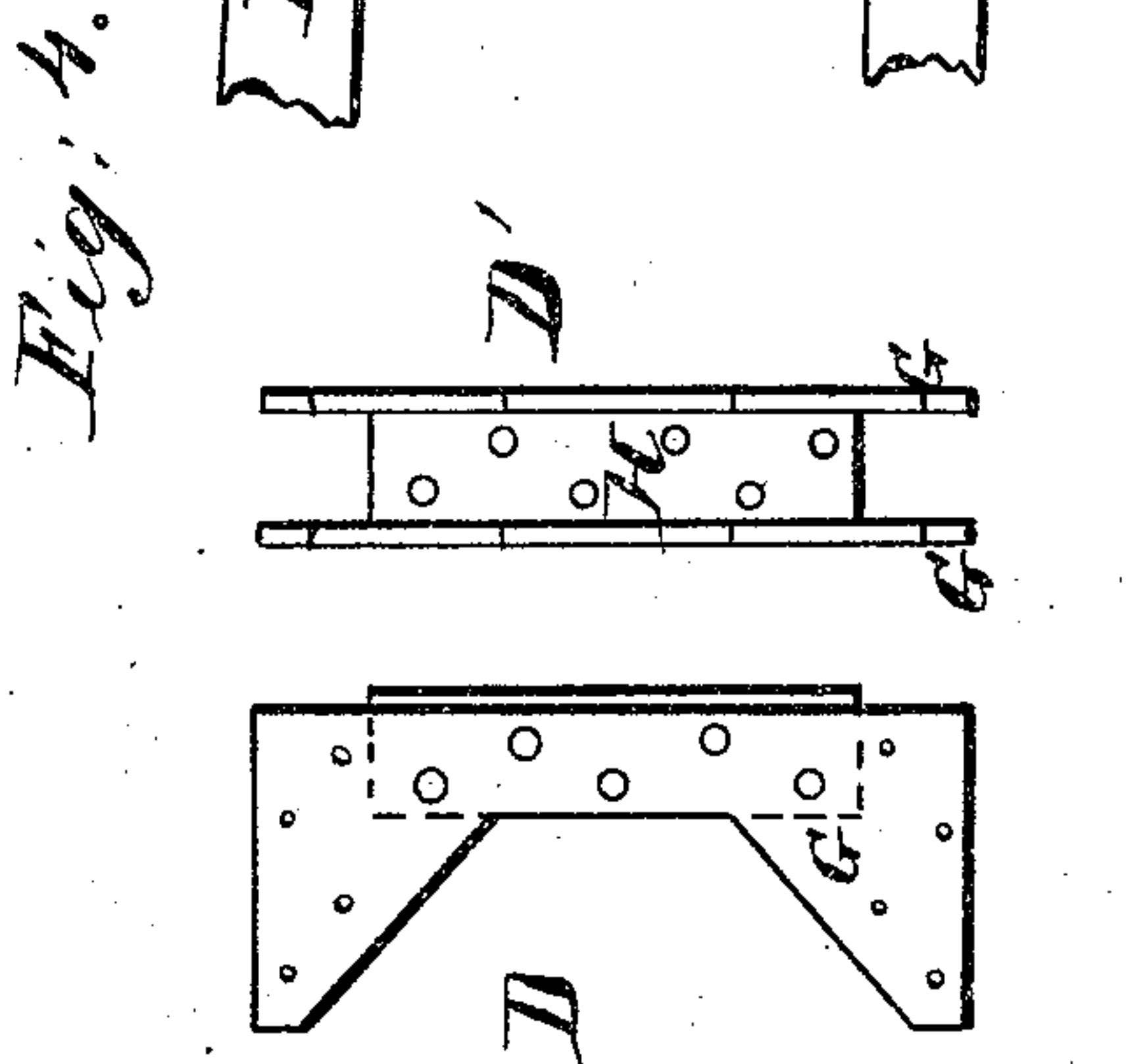
