(No Model.) 2 Sheets—Sheet 1.

J. C. GARDNER.

STEP LADDER.

No. 448,648. Patented Mar. 24, 1891.

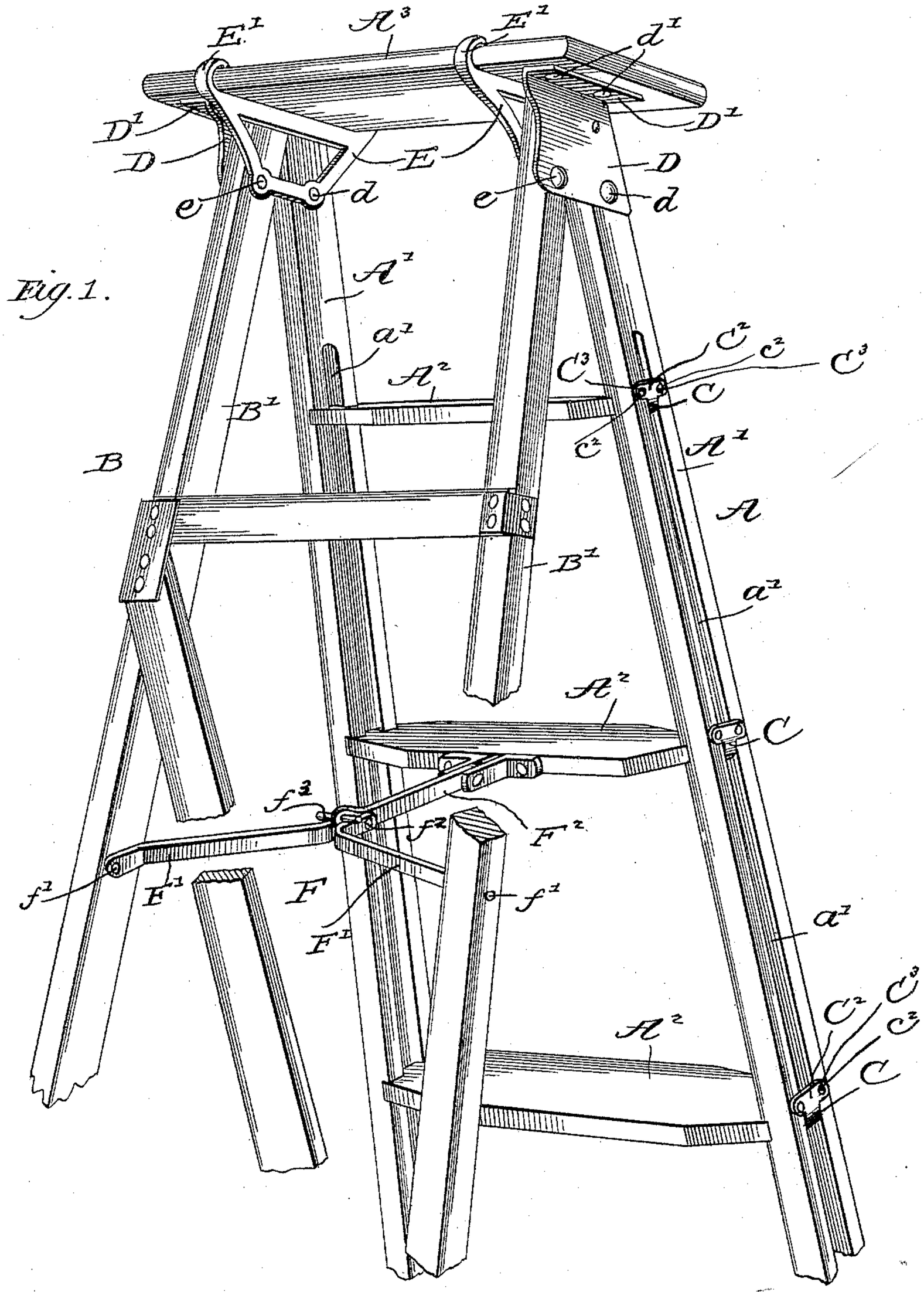

Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

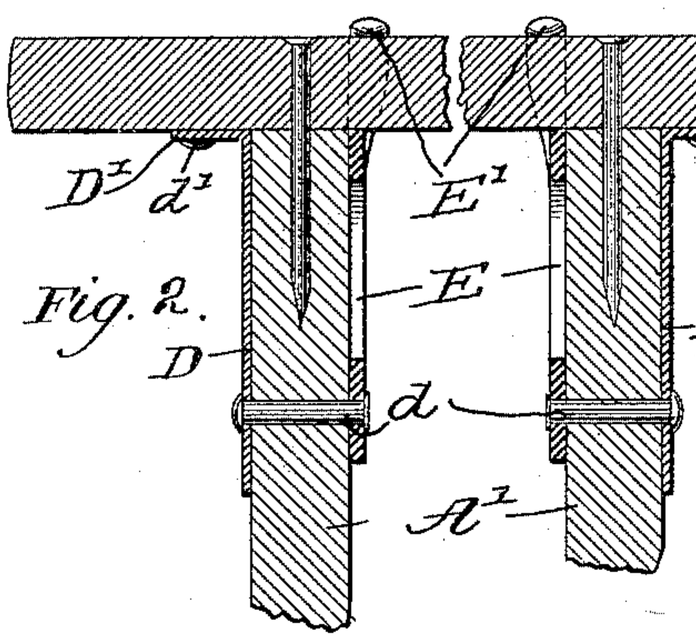


Fig. 3.

