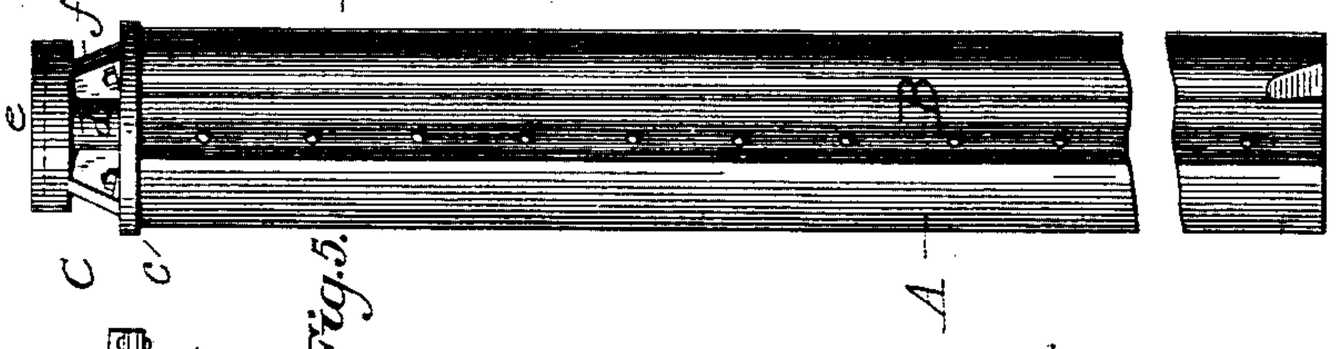

Fig. 5.

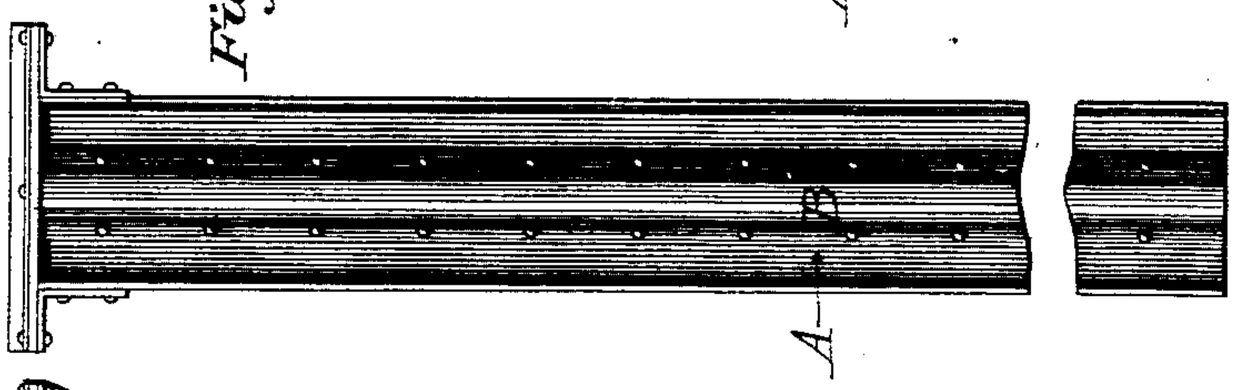

Fig. 3.