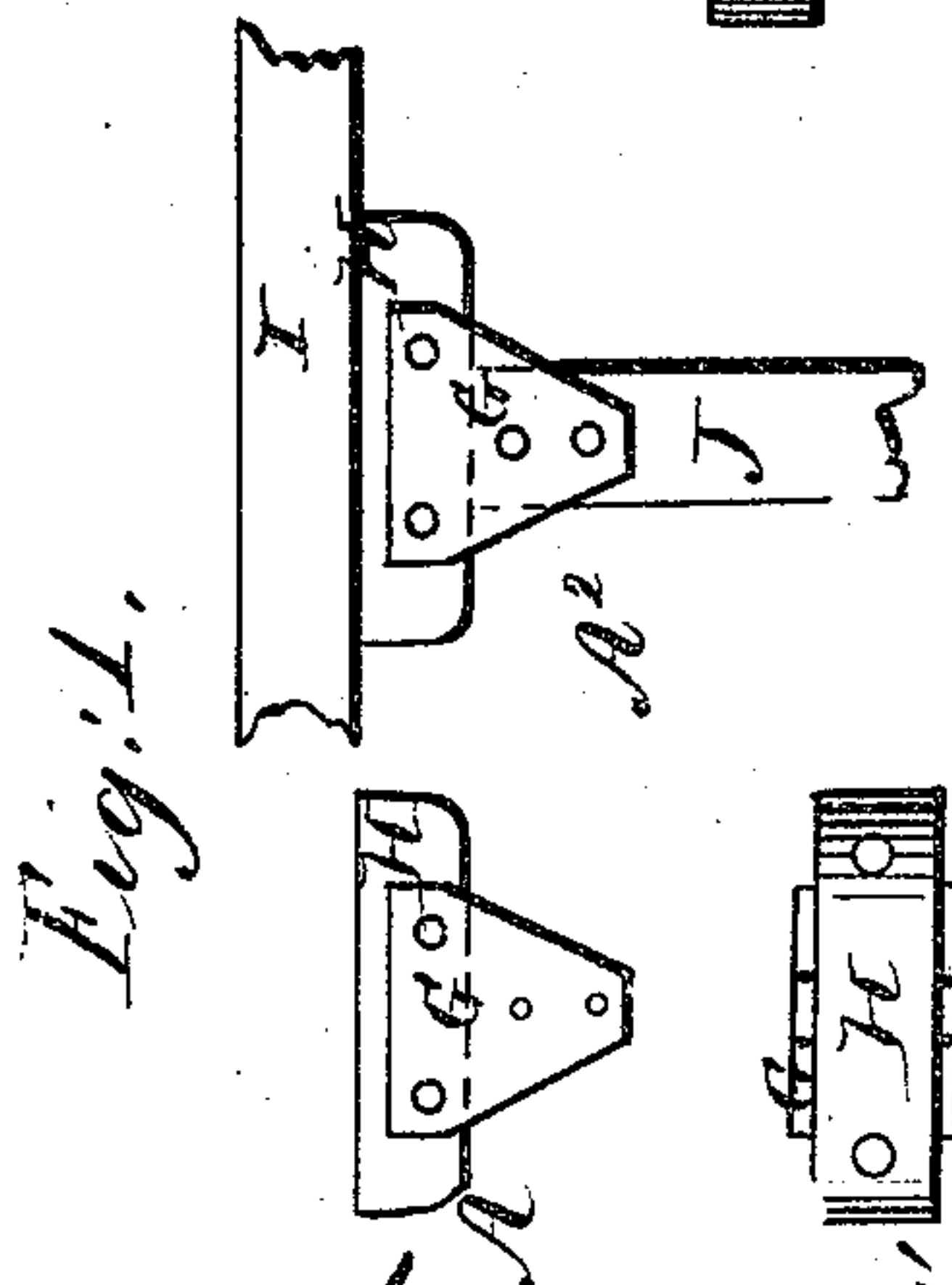
