L. O. GARRAWAY.

FOLDING STEP LADDER.

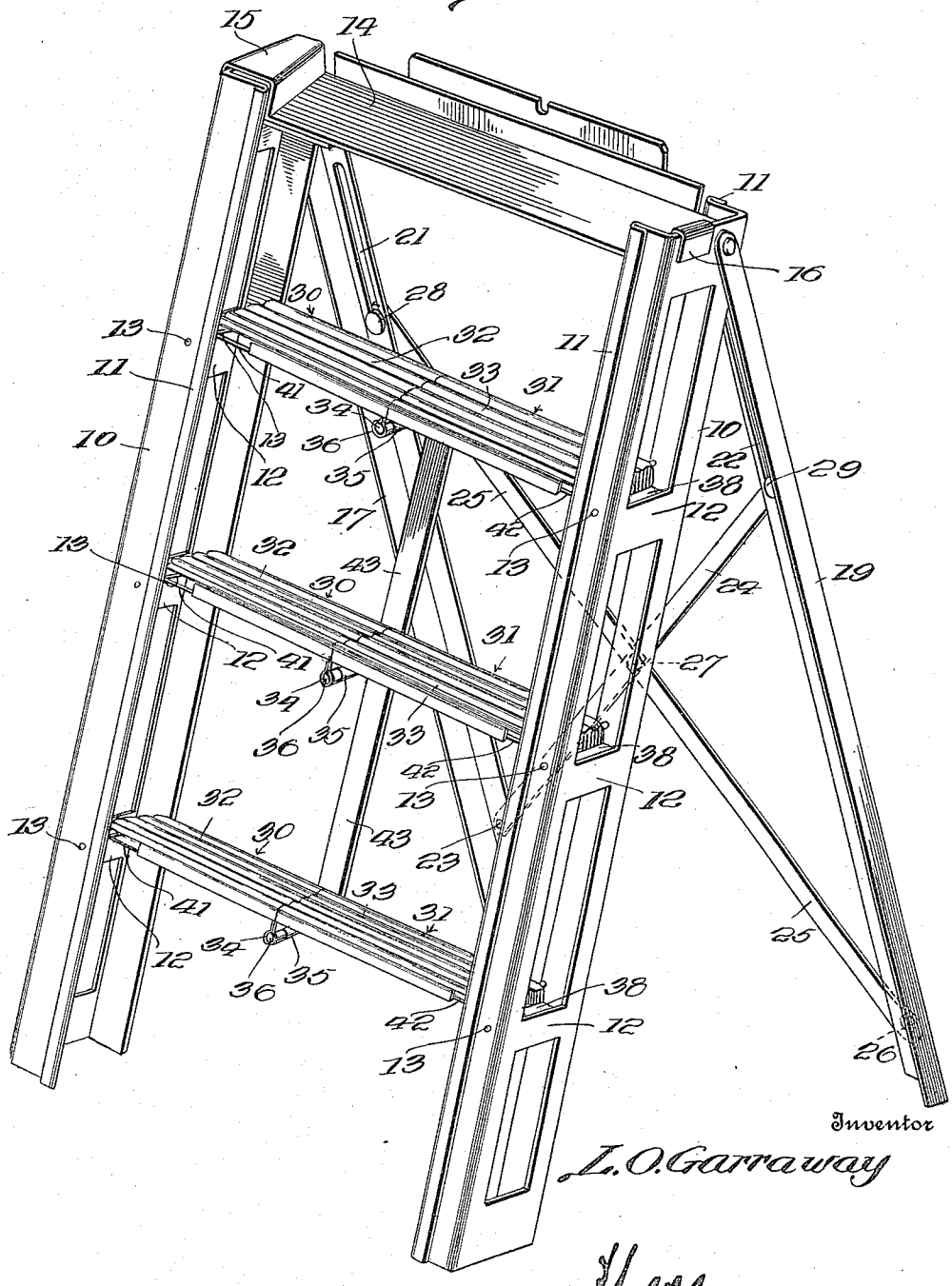
APPLICATION FILED MAY 25, 1915.

1,165,588.

Patented Dec. 28, 1915.

4 SHEETS—SHEET 1.

Fig. 1.



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4 SHEETS—SHEET 2.

Fig. 2.

