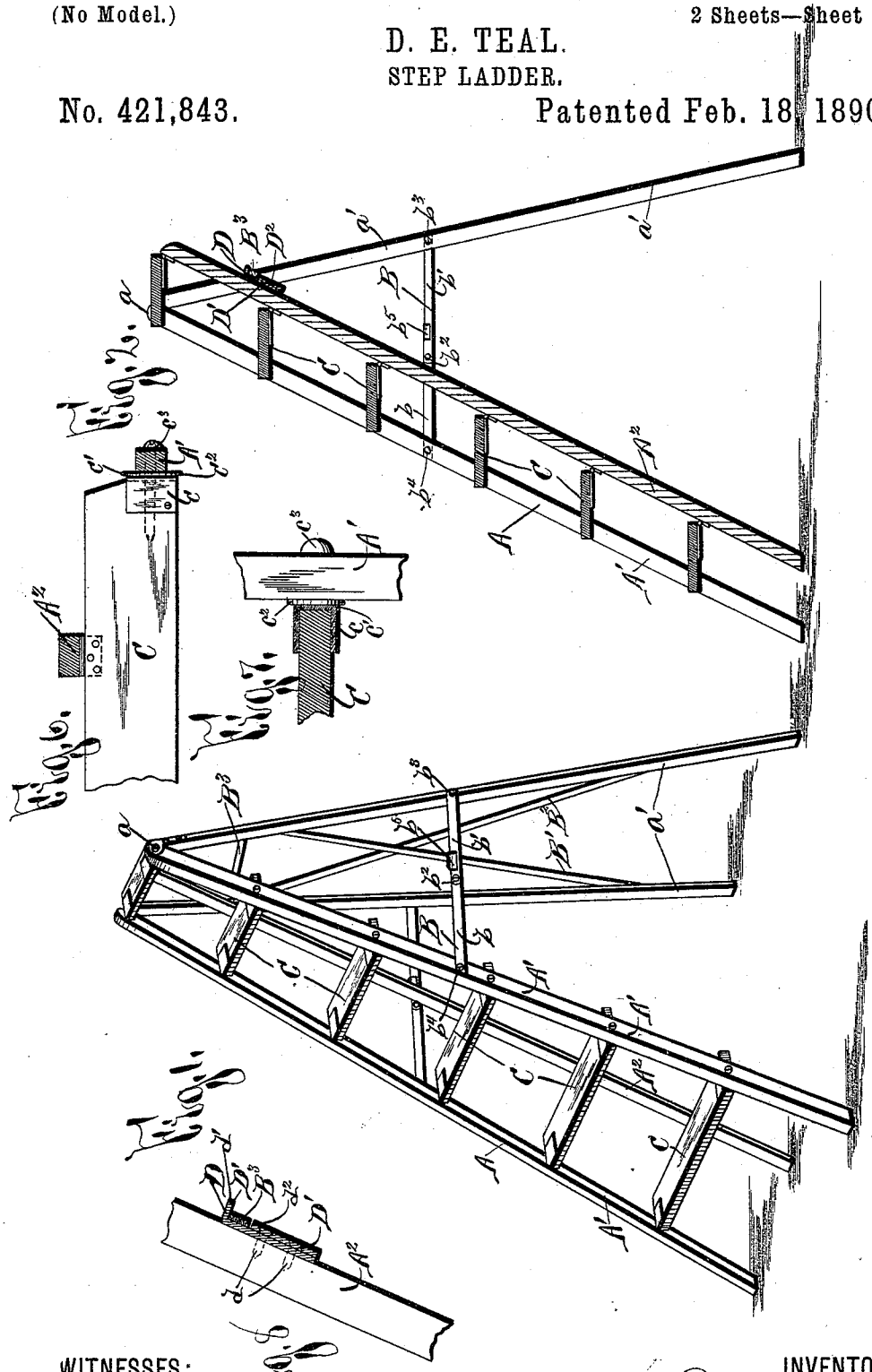
(No Model.) 2 Sheets—Sheet 1.

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STEP LADDER.

No. 421,843. Patented Feb. 18, 1890.