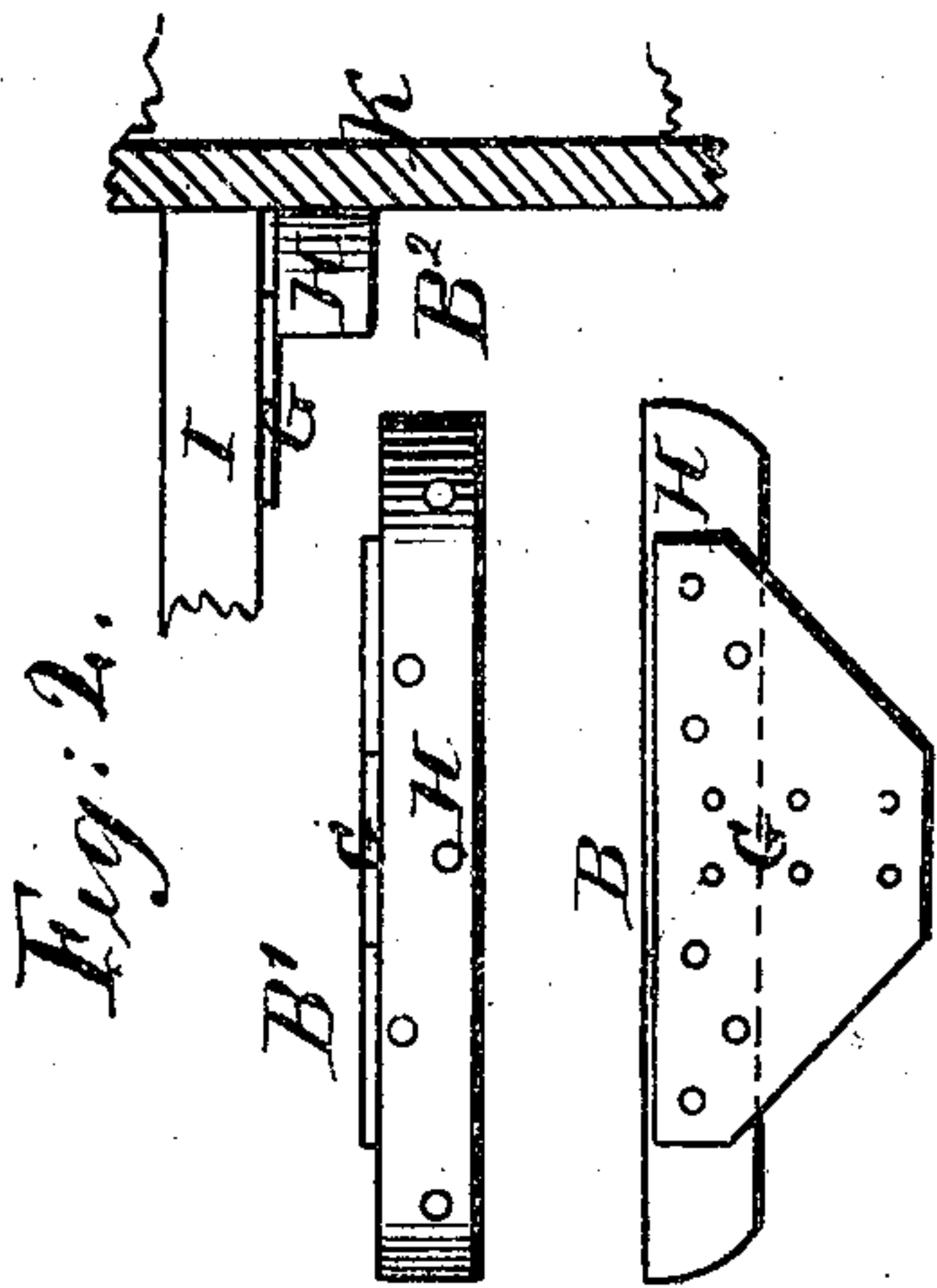