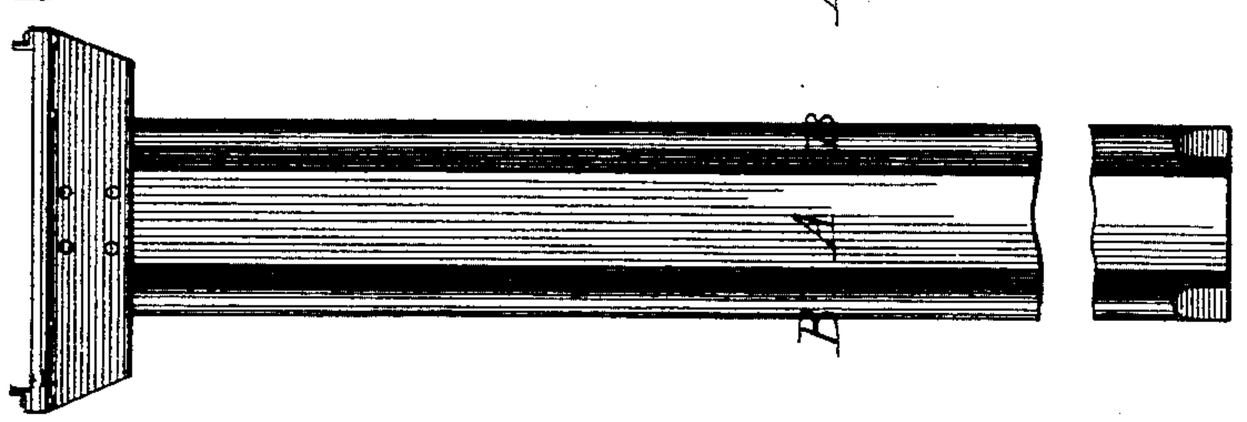

Fig. 1.

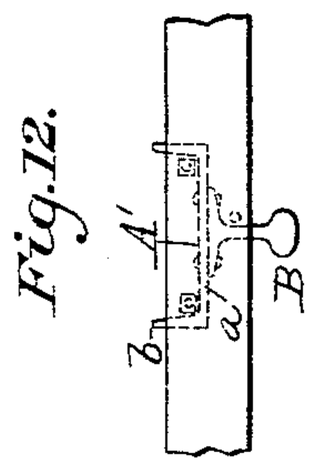

Fig. 12.

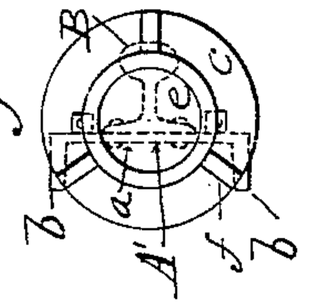

Fig. 10.

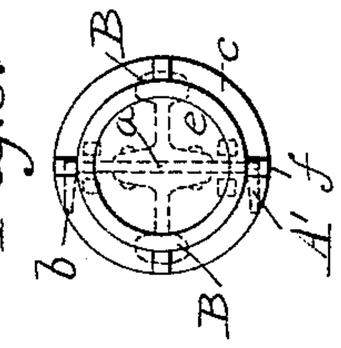

Fig. 8.

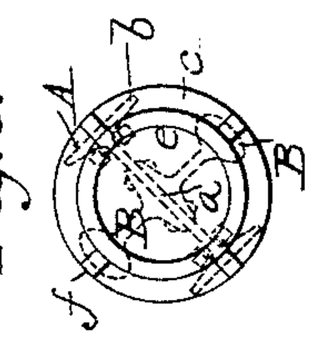

Fig. 6.

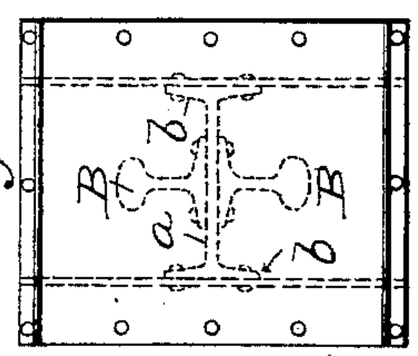

Fig. 4.

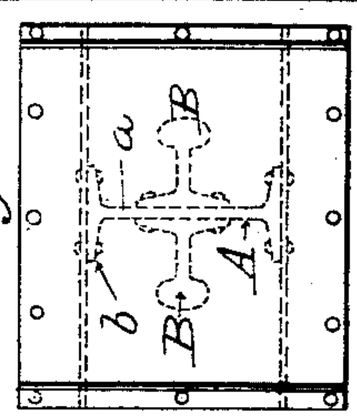

Fig. 2.

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Fig. 13.