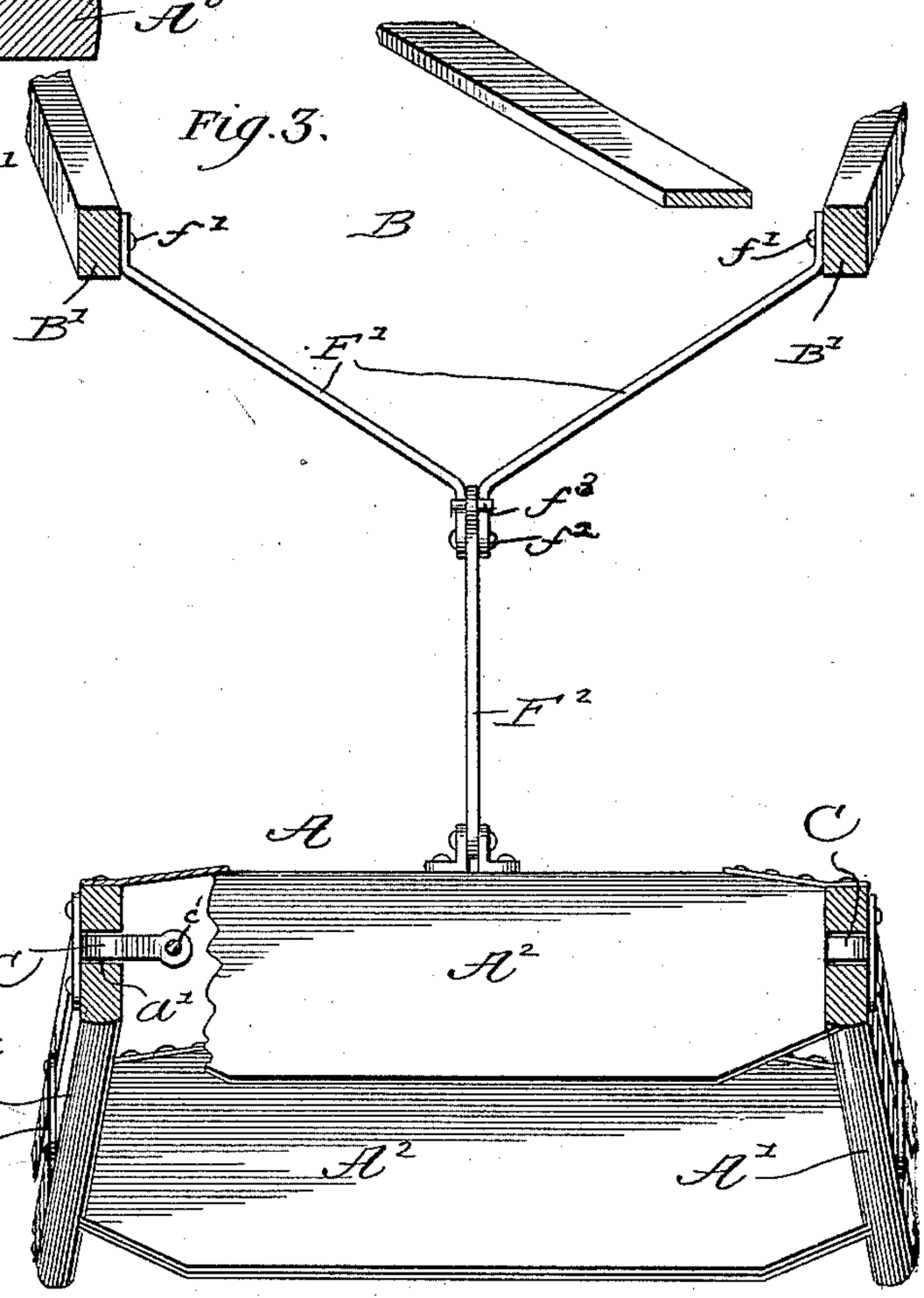


Fig. 4.