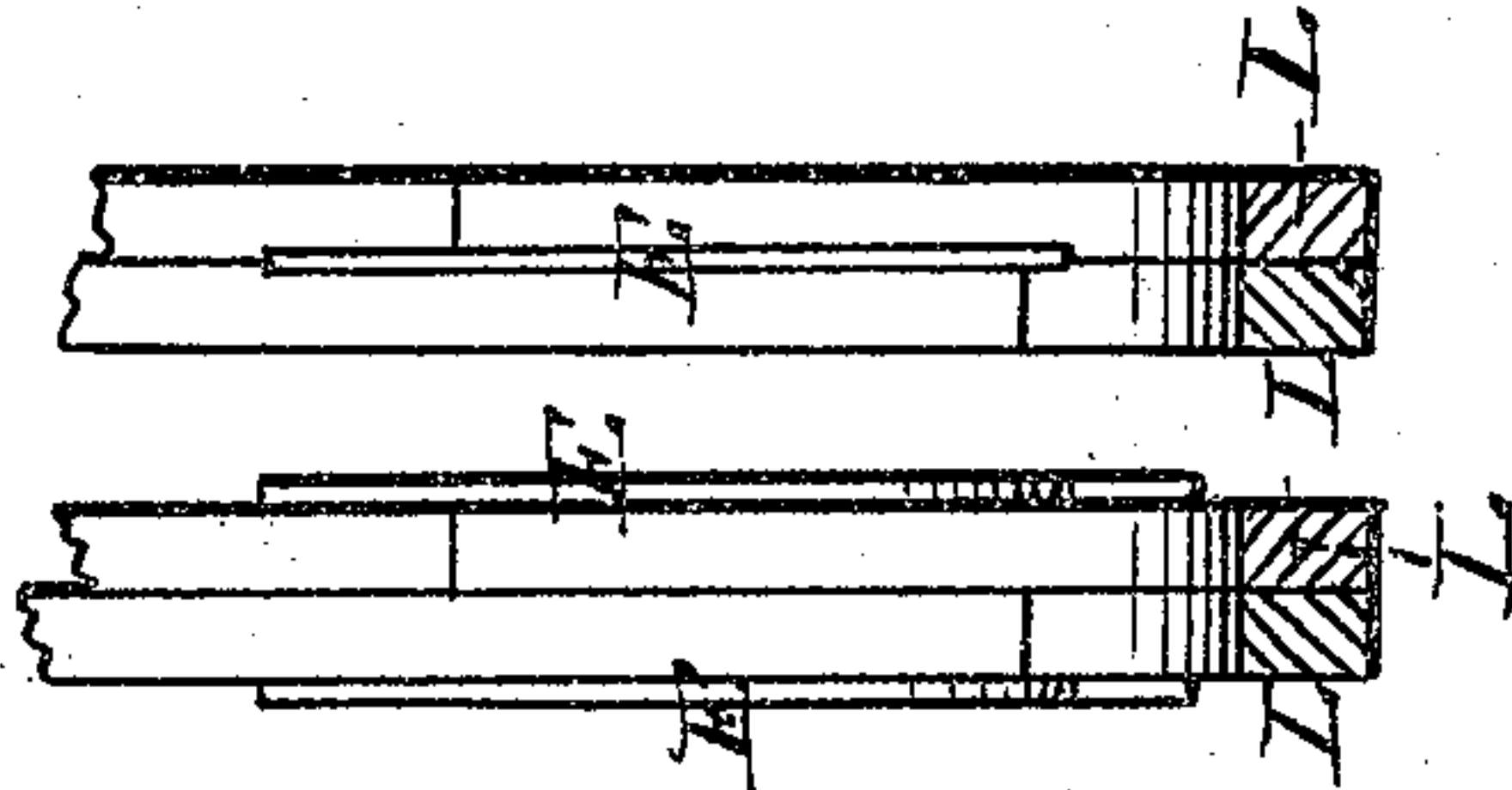
