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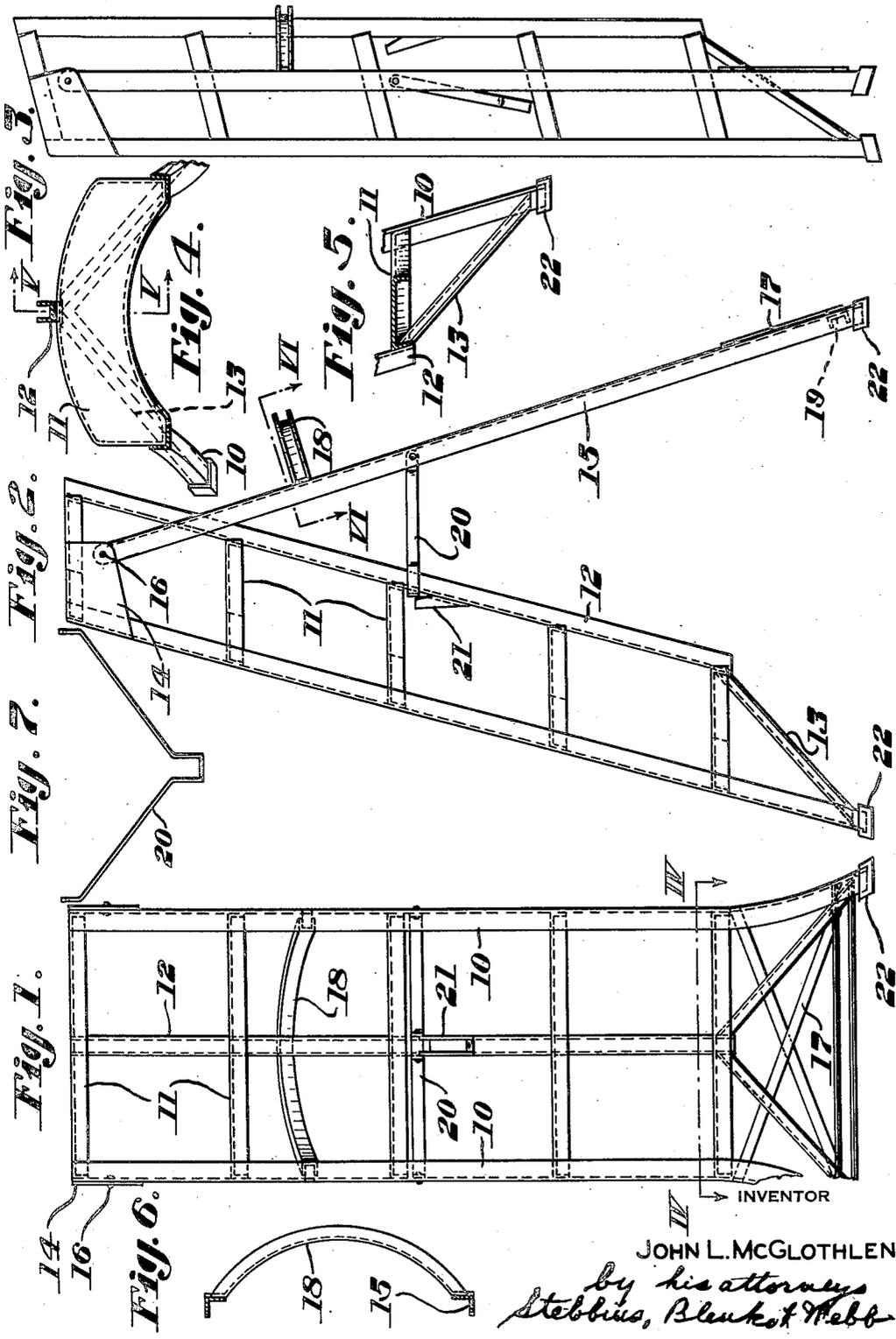
J. L. MCGLOTHLEN