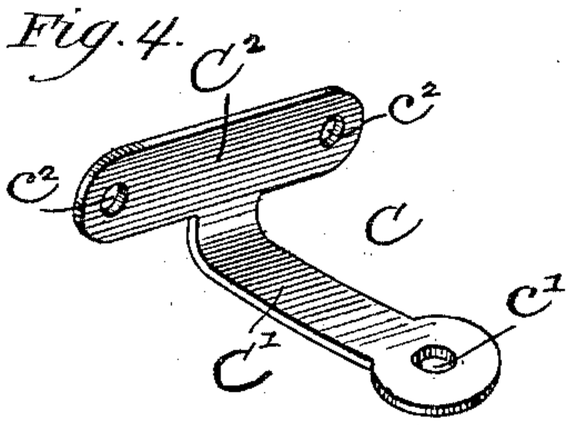
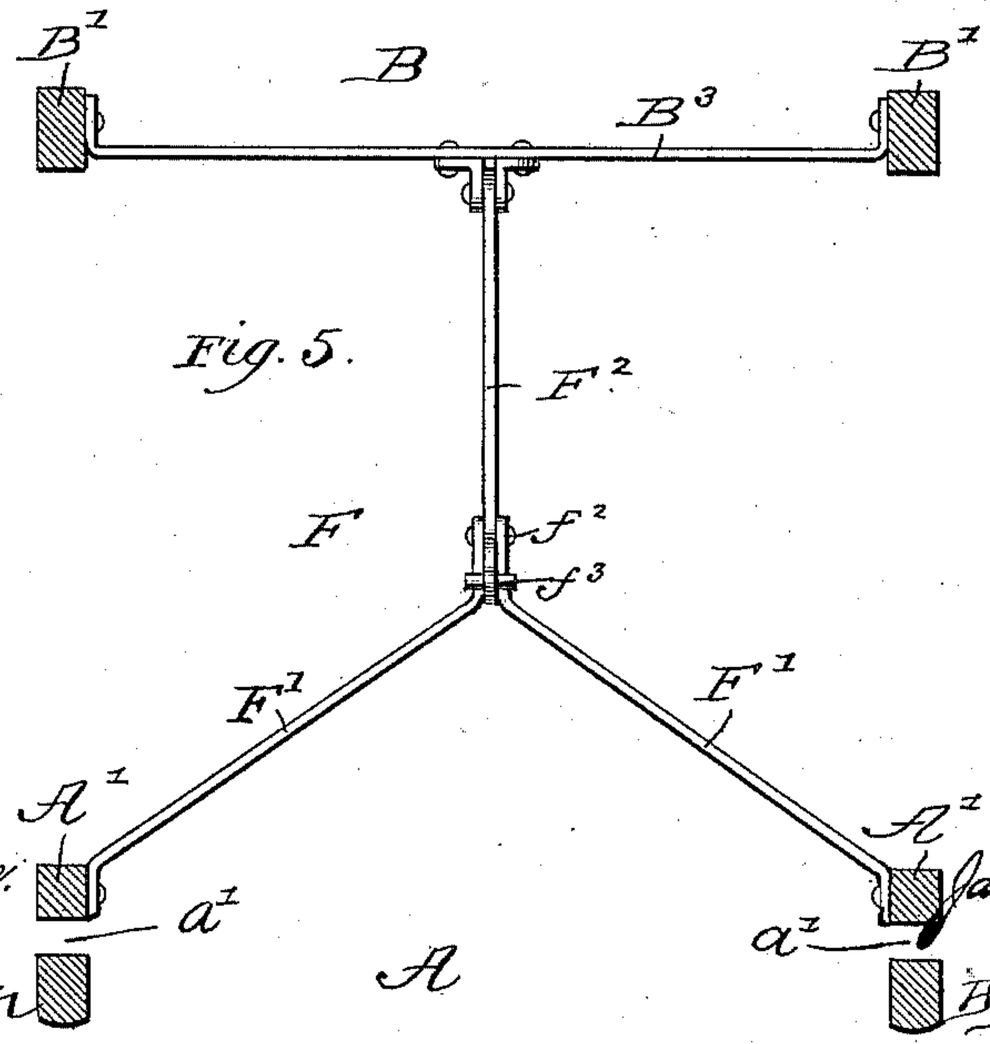