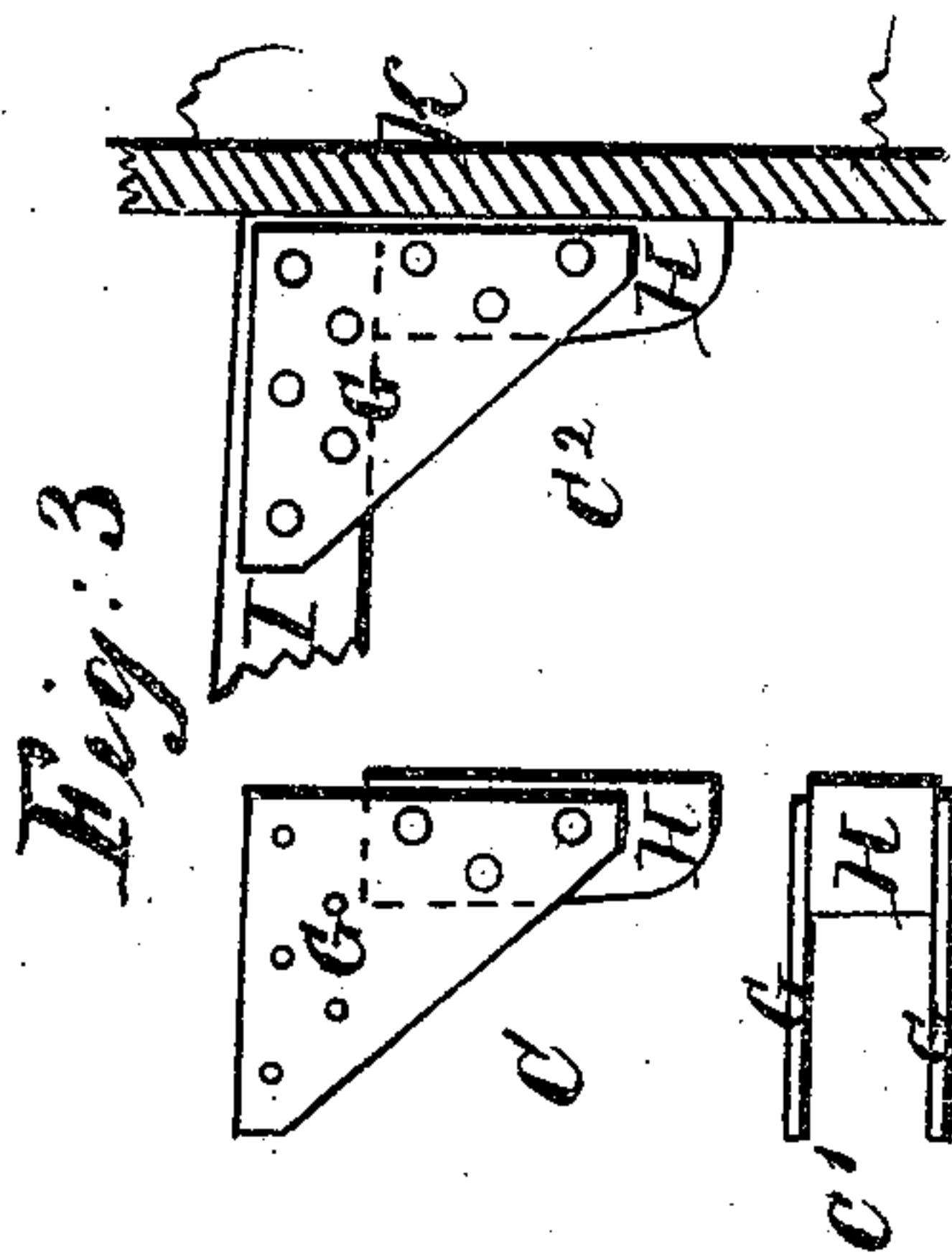


