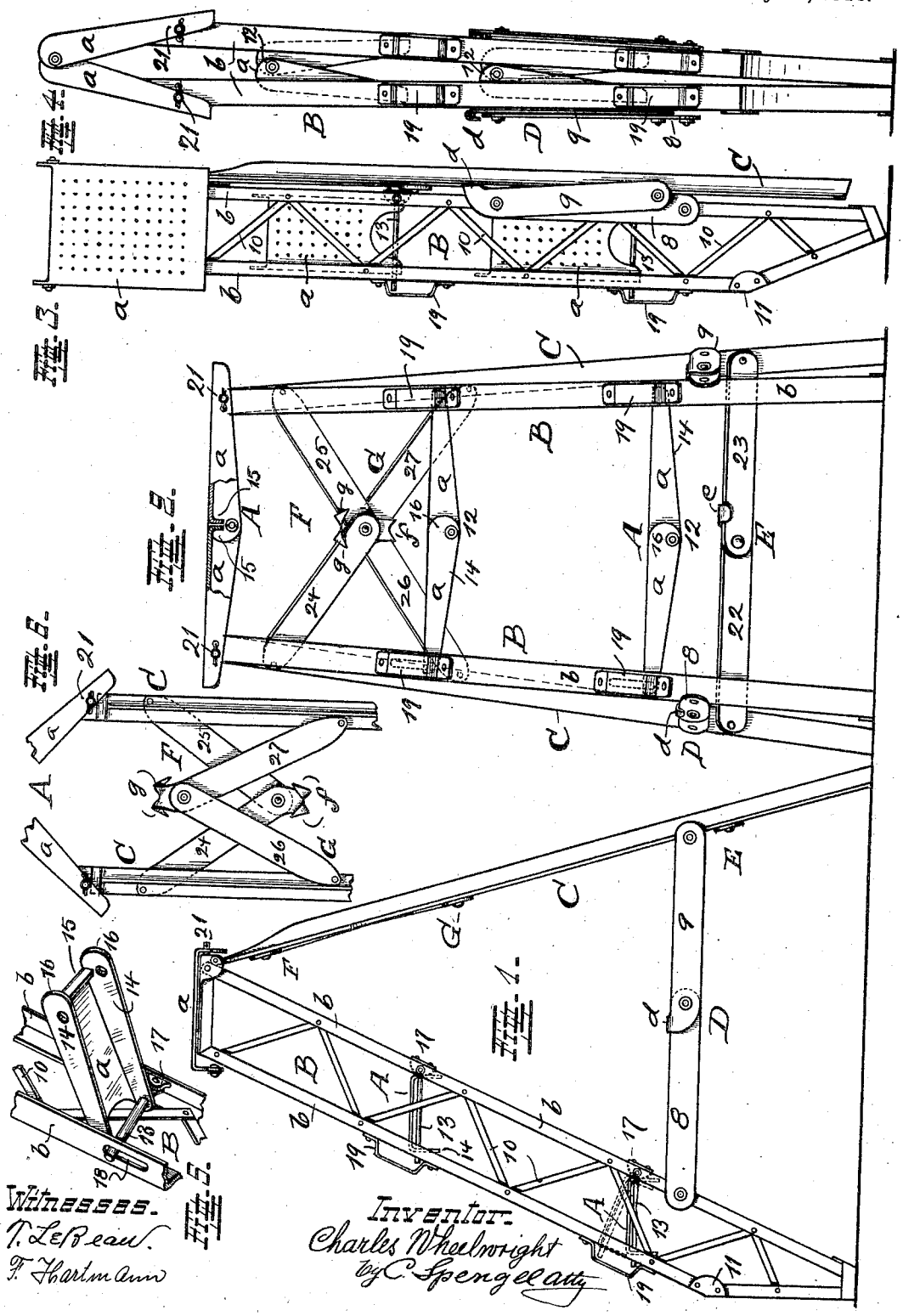
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FOLD-UP STEP LADDER.

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FOLD-UP STEP-LADDER.

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To all whom it may concern:

Be it known that I, CHARLES WHEELWRIGHT, a citizen of the United States, and a resident of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Fold-Up Step-Ladders; and I do declare the following to be a clear, full, and exact description of the invention, attention being called to the drawing which accompanies this application and forms a part thereof.

This invention relates to improvements in the construction of step-ladders of the kind which, after being closed up in the usual manner, may also be folded up transversely in order to reduce the bulk of the implement.

The invention consists of the particular construction as described and claimed hereinafter and as illustrated in the accompanying drawing, in which:—

Figure 1, shows the ladder in side-view with its parts opened out and in position for use. Fig. 2, is a complementary front-view. Fig. 3, shows the ladder again in side-view, but closed up in the usual manner, the movement being in the plane of view of Fig. 1. Fig. 4, is a complementary front-view of the ladder as shown in the preceding figure, it being folded up transversely, the movement being in the plane of view of Fig. 2. Fig. 5, in a perspective view shows details of construction of the step-supporting means. Fig. 6, shows part of a rear view of the ladder partly folded up.