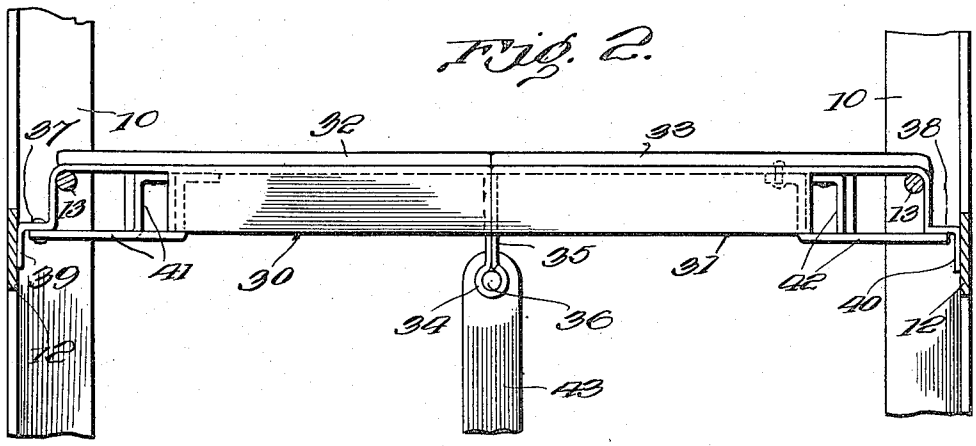


Fig. 3.

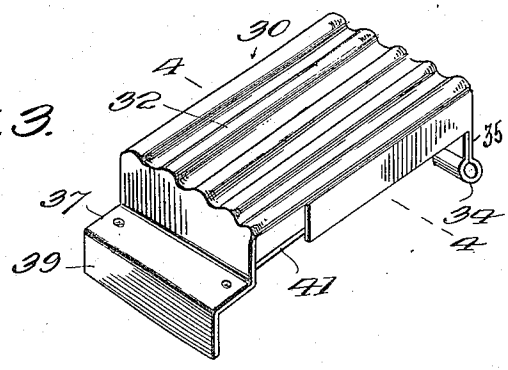
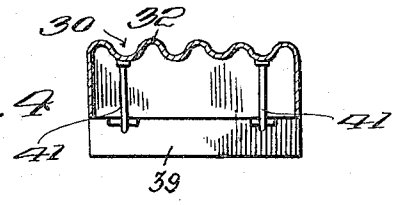


Fig. 4.



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4 SHEETS—SHEET 3.

Fig. 5

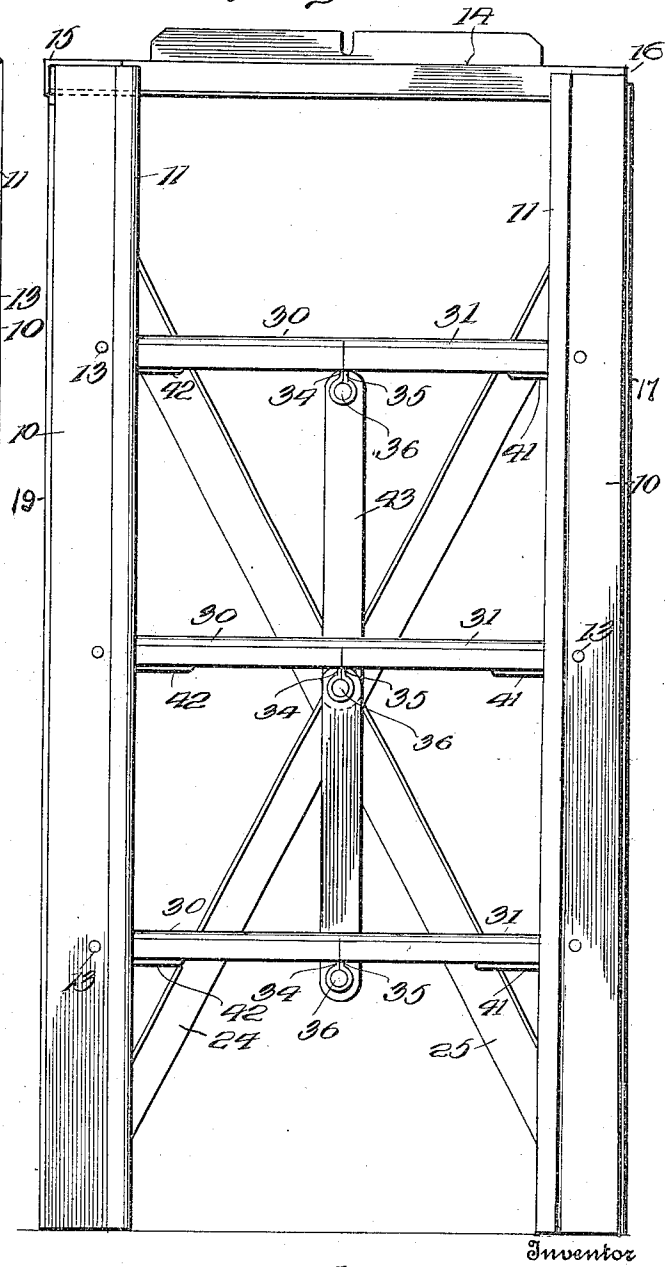
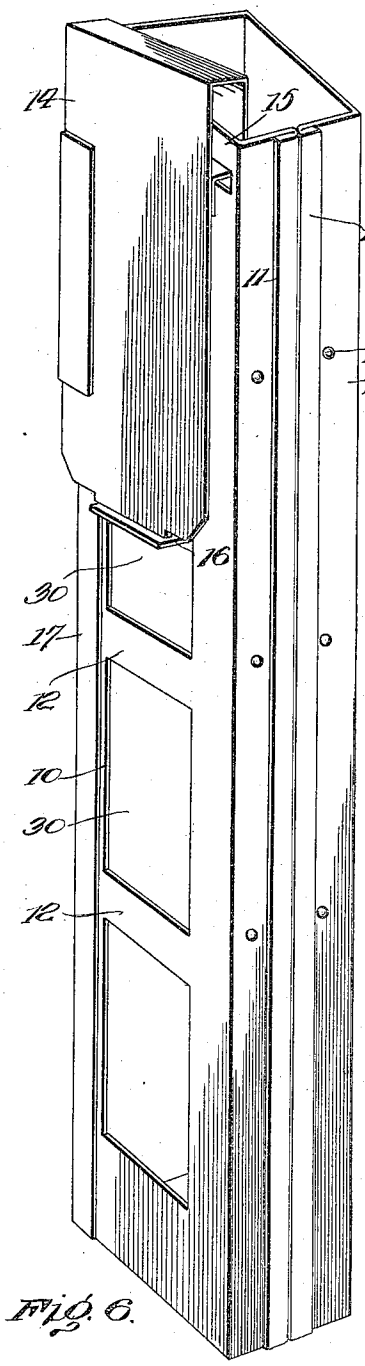


