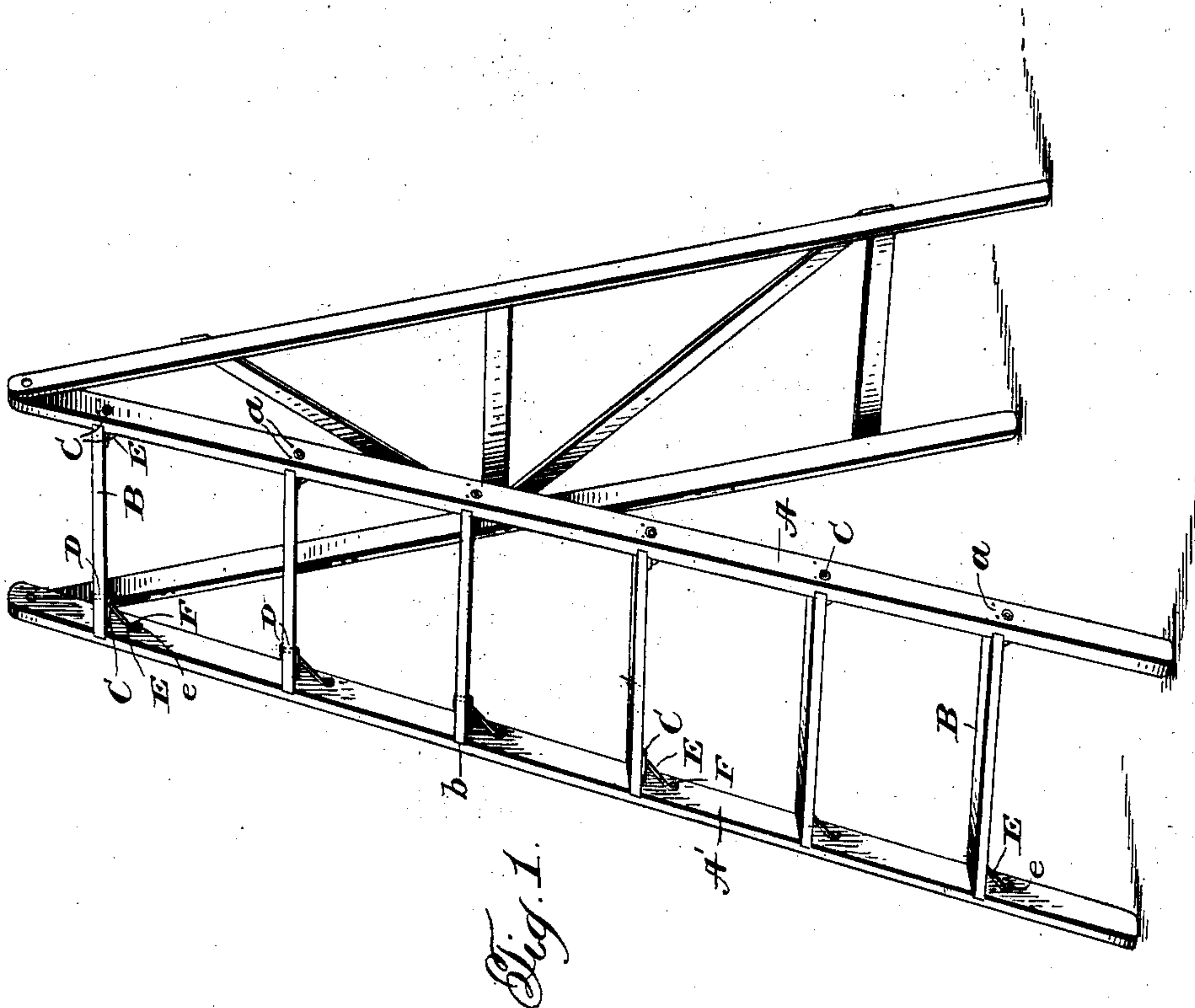