The step-ladder consists of two main sections viz. a step-ladder section and a prop-section, both sections hinged to each other at their tops. The ladder-section consists of the steps A and of the side frames B—B which support them. The prop-section consists of two props C—C, hinged at their upper ends to the upper ends of the side-frames B—B, one to each frame and is used to hold the ladder in position for use, as shown in Figs. 1 and 2. The ladder is held in the position required for this purpose by two collapsible links D—D, one on each side of it, each link consisting of two parts, one part shown at 8 which is hinged to side-frames B—B and another part 9 hinged to props C—C, the two parts being also hinged to each other. One of these parts is provided with a stop *d* which, by engaging the other link part, serves to hold the links rigid as shown in Fig. 1, without interfering with their being closed up as shown in Fig. 3. The props as well as the two members *b b*, of which each side-frame B is made up, are made of structural profile-rails, the former being in shape of T-irons and the latter in form of angle-irons. Sheet-iron is used and the particular rail-shapes may be formed either integral or built up, rivets being used for the purpose. Flat bars are used to form the angularly arranged braces 10 whereby members *b*—*b*, are connected to each other to make up the side-frames B—B. The ends of these latter are filled in with iron shaped similar to that of members *b*—*b*. At corners, turns may be made by bending the rails, one of the webs being cut, to permit this. Reinforcements may be provided in form of gussets 11 and rivets are used to make connections at joints.

Each of the steps consists of two sections *a*—*a*, hinged endwise to each other as shown at 12, each section being also hinged at its other end to one of the side-frames B. This latter connection is by means of pins 13 which extend between the frame-parts *b*—*b* of the side frames on which they are supported. The steps are also formed out of sheet-metal and are shaped as shown in Fig. 5 to have flanges 14 at their front and rear edges which near the ends of the steps have perforations for reception of these pins. The sections of each step have also flanges at their adjoining ends forming shoulders 15 which, when the step sections are alined to form the steps contact with each other and render the steps rigid. Flanges 14 are extended beyond these shoulders and form lugs 16, whereby the step-sections are hinged to each other. Pins 13 which support the steps are pivotally connected at their rear ends to the inner or rear part *b* of the frame-sections as shown at 17. Their free ends occupy slots 18 in the front part *b* of the frame-sections in which they may move. When the ladder is in use these free ends rest against the lower ends of the slots so as to hold the pins firmly in their step-supporting position. The object of this particular manner of connecting the step-supporting pins is to permit the steps to fold up when the ladder is to be folded up transversely as shown in Fig. 4 and to permit the closed up steps to assume a position between the side-frames as shown in Fig. 3. and parallel to the parts *b*—*b* thereof.

These frame-members may be reinforced at the points where they are slotted by braces 19. The top step does not require these pin-supports and is simply connected at its rear flange to the side-frames as shown at 21. When the ladder is in use it rests on the upper ends of these frames.

The props C—C, are held in position, for forming the prop-section when serving to sustain the ladder as shown in Fig. 2, by collapsible devices as follows: Below, there is a brace E, consisting of two hingedly connected members 22 and 23, each also hingedly connected to one of the props and one of them provided with a locking lug *e*. There are also angular braces F—G, each consisting of two sections, the first consisting of sections 24 and 25, and the other of sections 26 and 27 each set of these sections being hinged to each other and to props C—C, as best shown in Figs. 2 and 6. They are adapted to engage each other at the points of their connection and when so engaged hold the prop-sections firmly in expanded position. The engagement is by means of hook-shaped catches *f* and *g*.

It will now be seen that the extended ladder held in position by the properly expanded and connected links and braces, as shown in Figs. 1 and 2, may be readily closed up in the usual manner and as shown in Fig. 3, by collapsing the side links D. From this position it may be transversely folded up as shown in Fig. 4, by disengaging and collapsing the rear braces between the props and by collapsing the steps and moving them on the hinged connection of the hinge-pins, so as to occupy positions between the members of the side-frames.

Having described my invention, I claim as new:

1. In a stepladder which, when closed up in the usual manner, may also be folded up transversely, the combination of metallic side-frames consisting each of two spaced members, step-supporting hinge-pins provided on these side-frames, being pivotally connected at one of their ends to one of the members of these frames and extending with their other ends into slots in the other member of these frames and in which slots these ends are free to move and metallic steps each consisting of two sections hinged to each other and hingedly connected at their free ends to the hinge-pins on the side-frames mentioned and adapted to move with them when the ladder is being unfolded or closed up.

2. In a stepladder which, when closed up in the usual manner, may also be folded up transversely, the combination of metallic side-frames consisting each of two spaced members connected to each other by braces, step-supporting hinge-pins provided on these side-frames and metallic step each consisting of two sections hinged to each other and shaped to contain flanges at their front and rear edges which flanges at the ends of these steps are perforated to receive the hinge-pins on the frame-members.

3. In a stepladder which, when closed up in the usual manner, may also be folded up transversely, the combination of a ladder section consisting of two metallic side-frames, metallic steps consisting each of hingedly connected sections and hingedly connected at their ends to these side-frames, a prop-section consisting of two props each hingedly connected at its upper end, one to the upper end of each of the side-frames of the ladder-section, sectional links connecting each prop to its corresponding side-frame, means to render these links rigid, a sectional brace connecting the props of the prop-section to each other, two additional braces adapted to co-act and consisting each of two sections hingedly connected to each other and hingedly connected at their ends to the props and means permitting these braces to engage each other at the junction of their respective angularly positioned sections, to render the extended prop-section rigid when the ladder is in position for use.

4. In a stepladder which, when closed up in the usual manner, may also be folded up transversely, the combination of metallic side-frames consisting each of two spaced members alined in a plane one behind the other, the front members being provided with vertically disposed spaced slots, reinforcing braces provided opposite these slots and spaced therefrom, step-supporting hinge-pins hingedly connected at one of their ends to the rear members of the side-frames and at a point opposite the slots in the front-member into which slots the other ends of said pins extend, and wherein they may adjust themselves according to positions of the ladder and metallic steps, each consisting of two sections hinged to each other and hingedly connected at their free ends to the hinge-pins on the side-frames mentioned to permit the steps moving with said pins to adjust themselves according to position of the ladder.

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

CHARLES WHEELWRIGHT.

Witnesses:
C. SPENGEL,
T. LE BEAU.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."