Fig. 6.



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4 SHEETS—SHEET 4.

Fig. 7.

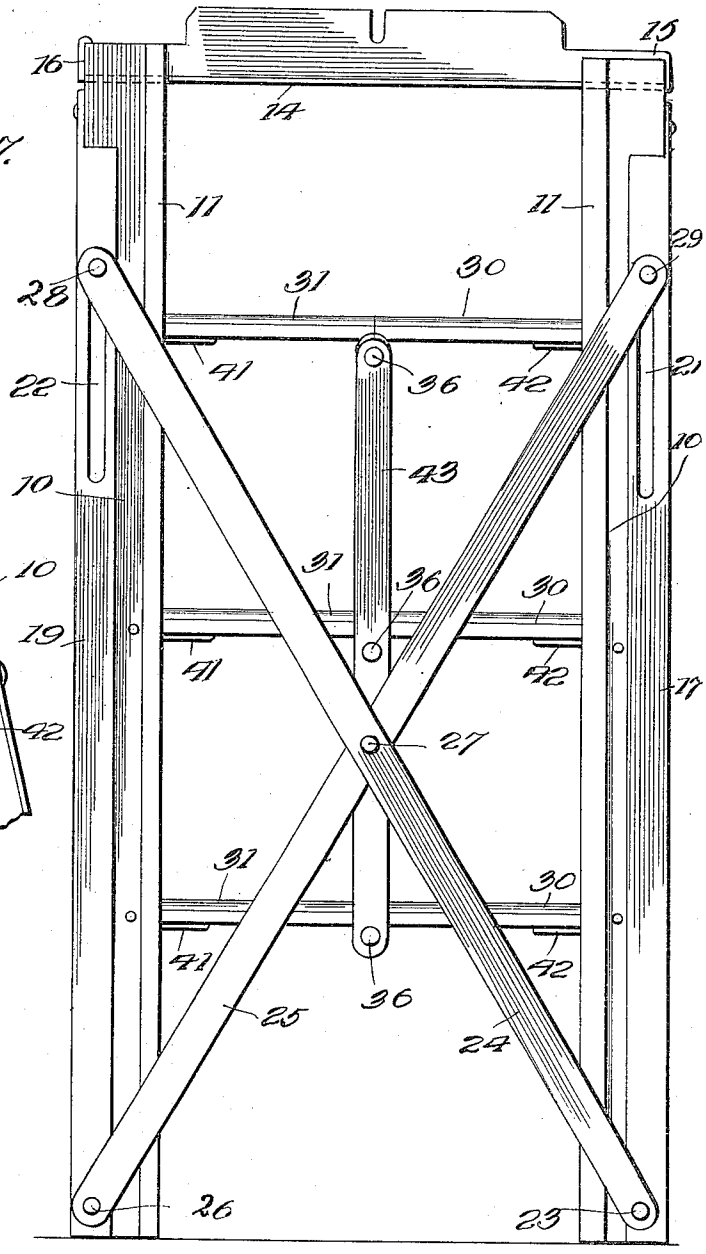
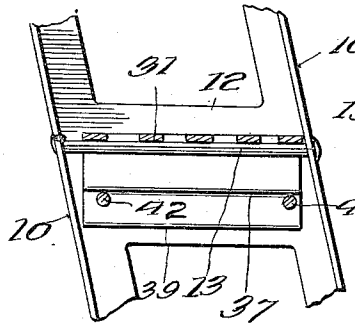