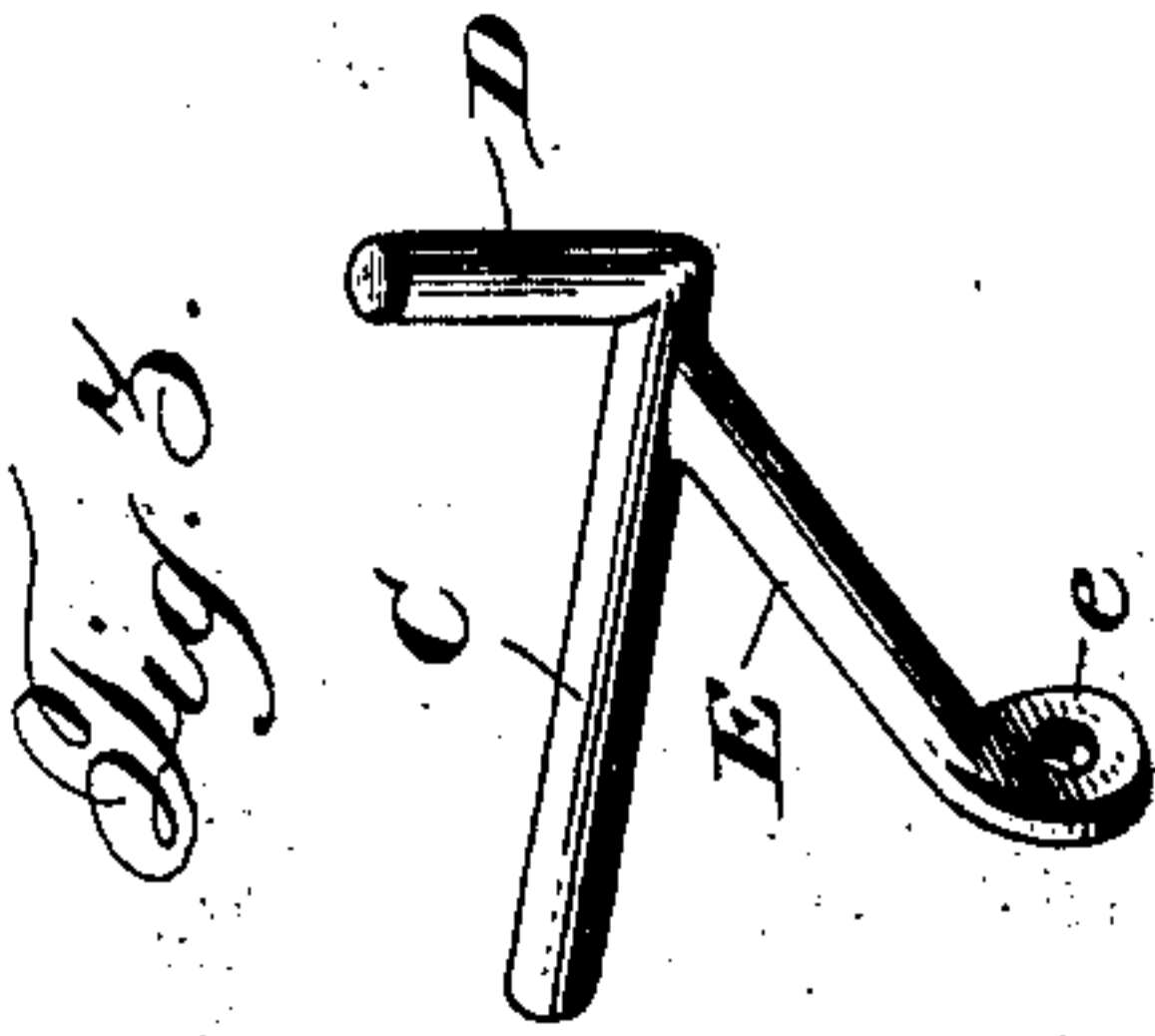