2,527,834

STEPLADDER

Filed Aug. 30, 1946

2 Sheets-Sheet 1



INVENTOR
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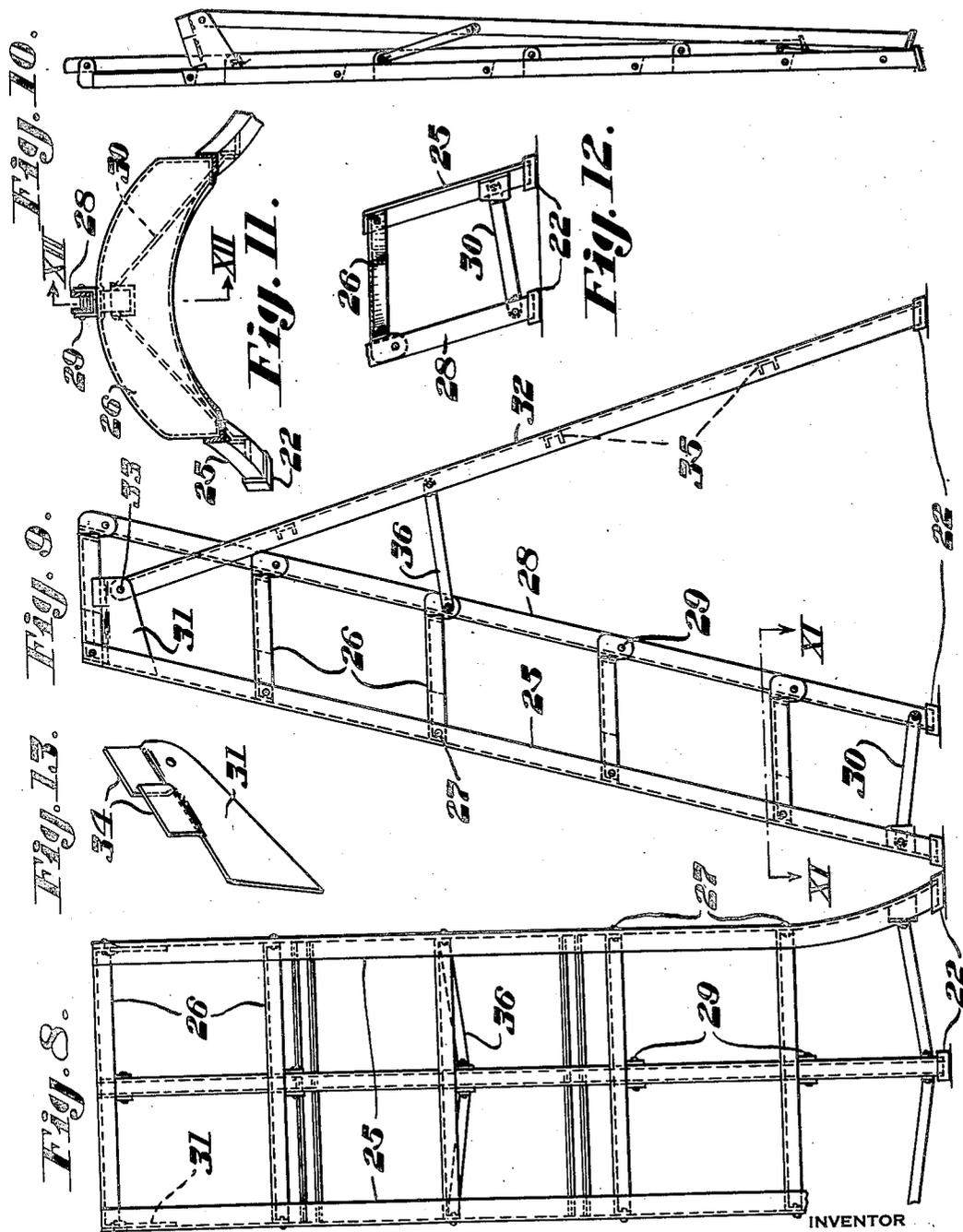
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UNITED STATES PATENT OFFICE

2,527,834

STEPLADDER

John L. McGlothlen, Pittsburgh, Pa.

Application August 30, 1946, Serial No. 694,099

2 Claims. (Cl. 228—29)

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This invention relates to step ladders and, in particular, to an improved ladder construction utilizing arched treads such as disclosed and claimed in my copending application, Serial No. 653,855.

The object of my invention is to provide a step ladder of light weight and great strength and rigidity, so designed that it takes up but little space when folded for storage. In a preferred embodiment, the ladder of my invention comprises spaced risers having treads secured thereto and a central strut or stay secured to the inner edges of the treads. Bracing legs are pivoted to plates secured to the risers. The treads may be rigidly secured to the risers and strut or may be hinged thereto to reduce the amount of space taken up by the ladder when folded.

Other details, novel features and advantages of the invention will become apparent during the following complete description and explanation thereof which refer to the accompanying drawings. In the drawings,

Figure 1 is a front elevation of one form of ladder according to the invention;

Figure 2 is a side elevation thereof showing the bracing legs extended;

Figure 3 is a side elevation showing the ladder folded for storage;

Figure 4 is a transverse section taken along the plane of line IV—IV of Figure 1;

Figure 5 is a partial central section taken along the plane of line V—V of Figure 4;

Figure 6 is a partial section taken along the plane of line VI—VI of Figure 2;

Figure 7 is a plan view of a detail;

Figure 8 is a front elevation of a further form of the invention in which the treads are hinged to the risers and strut;

Figure 9 is a side elevation showing the bracing legs extended;

Figure 10 is a side elevation showing the ladder folded for storage;

Figure 11 is a front section taken along the plane of line XI—XI of Figure 9;

Figure 12 is a partial section taken along the plane of line XII—XII of Figure 11; and

Figure 13 is a perspective view of a detail.