WITNESSES:

H. E. Chase

H. C. Parsonnes

INVENTOR

Daniel Easton Teal

BY

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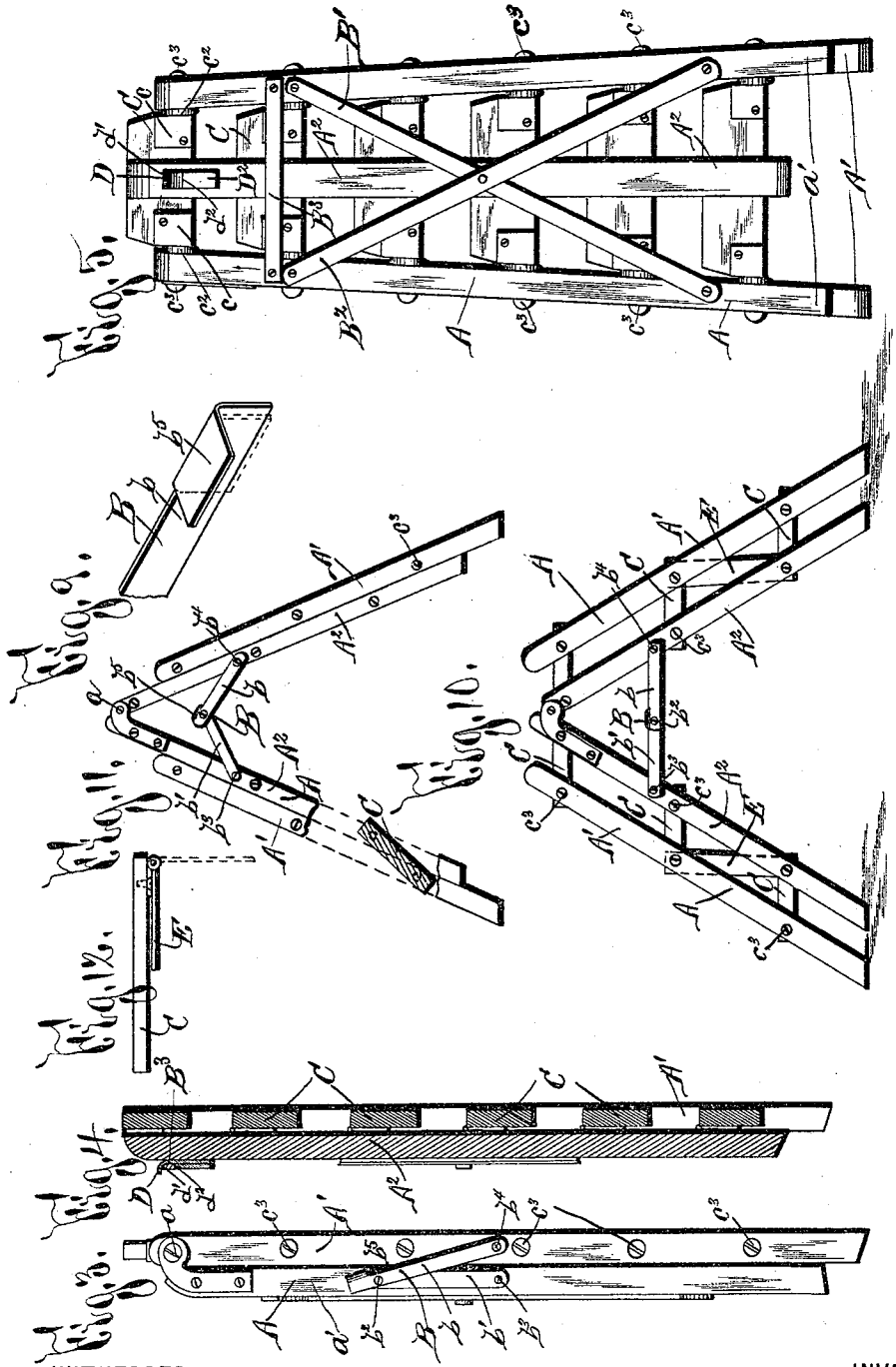
N. PETERS, Photo-Lithographer, Washington, D. C.

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UNITED STATES PATENT OFFICE.

DANIEL E. TEAL, OF ONEIDA CASTLE, NEW YORK.

STEP-LADDER.

SPECIFICATION forming part of Letters Patent No. 421,843, dated February 18, 1890.

Application filed April 29, 1889. Serial No. 309,017. (No model.)

To all whom it may concern:

Be it known that I, DANIEL E. TEAL, of Oneida Castle, in the county of Oneida, in the State of New York, have invented new and useful Improvements in Step-Ladders, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention relates to an improved step-ladder or stand, and has for its object the production of a simple and effective device which can be closely folded together, thus requiring but little space when packed for shipment or stored when not in use; and to this end it consists, essentially, in a supporting-frame for the step-ladder or stand, steps hinged to the supporting-frame, and an improved brace connecting the legs or supports of the step-ladder.

