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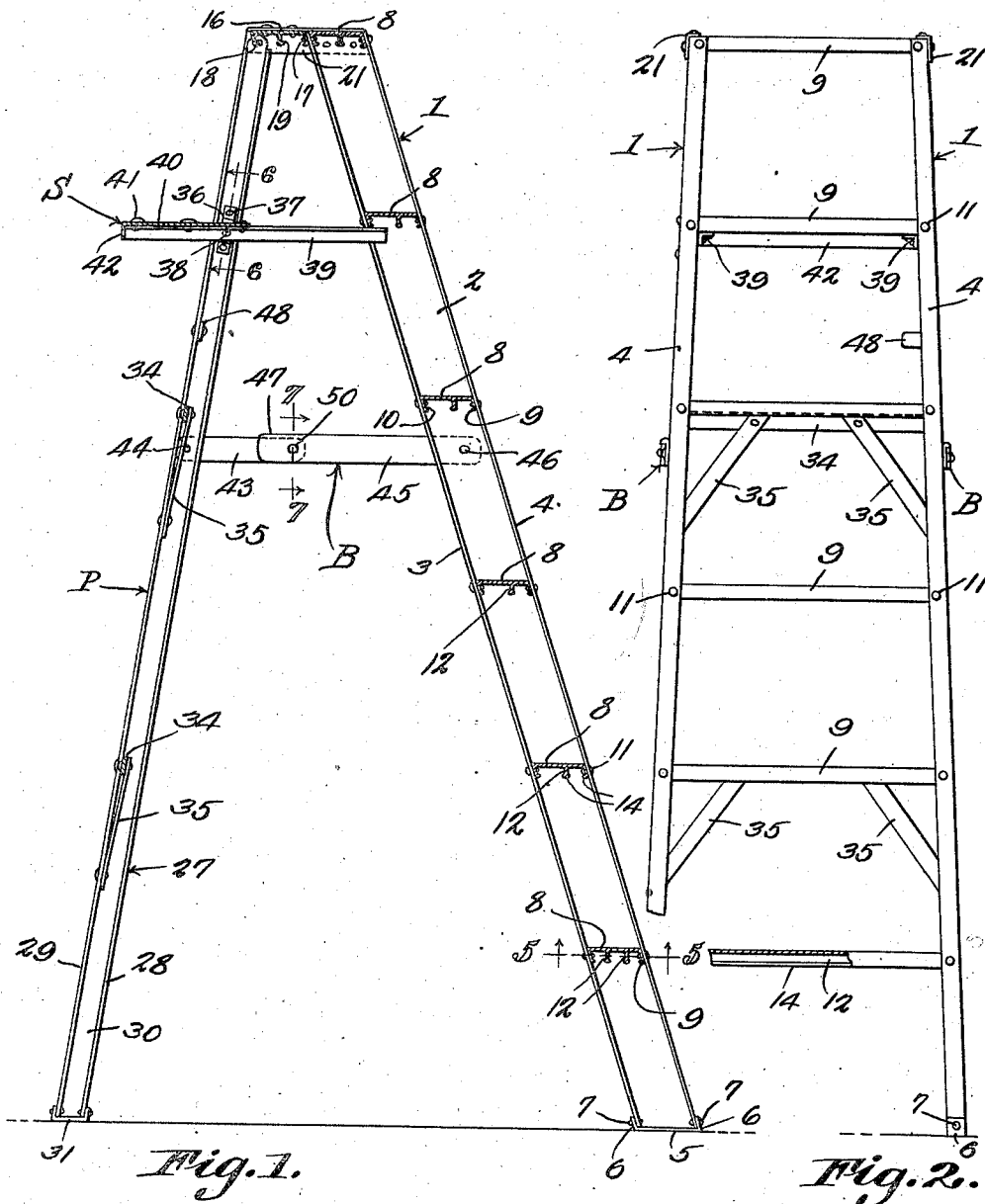
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2,126,171