Fig. 8.



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UNITED STATES PATENT OFFICE.

LEE O. GARRAWAY, OF MEMPHIS, TENNESSEE.

FOLDING STEP-LADDER.

1,165,588. Specification of Letters Patent. Patented Dec. 28, 1915.

Application filed May 25, 1915. Serial No. 30,402.

To all whom it may concern:

Be it known that I, LEE O. GARRAWAY, a citizen of the United States, residing at Memphis, in the county of Shelby and State of Tennessee, have invented certain new and useful Improvements in Folding Step-Ladders, of which the following is a specification.

This invention relates to improvements in folding step ladders and has for one of its objects to improve the construction and increase the efficiency and utility of a device of this character.

Another object of the invention is to provide a device of this character having an improved construction of step and the manner of mounting and operating the same.

With these and other objects in view, the invention consists in certain novel features of construction as hereinafter shown and described and then specifically pointed out in the claims; and in the drawings illustrative of the preferred embodiment of the invention, Figure 1 is a perspective view of the improved ladder in open position; Fig. 2 is an enlarged sectional detail illustrating the construction and operation of the foldable flexible step; Fig. 3 is a detachable perspective view of one of the foldable steps viewed from above; Fig. 4 is a transverse section on the line 4—4 of Fig. 3. Fig. 5 is a front elevation of the device in open position. Fig. 6 is a perspective view of the device in folded position. Fig. 7 is a rear elevation of the device in open position. Fig. 8 is a view similar to Fig. 4, illustrating a modification in the construction.

Corresponding and like parts are referred to in the following description and indicated in all the views of the accompanying drawings by the same reference characters.

The improved ladder comprises in general side members spaced apart, steps formed of coacting members hingedly united at their confronting ends and hingedly united to the sides, the step sections being disposed in parallel relation to the sides when the ladder is folded and at right angles to the sides when the ladder is opened.

All of the parts in the improved ladder are of metal as light as possible consistent with the strains to which the parts will be subjected when in use. The sides of the improved ladder are each constructed from a single sheet of metal bent into channel shape longitudinally and indicated as a whole at 10 and with the edges reinforced by bending the metal upon itself, as shown at 11. The body portion of each side member is cut out at intervals to lighten the same, leaving transverse portions 12 where the steps are to be located.

Tie rods 13 connect the bent over portions of the side members, one opposite each of the connecting sections 12. The terminals of the side members are cut angular to the longitudinal plane, and the connecting sections 12 are likewise oblique to the longitudinal plane so that when the ladder is in open position and supported at an incline, the sections 12 and the rods 13 will be in horizontal position. At their upper ends the sides are connected by a top step member 14, hingedly united at 15 to one of the sides and formed with a socket like portion 16 near the opposite end to engage over the other side member, and thus lock the sides in open position. The top step is foldable against the side member to which it is pivoted when not in use, or when the ladder is folded. A supporting leg 17 is pivoted at its upper end to one of the sides of the ladder, and a similar supporting leg 19 is pivoted at its upper end to the other side member of the ladder. The leg members 17—19 are preferably formed of L-bars, as shown, and fold around the adjacent corners of the side members to which they are pivoted when not in use. The leg members 17—19 are respectively slotted, as shown at 21—22, and pivoted at 23, to the leg member 17, is a brace member 24, and a similar brace member 25 is pivoted at 26 to the leg member 19. The brace members are pivotally united intermediate their ends, as shown at 27, and likewise provided with pivot devices 28—29 to slidably engage respectively in the slots 21—22, the object to be hereinafter explained.