It furthermore consists in the detail, construction, and arrangement of the parts, all as hereinafter more fully described, and pointed out in the claims.

In describing my invention reference is had to the accompanying drawings, forming a part of this specification, in which like letters indicate corresponding parts in all the views.

Figure 1 is an isometric perspective of my improved step-ladder set up in position for use, clearly illustrating the general construction and arrangement of the parts. Fig. 2 is a longitudinal vertical section of the step-ladder in the position shown in Fig. 1. Fig. 3 is a side elevation of the step-ladder folded together. Fig. 4 is a vertical section, and Fig. 5 a rear elevation, of the step-ladder in the position shown in Fig. 3, clearly illustrating the relative construction and arrangement thereof. Fig. 6 is a top plan view of one of the steps, illustrating a portion of the frame of the step-ladder in section and the connection of the step thereto. Fig. 7 is an elevation of the extremity of the step shown in Fig. 6, illustrating the wearing-plate provided thereupon and the connection to the frame. Fig. 8 is a detail view illustrating the catch for holding the steps in position. Fig. 9 is an isometric detail view of the brace connecting the legs of the step-ladder. Fig. 10 is an elevation of a modified construction of the step-ladder formed with steps on both sides thereof. Fig. 11 is an elevation, partly in section, of the device illustrated in Fig. 9, shown partly folded together; and Fig. 12 is a detail view illustrating the catch provided upon the modified form of the step-ladder illustrated in Figs. 10 and 11.

A represents the step-ladder, the supporting-frame of which is composed of the front legs or supports A′, arranged with a wider space between their lower extremities than their upper and hinged at *a* to the rear legs or supports *a*′, arranged in like manner to the forward legs and braced by means of cross-bars B′, B^2, and B^3.

B represents the side brace for holding the forward and rear legs apart when the step-ladder is in position for use. This brace is composed of the separate divisions *b* and *b*′, hinged together at b^2, so that the adjacent extremities of these divisions overlap each other, affording great rigidity thereto. The division *b*′ is hinged at b^3 to the rear leg or support *a*′, and the division *b* is hinged at b^4 to the forward leg A′. Formed or provided upon the inner extremity of the division *b* is the bend or loop b^5, which, when the step-ladder is in its normal position, is adapted to cap over the adjacent extremity of the division *b*′, thus further affording rigidity and preventing the divisions from being forced downward, since the upper edge of the division *b*′ contacts against the under edge of the loop, thus preventing farther downward movement thereof.

When the step-ladder is set up for use and the cross-braces B are in the position illustrated in Fig. 1, it will be seen that the step-ladder is retained in the desired position, since strain applied upon the steps would be unable to move the legs or supports A′ and *a*′ together, as the cross-brace B is then in a horizontal line. These braces B, being prevented from downward or lateral movement by their peculiar construction, as described, further prevent the collapse of the step-ladder and insure great rigidity when in position for use. The steps C are pivoted, and preferably at their forward edges, to the front legs A′, and to prevent undue wear thereupon are preferably provided with the cap *c*, formed of sheet metal bent over the edge *c*′ of the step adjacent to the forward legs or supports

A′ and extended for a short distance along the top and bottom faces of said step. A washer c^2 is then inserted between the leg or support A′ and the wearing-plate c, and a screw c^3 is forced through the said leg, washer, wearing-plate, and step, securely pivoting or hinging the step to the supporting-leg, and from the construction of the parts very little wear is occasioned by the operating or folding of the step-ladder.

To support the step C in its normal operative position I form the longitudinal support or leg A^2, hinged or pivoted to which are the rearward extremities of the steps, and at the upper part of this support or leg I provide the catch D, for locking the step-ladder in operative position. This catch D is formed of the plate D′, of suitable material, secured to the support or leg A^2 by screws or other suitable means d, and provided with the upward lateral projection d' and the shoulder d^2, which shoulder is preferably formed by securing a second plate D^2 upon the lower part of the plate D′. The space between the shoulder d^2 and the projection d' is equal to the width of the cross-bar B^3, secured at the upper part of the rear legs a', and the lower extremities of the plates D′ and D^2 are preferably beveled, so that when the step-ladder is forced to its normal position the cross-bar B^3, which is formed of spring metal, rides over the said plates, and when registered with the space between the shoulders d^2 and d' is automatically locked therein by the spring of the metal. The lower extremity of said leg A^2 bears upon the ground or other support for the step-ladder, and thus by means of the catch D the steps are automatically locked in position when the step-ladder is forced to its operative position.