Fig. 5.



Witnesses:
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UNITED STATES PATENT OFFICE.

JAMES C. GARDNER, OF CHICAGO, ILLINOIS.

STEP-LADDER.

SPECIFICATION forming part of Letters Patent No. 448,648, dated March 24, 1891.

Application filed April 7, 1890. Serial No. 346,815. (No model.)

To all whom it may concern:

Be it known that I, JAMES C. GARDNER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Step-Ladders; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My improvement relates to means for joining the top step of a step-ladder with the body and support of the ladder to a folding brace for connecting the body and support of the ladder, and to an improved anchor for securing the ends of the step to the side rail of the ladder.

In the accompanying drawings, Figure 1 is an oblique rear perspective. Fig. 2 is a detail view of the plates for binding together the top step, the body, and the support of the ladder. Fig. 3 is a horizontal section above the folding brace, one end of the step below the section being broken away to show the anchor used in joining said step to the adjacent side rails. Fig. 4 is a detail of the anchor. Fig. 5 is a plan of a modified application of the folding brace.

A is the body of the ladder. This comprises the side rails A′ and steps A^2.

A^3 is the top step. The side rails A′ have the longitudinal slot a'.

At the meeting of each step A^2 with the side rail A′ there is an anchor C. Said anchor is made of sheet metal stamped into the form of the letter T and having the stem C′ at right angles and applied through the slot a' flatwise against the bottom of the step A^2 and secured thereto by a nail c, driven through a hole c' in said stem. The head C^2 of said anchor is applied flatwise to the outer face of the side rail A′ opposite the end of said step, and has at each end a hole c^2, through each of which is driven a long nail C^3. Anchors resembling these have heretofore been made by casting; but it has been necessary to cast them with only the holes in either the stem or the head and drill the others. This has been so expensive as to be objectionable. The sheet metal can be stamped with all the holes in a die for an extremely-low price.

D D are plates applied to the outer side of the ladder A and support B and having at their upper portion the horizontal flange D′, applied to the bottom of the top step A^3, and secured thereto by nails or screws d'.