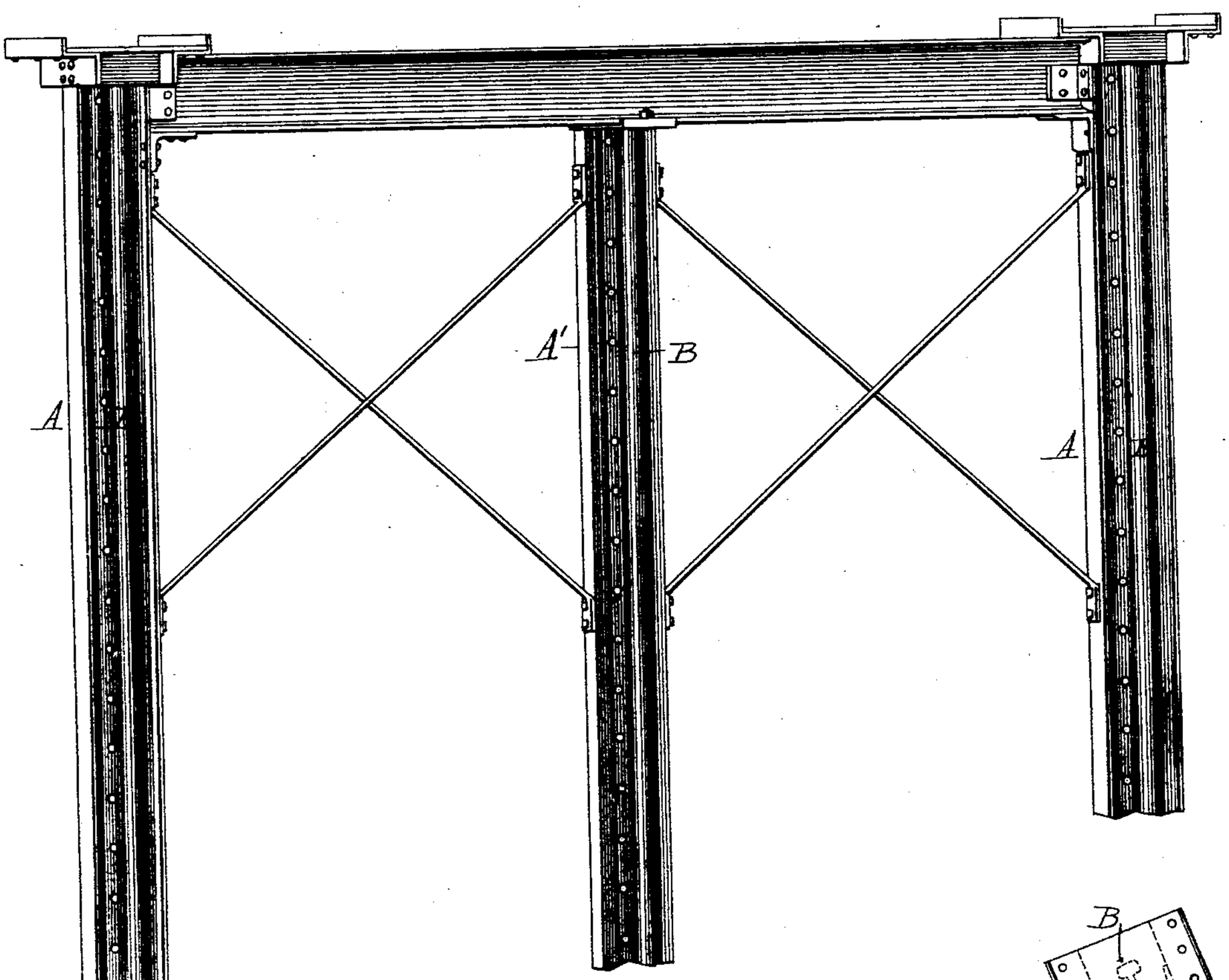
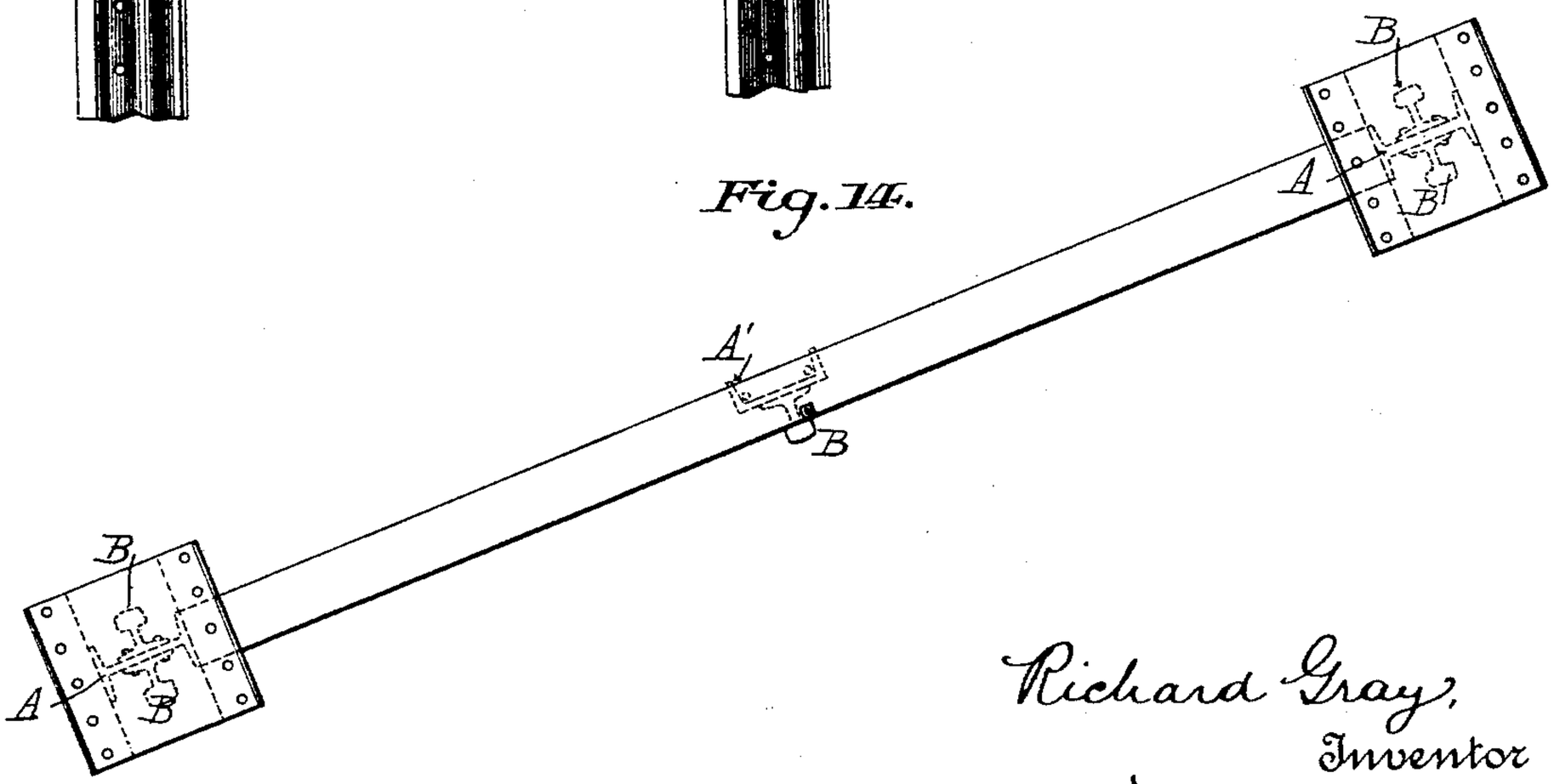