When it is desired to fold the steps, by forcing upward the hinged extremities of the cross-braces B and forcing outward the cross-bar B^3, so that it is disengaged from the shoulders d' and d^2, it will be seen that the leg A^2 can be forced upward, the steps folded upward, and the legs or supports A′ and a' brought closely together, as illustrated in Figs. 3 and 4.

At Figs. 10 and 11 I have shown a modified form of the step-ladder, which is formed with steps at the front and rear thereof. This construction is obtained by using two legs A^2 and placing the same on the outside of the steps instead of as illustrated in the previous figures of the drawings and by hinging these legs A^2 to each other at their upward extremity and connecting them by the cross-braces B. This construction of step is very desirable for certain purposes, and by forcing upward the hinged divisions of the side brace B and the legs A^2 the folding of this construction of step-ladder will be accomplished in precisely the same manner as that illustrated in the previous figures.

It will be observed that when weight is applied to the outward edges of the step-ladders in the construction illustrated in Figs. 10 and 11, there is a tendency for the step-ladder to be forced out of operative position by the upward movement of the legs A^2. To counteract this I secure on the underneath side of one or more of the steps at the forward edge thereof a catch E, which, when the step-ladder is in operative position, is dropped or forced downward and bears at the rearward edge of the next lower step.

This construction of step is especially applicable for a stand for a show-window or other place where it is desirable to place a number of articles for observation, and from its peculiar construction a great quantity can be placed thereupon, and when not in use the device can be readily folded together and takes up but little room.

The parts of my improved device are simple in construction and effective in operation, and by my invention I produce an article which, while possessing all the usual qualities without increased cost of manufacture, can be closely folded together when not in use or when packed for shipment.

It will be understood that while the illustrated forms are the preferable construction of my improved device, considerable change may be made in the relative and detail construction and arrangement of the parts without departing from the spirit of my invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a step-ladder, the combination of a supporting-frame, steps hinged to said frame, and a spring-catch for locking said steps in their normal position, substantially as set forth.

2. The combination of steps, supporting-legs for said steps, a screw for hinging said steps and legs, and a supporting bar or leg hinged to the steps at the rear thereof for supporting them in their normal position, substantially as described.

3. In combination with a support or leg, a step hinged to said support, a wearing-plate interposed between said step and support, and a support at the rear of the steps for supporting the steps in their normal position, substantially as and for the purpose specified.

4. The combination, with supporting-legs A′, hinged to rearward legs a', of the steps C, hinged to said supporting-legs, and a supporting-leg A^2, interposed between the legs A′ and hinged at the rear of the said steps, substantially as described.

5. The combination, with supporting-legs A′, hinged to rearward legs a', of the steps C, hinged to said supporting-legs, a support or bar for supporting the legs in their normal position, and a spring-catch for automatically locking said bar to support the legs, substantially as specified.

6. The combination, with supporting-legs A′, hinged to rearward legs a', of the steps C, hinged to said supporting-legs, a supporting-

leg A^2, interposed between the legs A′ and hinged at the rear of the said steps, and a catch for locking said leg A^2 in its normal position, substantially as described.

7. The combination of supporting-legs, bracing-legs hinged to said supporting-legs, steps hinged to said supporting-legs, a supporting-leg A^2, hinged to the rear of the steps, and a lug or catch upon said latter supporting-leg for engaging the rearward bracing-legs and holding the steps in their normal position, substantially as described.

8. The combination, with the supporting-legs A′, rearward legs a', and a spring-bar upon the legs a', of steps hinged to the legs A′, a rearward leg A^2, for supporting the steps in their normal position, and a catch upon said leg for engaging the spring-bar upon the legs a', substantially as specified.

9. The combination of the supporting-legs A′, the rearward legs a', and a tie-bar between said legs A′ and a', composed of separate halves or divisions secured to the said respective legs A′ and a' and connected to each other to support said legs at their desired adjustment, with steps hinged to the supporting-legs A′, a supporting-leg A^2, and a catch for engaging said leg A^2 when the tie-bar is in operative position, substantially as and for the purpose specified.

10. In combination, the support A′, the step C, the wearing-plate c, and the pivotal screw C^3, for pivoting said step to the support A′, substantially as and for the purpose described.

In testimony whereof I have hereunto signed my name, in the presence of two attesting witnesses, at Syracuse, in the county of Onondaga, in the State of New York, this 22d day of April, 1889.

DANIEL E. TEAL.

Witnesses:
CLARK H. NORTON,
ARTHUR E. PARSONS.