LADDER

Filed June 28, 1937

3 Sheets-Sheet 1



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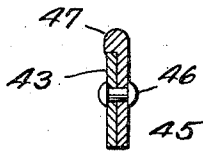
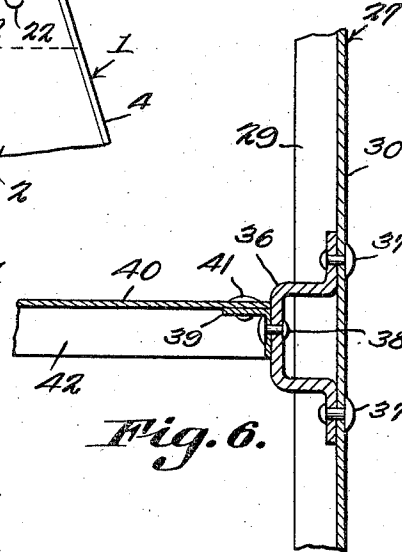
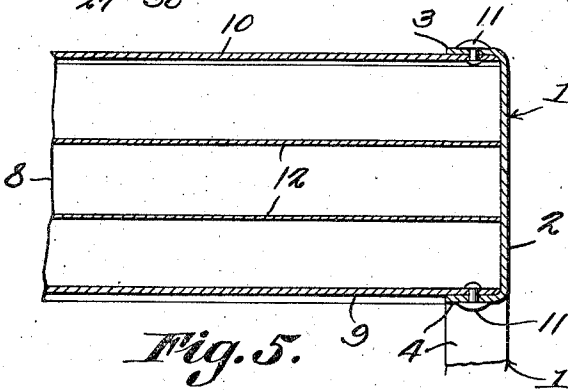
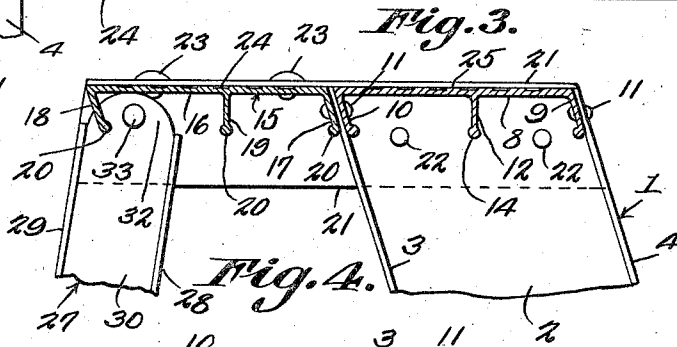
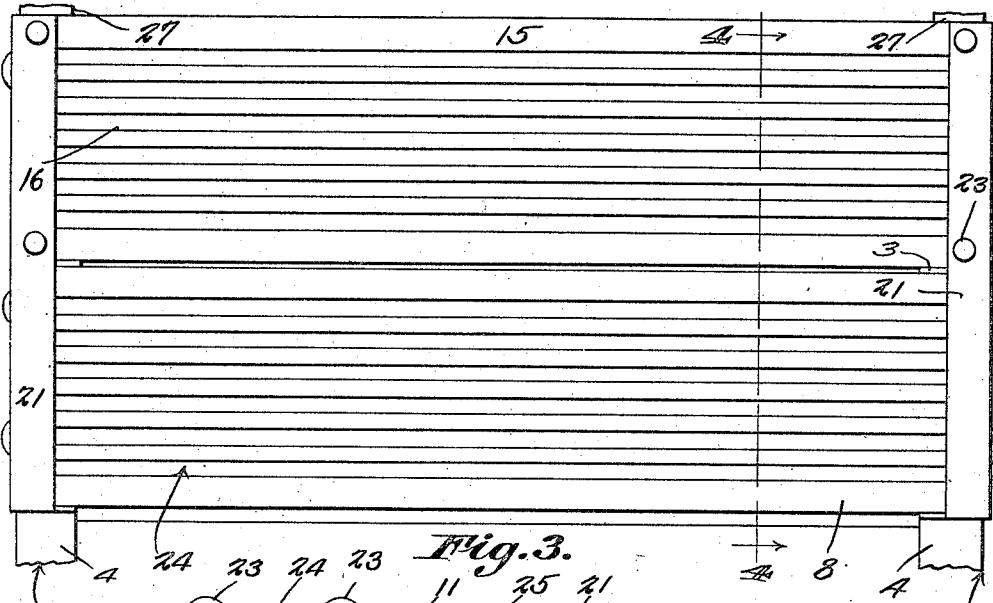


Fig. 7.