Fig. 14.



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UNITED STATES PATENT OFFICE.

RICHARD GRAY, OF BLOOMINGTON, ILLINOIS.

METALLIC COLUMN OR PILE.

SPECIFICATION forming part of Letters Patent No. 520,047, dated May 22, 1894.

Application filed October 2, 1893. Serial No. 486,981. (No model.)

To all whom it may concern:

Be it known that I, RICHARD GRAY, a citizen of the United States, residing at Bloomington, in the county of McLean and State of Illinois, have invented certain new and useful Improvements in Metallic Columns or Piles, of which the following is a specification.

My invention relates to metallic columns, designed particularly for use as piles, though obviously capable of use in other relations.

Metallic columns have heretofore been made in a variety of forms, but while they have been successfully employed merely as columns, they were unsuited to use as piles for the reason that the latter are not only columns when erected, but are subjected to violent usage during the process of erection. Any column or structure which is designed for use as a pile, must, in order to meet the necessary requirements, be capable of withstanding or resisting shocks, compression, and a shearing, bending or torsional strain, and sometimes tension. All or part of these may occur in any particular case, and as the probability of their occurring cannot be determined in advance, it becomes necessary to be prepared for them in all cases.

To produce a column having the requirements enumerated is the object of the present invention, which consists in the combination with an ordinary railroad rail or T rail, of a plate or bar having auxiliary flanges.

In the drawings,—Figures 1, 3, 5, 7, 9 and 11 are side elevations of different styles of piles or columns constructed in accordance with my invention. Figs. 2, 4, 6, 8, 10 and 12, are, respectively, plan views of the same; Fig. 13, a perspective view of a structure employing piles or columns of my invention; and Fig. 14, a top plan view of the same.