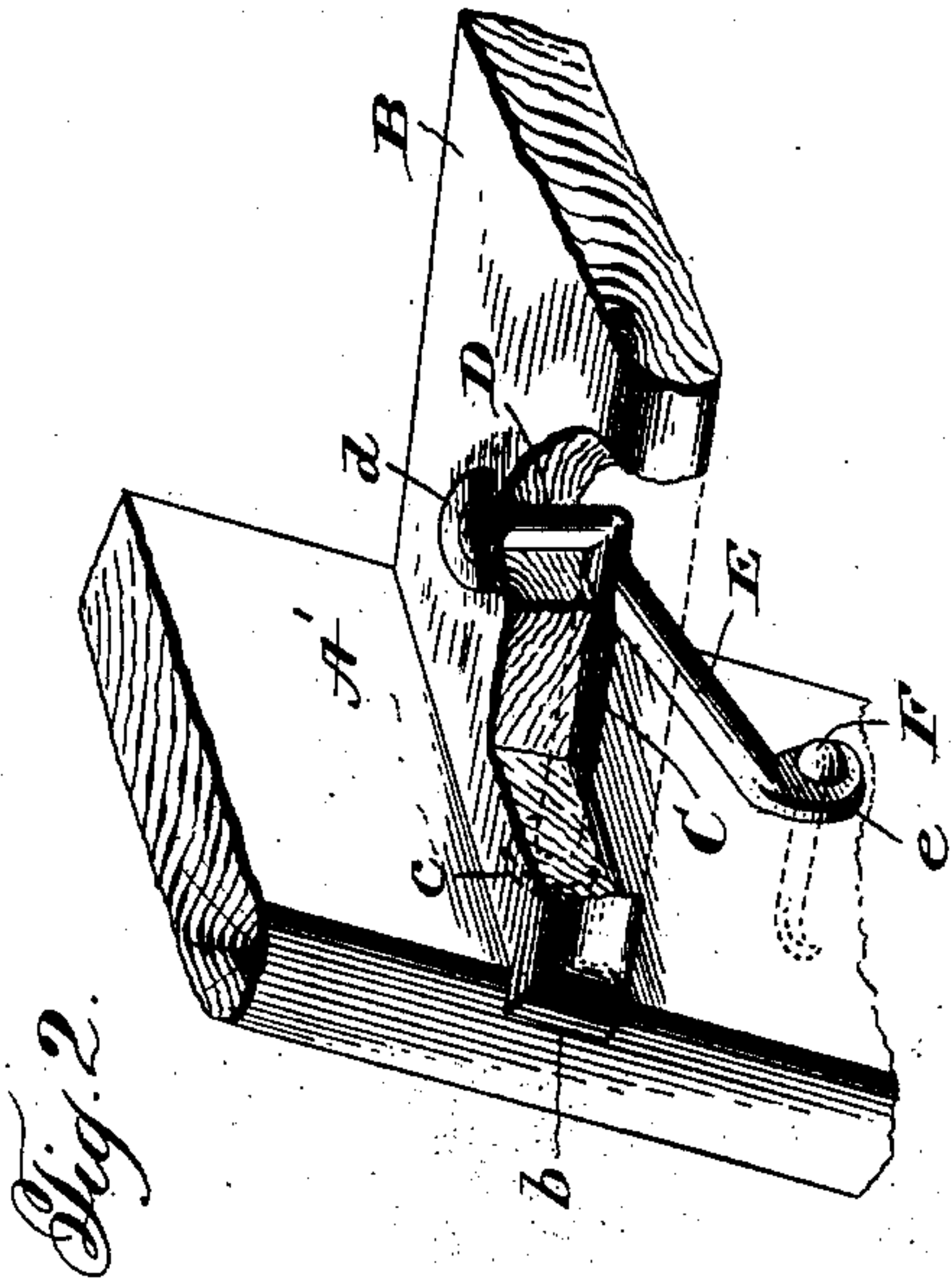