R. Thomas. Building.

N^o 43,611.

Patented Jul. 19, 1864.



Witnesses.
E B Forbush
Geo Wallace

Inventor.
Robt Thomas

UNITED STATES PATENT OFFICE.

ROBERT THOMAS, OF BUFFALO, NEW YORK.

IMPROVED SHIP'S KNEE.

Specification forming part of Letters Patent No. 43,611, dated July 19, 1864.

To all whom it may concern:

Be it known that I, ROBERT THOMAS, now resident of the city of Buffalo, county of Erie, and State of New York, and a native of the Kingdom of Great Britain, have invented a new and Improved Knee Applicable for Ship-Building; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure I: letter A is a plan of one form of knee applicable to stanchions and beams. A' is a front view of the same, and A² shows its attachment to a stanchion and beam.

Fig. II is another form applicable for strengthening the connection of the beam with the side of the vessel. B is a plan of the same; B', a front view, and B² shows its connection to a beam and the side of the vessel.

Fig. III shows the same principle applied in another form for strengthening the connection of the beams to the sides of the vessel. C is a side plan view; C', is a top plan view, and C² shows its connection to the beam and side of the vessel.

Fig. IV represents the same principle applied in the form of a double knee for securing the upper and lower deck beams to the sides of the vessel, D being a side view, D' a front view, and D² shows its connection to the upper and lower deck beams and to the side of the vessel.

Fig. V shows my method of extending the principle of the knee to strengthening the bilge-timbers or "foot-hooks" by curved pieces of plate iron. E represents a curved piece cut from boiler-plate iron and its application on each side of the bilge-timber, and also the insertion of one of these pieces in the center of the bilge-timber.

The nature of this invention relates to making a knee for ship-building of iron plates cut in the proper form from boiler-plate iron and bolted to a wood chock. This plan forms a knee of much greater strength and at less expense than the ordinary kind made wholly of wood or iron.

Letters of like name and kind refer to like parts in each of the figures.

G, Figs. I and III, represents a piece of iron which is cut in the proper form from a plate

of boiler-iron or other plate-iron of equal strength, and hence needs no forging or flanges. This piece is riveted or strongly bolted to an oak or other hard wood chock, H, one piece of iron upon each side of the chock, the bolts pass through each piece of iron and the chock, thus forming a knee of great strength. or one plate of iron may be used for small vessels. Wherever the knee is used in the vessel the chock is firmly bolted to that part of the vessel where used. When used for securing a post or stanchion, the chock is bolted to the beams of the vessel, as shown at I, Fig. I, the lower one being bolted to the keelson and the projecting part of the iron is bolted to the posts or stanchions, as shown at J. When used for securing a beam, the chock is bolted to the side of the vessel, as shown at K, Fig. III, and the projecting part of the iron is bolted to the beam. When one piece of iron only is used with the chock, then the chock is bolted to the side of the vessel, and the projecting part of the iron is bolted to the under side of the beam, as shown in Fig. II, and in some cases it may be used advantageously on the upper side of the beam. When a double or standard knee is used, then the projecting parts of the iron is bolted both to the upper and lower deck beams, as shown in Fig. V. Thus it will be seen that I have devised a knee which may be used for securing beams and stanchions or in any part of the ship where a knee is required.

I propose to strengthen the bilge-timbers or foot-hooks by the use of the two curved pieces of plate iron, one on each side of the frame, and well bolted to the same, the same bolts passing through both plates, the plates to be long enough to get two bolts in the head of the floor-timbers, and two in the head of the top timbers, and the breadth of the plate to be somewhat less than the molding of the foot-hooks, so as not to interfere with dubbing or planking. In small vessels one plate inserted between the foot-hooks of each frame would be sufficient, as shown at Fig. V. These knees can be used either perpendicularly or horizontally, as shown. When used horizontally, it will add to the strength of the vessel if the chock be continued in one piece in the manner of a stringer or shelf-piece. In securing stanchions it is also better to make

the chocks in continuous pieces, the lower ones being bolted to the keelson and the upper ones to the beams.

G H represent my improved knee; I, deck-beam; I², lower deck-beam; J, post or stanchion; K, side of the vessel; L, bilge-timbers or foot-hooks.

I do not claim strengthening ship-timbers by the application and use of iron plates on either side thereof. Neither do I claim the invention of a ship-knee made wholly of iron, nor a ship-knee made wholly of wood; but

What I do claim, and desire to secure by Letters Patent, is—

A ship-knee made partly of wood, as represented by the chock H, and partly of iron, as represented by the iron plate piece G, as a distinct construction, substantially as set forth.

ROBT. THOMAS.

Witnesses:

GEO. W. WALLACE,
E. B. FORBUSH.