Referring now in detail to the drawings and, for the present, to Figures 1 through 7, one form of ladder according to the invention comprises spaced risers 10 having arched treads 11 secured thereto and a central strut or stay 12 secured to the inner edges of the treads. The risers 10 are preferably formed from angle bar of a suitable metal. The treads are preferably stamped from

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sheet metal, have a down-turned flange around the edges thereof and are of arch shape in plan. The outer corners of the treads are secured to the risers. The strut 12 is shown as of channel section but may be of any desired shape. It terminates at the bottom tread. Angle braces 13 extend from the lower end of the strut to the lower ends of the risers.

Gusset plates 14 are secured to the risers and the top tread. Bracing legs 15 also of angle bar are pivoted to the gusset plates at 16. The bracing legs 15 are connected by diagonal braces 17 and cross bars 18 and 19. The cross bar 18 is arched as shown in Figure 6 to clear the strut 12 when the bracing legs are folded parallel to the risers. A yoke-shaped strap 20 shown in detail in Figure 7 is pivoted to the bracing legs and extends around the strut 12 to limit angular movement of the bracing legs relative to the risers. A detent 21 is secured to the strut 12 to hold the strap in the position shown in Figure 2. The detent comprises simply a piece of channel cut on a bias. When it is desired to fold the ladder, the strap 20 may be tilted up slightly to clear the detent after which the strap folds down as the bracing legs are closed to the position shown in Figure 3.

Feet 22 of suitable material such as rubber or the like are fitted on the lower ends of the risers 10 and bracing legs 15.

The treads 11 being attached to the risers at their outer corners and having their inner edges secured to the strut 12 afford extensive freedom for the feet of the user. The arched outer edges of the treads, furthermore, provide ample leg room for one standing on the ladder.

Figures 8 through 13 show a ladder generally similar to that already described except that the treads are hinged to the risers and strut to permit the ladder to be folded into a smaller compass. The ladder comprises spaced risers 25 having treads 26 hinged thereto at 27. A central strut 28 is hinged to the inner edges of the treads as at 29. Bracing links 30 are pivoted to the lower end of the risers and strut. Gusset plates 31 are secured to the upper ends of the risers and bracing legs 32 are pivoted thereto as at 33. The gusset plates have tongues 34 deformed laterally in opposite directions from the general plane thereof to accommodate the side flanges on the top tread 26.

The bracing legs 32 are connected by cross members 35. Spreader links 36 are pivoted to the legs 32 and the strut 28. When it is desired to fold the ladder, it is only necessary to push

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up on the strut 28 to start the hinging movement of the treads and, after the links 36 have passed dead center, to close the legs 32 against the risers. The final positions of the parts are indicated in Figure 10. As there shown, the treads are coplanar with the risers and the bracing legs are closely adjacent thereto so that the ladder requires but a minimum of space for storage when folded.

As shown in the drawing the risers are curved laterally and outwardly adjacent their lower ends beneath the lowest tread and it has been found that when a weight is placed on the ladder, the risers, if unsupported have a tendency to rotate inwardly about a vertical axis. Furthermore, due to the curved tread members, there is a tendency for these tread members to rotate about their connections with the risers when a weight is placed on the edges thereof. The braces 13 therefore serve a dual function of preventing the rotation of the risers about a vertical axis and the rotation of the treads.

When the ladder is opened up for use, the strut 28 extends downwardly to the floor or other surface on which the ladder stands, thereby transmitting a portion of the load on the treads directly to the supporting surface.

It will be apparent from the foregoing description that the invention provides a step ladder having numerous features of advantage over ladders as heretofore constructed. The invention provides a light-weight ladder which has ample strength and rigidity for ordinary use and may be manufactured at relatively low cost. In addition, the ladder folds compactly for storage. The advantage of the arched treads claimed in my copending application is fully retained and actually enhanced. The risers and strut are out of the way of the feet of the user, thus giving exceptional freedom of movement and comfortable standing.

Although I have illustrated and described but two embodiments of the invention, it will be recognized that changes in the details of construction disclosed may be made without departing from the spirit of the invention or the scope of the appended claims.

I claim:

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1. A step ladder comprising a pair of spaced risers, inwardly bowed treads extending between the risers, a strut connecting the inner edges of the treads and extending from the lowest to the highest tread, and braces rigidly secured to the strut at a point adjacent its lower end, said braces also being secured to the risers at points adjacent the bases of the risers, whereby any tendency of the inwardly bowed treads to rotate about a longitudinal axis is resisted by the strut and the braces.

2. A step ladder comprising a pair of spaced risers, said risers curving laterally and outwardly adjacent their lower ends, inwardly bowed treads extending between the risers, a strut connecting the inner edges of the treads and extending from the lowest to the highest tread, and braces rigidly connected to the strut at a point adjacent its lower end and to the risers at points adjacent their bases whereby the strut and braces resist any tendency of the treads to rotate about their points of connection with the risers and any tendency of the risers to rotate about a vertical axis.

JOHN L. MCGLOTHLEN.

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