E E are malleable irons applied to the inner faces of the side rails B′ of the support B and resting against the lower face of the top step A^3. A bolt or rivet d extends through each plate D, adjacent side rail A′, and iron E, and a rivet or bolt e extends through each plate D, adjacent rail B′, and iron E. Said rivets or bolts form the hinge between the ladder A and the support B. At each upper corner of the plate E a prong E′ extends upward around the end of the top step A^3. In casting, said prongs are spread farther than the width of the top step, and when the latter is put into place said prongs are bent over against the edges of said step, so as to firmly bind the latter. The positions of the plates D and E may be interchanged without changing their function. By the manner of combining these several parts they are very firmly secured and the construction is very cheap.

F is the folding brace joining the body A to the support B. The purpose of said brace is to keep the ladder from spreading. Said brace consists of two strap-metal arms F′, each secured by one end to the inner face of one of the side rails B′ of the support B by means of a screw or nail f' and approaching each other at their other ends, and having such ends bent parallel to a plane at right angles to the steps A^2 and parallel to the side rails A.

F^2 is an arm hinged by one end to the adjacent step A^2 and having the other end extending between the meeting ends of the arms F′ F′ and secured thereto by a rivet f^2, extending horizontally through said three arms and forming a hinge-joint between the two members, consisting on the one hand of the two arms F′ and on the other hand of the arm F^2. When the ladder is to be folded, the meeting ends of said arms are raised higher and higher as the ladder A and support B are

brought toward each other until the ladder is quite folded. On again extending the ladder the meeting ends of said arms are drawn downward until the brace is again in its horizontal position and the ladder A and support B have separated to the farthest limit. The arm F^2 extends a short distance beyond the rivet f^2 and is there turned up above the adjacent edges of the arms F′, and such upturned end supports a lug f^3. The latter is preferably a pin extending transversely through said end above the arms F′. When the brace is being extended, said lug or lugs descend into contact with the arms F′ and prevent said arms from settling below the horizontal position. It is to be observed that the arms F′ are continuous and not notched or cut to receive the lug f^2; but the latter merely rests upon the upper edge of said arms. The brace F may be reversed, the arms F′ F′ being secured to the side rails of the ladder A and the arm F^2 secured to a cross-piece B^3, secured to the support B. (See Fig. 5.) The arms of said brace are preferably cut of flat strap-iron and bent into the desired form. This makes a cheap as well as a strong construction.

It is to be observed that in the manufacture of step-ladders any feature tending to cheapen the cost of construction without reducing quality is of material importance.

The brace F may be used in the combination, with other devices embodying two members hinged to each other in such manner as to be folded, as described, of the two members A and B of the step-ladder.

I claim as my invention—

1. The combination, with the ladder A and support B, having respectively the side rails A′ and B′, of a top step A^3, parts D, applied against the sides of said side rails, and having the horizontal portion D′ secured to the lower face of the top step and irons E applied against the sides of said side rails opposite the parts D, and having prongs E′ engaging the edges of the top step, and rivets securing said parts D and irons E to the side rails A′, and rivets or bolts *e*, extending through said parts D, side rails B′, and irons E, substantially as shown and described.

2. The combination, with the members A and B, hinged to each other substantially as set forth, of a folding brace consisting of two arms F′ F′, each hinged by one end to one of said members, and an arm F^2, hinged to the other of said members by one end and having the other end extending between the ends of the arms F′ and hinged thereto, said arm F^2 extending beyond said hinge and being there upturned, and said upturned end supporting a laterally-directed lug or lugs above the upper edge of the arms F′, substantially as shown and described.

3. The combination, with the members A and B, hinged to each other substantially as set forth, of a folding brace consisting of two arms F′ F′, each hinged by one end to one of said members, and an arm F^2, hinged to the other of said members by one end and having the other end extending between the ends of the arms F′ and hinged thereto, said arm F^2 extending beyond said hinge and being there upturned, and a pin f^3, extending through said upturned end above the upper edge of the arms F′, substantially as shown and described.

In testimony whereof I affix my signature, in presence of two witnesses, this 4th day of April, 1890.

JAMES C. GARDNER.

Witnesses:
CYRUS KEHR,
AMBROSE RISDON.