The step portions of the improved device are each formed of coacting sections represented as a whole at 30—31, each step being

formed with a main body portion having depending edges. The body portions of the steps are preferably corrugated, as at 32—33. At their converging ends the terminals of the steps are extended downwardly and formed with coacting hinge members 34—35, the hinge members adapted to receive a pintle 36. The hinge members 34—35 are located some distance below the lower line of the steps so that the adjacent ends of the steps bear squarely against each other and are limited in their downward movement thereby as shown. By locating the hinge members and the pintle below the lower line of the steps, the joint between the steps is materially strengthened and stiffened as hereafter explained.

At their outer ends the steps are projected outwardly, as shown at 37—38 and thence downwardly as shown at 39—40. The step sections engage over the rods 13, the depending sides of the steps being slotted or cut out to receive the rod 13. By this means the steps are mounted to swing upon the rods and free to move longitudinally a distance equal to the length of the slots or cut away portions of the steps. When the steps are disposed in operative position or in longitudinal alinement, the depending portions 39—40 bear against the inner faces of the transverse portions 12 of the sides, and are firmly supported thereby and coöperate with the pintles 36 to prevent the steps moving below the horizontal plane. Combined guide and brace devices 41—42 are connected at one end to the horizontal portions 37—38 of the steps and at their other ends to the body of the steps, and thus inclose the rods 13 and prevent displacement of the steps during the folding action. The slots or cut away portions of the steps at the front edges of the steps are of less length than the cut away portions at the rear, so that when the device is folded and the steps engage between the bent edges of the sides sufficient space is provided for the free movements of the rods 13 and to obviate any cramping effect between the parts. By this means the step ladder folds into a relatively small space for transportation or storage, and occupies no greater space than the combined transverse area of the side members and the folded leg members.

The pintles 36 extend rearwardly of the hinge members and a stay member 43 is connected to the extended terminals of the pintles and thus unites the various pintles and assists in causing them to fold simultaneously.

Any required number of foldable steps may be employed, but for the purpose of illustration three of the steps are shown, but it will be understood that the ladder may be increased in length to any required extent.

Having thus described the invention what is claimed as new is:—

1. In a step ladder, sides spaced apart and each including longitudinally extending members having transverse portions, rods connecting the longitudinal side members and spaced from said transverse portions, steps each formed of coacting members hingedly united at their confronting ends with their outer ends bent downwardly and thence outwardly in parallel relation to the body of the steps and thence downwardly to bear against the transverse portions of the sides, said steps engaging over said rods at the first-mentioned bend, and combined brace and guide rods connected at their ends to the outwardly extending portion of the step and at their other end to the adjacent step section and operating to brace and support the bent portion of the step and prevent upward displacement of the step section.

2. In a step ladder, sides spaced apart, each including longitudinal side members having transverse portions, rods connecting the longitudinal side members and spaced from said transverse portions, steps each formed of coacting body portions corrugated longitudinally and hingedly united at their confronting ends with their outer ends bent downwardly and thence outwardly in parallel relation to the body of the steps and thence downwardly for bearing against the transverse portions of the sides, said corrugations terminating at the first-mentioned bends and said steps likewise engaging over said rods at their first mentioned bend.

3. In a step ladder, sides spaced apart and each including longitudinally extending members having transverse portions, rods connecting the longitudinal side members and spaced from said transverse portions, steps each formed of coacting members having downwardly directed flanges entirely encompassing the same and with the side flanges cut away near the outer ends to movably engage the rods and the inner flanges extending downwardly to form hinge members to receive a pintle and locate the pintles below the line of the steps and support the same from downward movement when strain is applied.

4. In a step ladder, sides spaced apart and each including a body portion having the sides extending at right angles thereto, rods connecting said side portions and spaced from said body portions, steps, each formed of coacting members hingedly united at their confronting ends with their outer ends bent downwardly and thence outwardly in parallel relation to the body of the steps and thence downwardly to bear against the body portions of sides, said steps engaging over said rods at the first-mentioned bend, and combined brace and guide rods each con-

nected at one end to the outwardly extending portion of the step and at their other ends to the adjacent step section and operating to brace and support the bent portion of the step and prevent upward displacement of the step section.

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

LEE O. GARRAWAY. [L. S.]

Witnesses:

B. SPICER,

J. Y. WHITE.

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