In Figs. 1, 2, 3, 4, 5, and 6 it will be seen that I employ an ordinary I-beam A (having a central web or body *a*, and the auxiliary webs or flanges *b*) and two T-rails B B,—the latter being placed upon opposite faces of the central web *a*, and secured thereto and to each other by means of rivets.

In Figs. 8 to 13 inclusive is shown a beam of substantially [—]-shape in cross section,—a channel beam,—A′, combined, in one instance,—Figs. 7 and 8,—with two T-rails B; and, in two instances, Figs. 9, 10, 11 and 12,—with but one T-rail B,—the said rail or rails B in each case being riveted or similarly secured to the central web or body of the beam.

It will be noticed that whenever the beams are combined with the T-rails, the structure is rendered compact, which results not only in economizing room where the structure is employed in a building in the capacity of a column, but also in increased strength wherever it may be employed. Where the two T-rails are employed, they will project equally from opposite faces of the intermediate beam, which latter will advisably be of a width approximating the distance the T-rails project; or in other words, the form of the column is such that a circle described from the center would touch the outer faces of the beam and rails (see Figs. 2, 4, 6 and 8). Where the single T-rail is employed, this symmetry cannot be preserved, the axis of the column in such cases being without the beam a short distance.

Wherever it is possible so to do, the axis of the column should be placed within the beam, but where this is not convenient it should be placed as near as possible to the beam, in order that the leverage or strain exerted on one member shall not exceed that on the other. This is particularly important in piles, which, in the process of erection, are subjected to shocks from heavy hammers falling a considerable distance, and also meet with obstructions which must be thrust aside or penetrated. When the point encounters an obstruction which is not centrally located with reference to the pile, it gives rise to a violent shearing strain, tending to slide the several members upon each other lengthwise; or in case the hammer does not strike the head squarely the same thing occurs, or the obstruction may be so located as to produce a torsional or twisting strain. Again, by reason of obstructions and other causes, it not infrequently happens that a pile is careened over and leans out of position so that it will not receive the superstructure until straightened or jacked over; but this straightening subjects the pile to a bending strain. Bearing these difficulties in mind, the advantages of using a compact and strong pile will be ap-

parent, for it is clear that the more compact the pile, the less chance of meeting with an obstruction.

In order to facilitate the driving of the pile and to insure its penetrating or severing obstructions without glancing therefrom, the heads of the T-rails, and the lateral flanges or webs of the beams are beveled or sharpened at their lower ends so as to act as a chisel with cutting edges arranged at an angle to each other.

C indicates the removable pile head which is applied to the pile when driving. This head comprises a plate *c* to rest squarely upon the top of the pile, a central post or portion *d* projecting up from the plate *c* and terminating in a second plate *e* smaller than the first, the two plates and the central post or portion being connected by upright wings or flanges *f* as shown in Figs. 5 to 10. When driving the pile, a block of wood is placed upon the head C to prevent injury to the latter or to the hammer. By making the head smaller at the top where it is struck by the hammer, than at the base where it rests upon the pile, the force of the hammer blow is made more central upon the column or pile. This head piece C is held to its place upon the pile by means of bolts *g*, which, after the pile is driven, are removed to permit the removal of the head piece and the application of the bridge seats shown in Figs. 1, 2, 3 and 4.

I am aware of Letters Patent Nos. 164,135, 164,136, and 164,137, to Brown, for bridge girders, and I make no claim to anything therein shown,—those structures being obviously incapable of being forced or driven into the ground as a pile.

Having thus described my invention, what I claim is—

1. A metallic column or pile comprising a flanged beam, and one or more T-rails secured to the body of the beam, all substantially as shown and described.

2. A metallic column or pile comprising a flanged beam, and two T-rails secured to opposite faces of the body or central web of the beam, substantially as shown and described.

3. A metallic column or pile comprising a flanged beam, and two T-rails applied to opposite faces of the body or central web of the beam; and rivets or bolts uniting the rails and beam.

4. A metallic column or pile comprising a flanged beam and one or more T-rails secured thereto; said beam-flanges and rail-heads being beveled or pointed.

In witness whereof I hereunto set my hand in the presence of two witnesses.

RICHARD GRAY.

Witnesses:
WM. L. SHAFFER,
WM. O'CONNELL.