No. 827,047.

PATENTED JULY 24, 1906.

J. S. TILLEY.
STEP LADDER AND PARTS THEREOF.
APPLICATION FILED JAN. 13, 1906.



Witnesses:

James Hutchinson.
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UNITED STATES PATENT OFFICE.

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STEP-LADDER AND PARTS THEREOF.

No. 827,047.

Specification of Letters Patent.

Patented July 24, 1906.

Application filed January 13, 1906. Serial No. 295,927.

To all whom it may concern:

Be it known that I, JOHN S. TILLEY, a citizen of the United States, residing at Watervliet, in the county of Albany and State of New York, have invented certain new and useful Improvements in Step-Ladders and Parts Thereof, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to improvements in step-ladders and parts thereof, and has for its object the provision of improved braces or knees adapted to help in supporting the steps between the sides of the ladder and for rigidly fastening and bracing said steps and sides at their points of juncture.

A convenient embodiment of the invention comprises an integral bracket or knee having a horizontal part adapted to underlie the step of the ladder and pass through the side thereof, an upwardly-projecting part adapted to pass through said step, and a brace extending in an approximately diagonal direction from the inner end of said horizontal or underlying part down to the inner face of the side of the ladder and terminating at a point occupying a plane intersecting the horizontal part intermediate the ends of the latter. This embodiment of the invention is illustrated in the accompanying drawings, forming part hereof, and the novel details in the construction and arrangements of the several parts thereof will be apparent from an inspection of said drawings, in connection with the detailed description hereinafter contained.

In the drawings, Figure 1 is a perspective view of the ladder. Fig. 2 is an enlarged detail perspective view, parts being broken away to show the manner of applying the knee or brace; and Fig. 3 is a detail perspective view of the brace unattached.

Referring more specifically to the drawings, wherein like reference characters designate corresponding parts in the several views, A, A' represent the side bars of the ladder, which may be of any approved type, and B the steps thereof seated at their ends in suitable grooves *b* in the inner faces of the ladder sides, suitable nails or other fastening devices *a* passing through said sides and into the steps to secure them together.

Beneath each of the steps and at each end thereof I provide one of my improved knees or brackets, the latter comprising a horizontally-disposed part C, adapted to underlie

and support the step, said part being of sufficient length to pass through the side of the ladder and be riveted at the outer face thereof upon a washer *c*, an approximately vertically-disposed part D at the inner end of the part C, adapted to project upwardly through the step B and similarly riveted at the top of the step upon a washer *d*, and a diagonally-disposed downwardly and outwardly projecting brace E, arranged to project from a point near the inner end of the horizontal part C, but preferably not directly beneath the vertical extension D, to the inner face of the side A of the ladder or a point occupying a plane intersecting the horizontal part C intermediate the ends of the latter, the lower extremity of this brace E being offset and perforated to form a foot *e* for the reception of a secured nail or screw F, passed therethrough and embedded in the side A. This brace not only serves as an additional tie between the step and side bar and brace for supporting the step, but also effectually prevents any lateral play or rocking of the horizontal and vertical parts C and D in any direction, the tendency of which is to loosen the riveted ends thereof.

By placing the diagonal brace slightly back from the step part D a suitable support can be placed below the end to enable the upper end of the part D to be riveted over. It will also be noticed that in the construction the inner end of the part C, which constitutes a shoulder, serves as a point upon which to rest the knee when the outer end of the part C is being riveted over. It is essential that in making the connections between the sides and steps of a ladder the joint should be made very tight and one which would not have a tendency to become loosened. By the riveting method as described this tight joint is readily effected. In connecting the lower end of the members E to the side of the ladder it will be noticed that as the fastener F is passed transversely through the side A' of the ladder the tendency will be to draw the end of the brace close onto the ladder side, thus serving to bind the parts all firmly together. This is an important characteristic of the invention.

What I claim is—

1. A knee for ladders comprising a horizontal supporting part having an upwardly-projecting part designed to be secured to the step of the ladder, and a diagonal brace on the horizontal part connected thereto at a

point laterally to one side of the plane of the vertical part.

2. In a ladder, the combination with sides and steps, of a knee comprising a horizontal supporting part having its outer end secured to the side, an upwardly-extending part at its end secured in the step, a diagonal brace secured to and extending from a point back from the end of the horizontal part, and means for securing the lower end of the brace to the side of the ladder.

3. In a step-ladder, the combination with the side and step, of a knee comprising a horizontal part having its end passing through and riveted at the outer face of the side of the ladder, a vertical part on the horizontal part extending through the step and having its upper end riveted, and a diagonal brace secured to the horizontal part on a plane at one side of the vertical part and having a fastening means at its lower end for securing the same to the side of the ladder.

4. In a step-ladder, the combination with the side and step, of a knee comprising a hori-

zontal supporting part passing through the side and there secured, of an upwardly-extending part on the knee passing through the step and there secured, and a diagonal brace extending from the horizontal part toward the side and having means at its lower end for drawing it transversely toward and securing it to the side of the ladder.

5. In a ladder, the combination with a side, and step, of a knee comprising a horizontal supporting part having its outer end passing into and secured to the side and having a shouldered inner end, of a vertically-extending securing part on the horizontal part, an inclined brace on the horizontal part extending toward the side, and means for securing the lower end of the brace fixedly to the side.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN S. TILLEY.

Witnesses:

THOS. R. HEATH,
JOS. H. MILANS.