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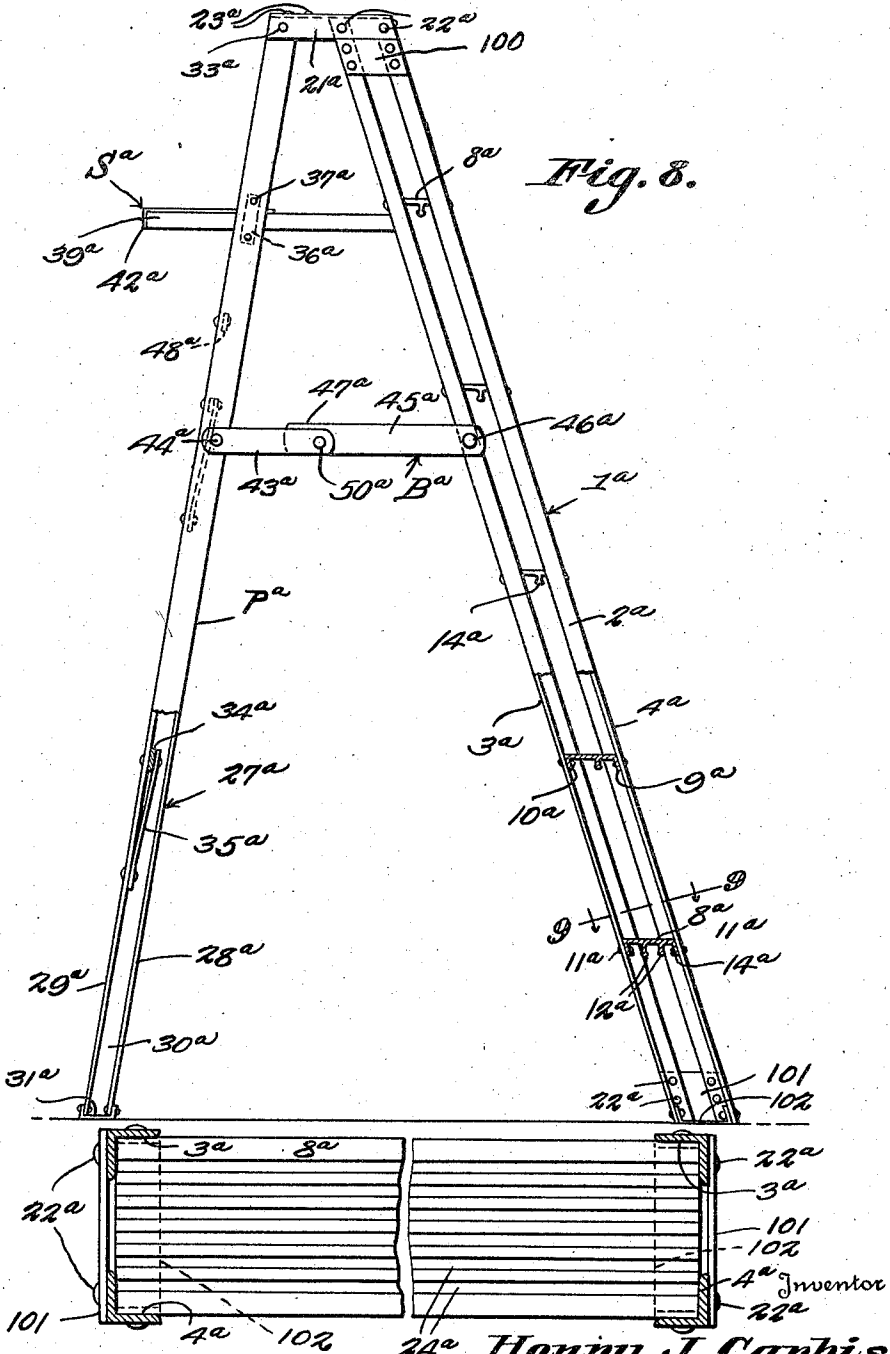


Fig. 9.

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UNITED STATES PATENT OFFICE

2,126,171

LADDER

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Application June 28, 1937, Serial No. 150,875

4 Claims. (Cl. 228-29)

The device forming the subject matter of this application is a ladder, made preferably of extruded metal, such as aluminum or magnesium. The invention aims to improve the connection between the steps and the side rails of the ladder, to improve and simplify the platform construction, to improve the prop, if the device is of the step ladder type, to improve the shelf structure and, generally to improve and to enhance the utility of devices of that type to which the present invention appertains.

With the above and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed, may be made within the scope of what is claimed, without departing from the spirit of the invention.

In the accompanying drawings:

Fig. 1 shows in vertical section, a ladder constructed in accordance with the invention;

Fig. 2 is a front elevation;

Fig. 3 is a top plan on an enlarged scale, parts being broken away;

Fig. 4 is a transverse section on the line 4-4 of Fig. 3;

Fig. 5 is a section on the line 5-5 of Fig. 1;

Fig. 6 is a section on the line 6-6 of Fig. 1;

Fig. 7 is a section on the line 7-7 of Fig. 1;

Fig. 8 is a side elevation showing a modification, parts being broken away;

Fig. 9 is a cross section on the line 9-9 of Fig. 8.

The ladder proper includes side rails 1, which in the form shown in Figs. 1 to 7 are one-piece channels, each including a body 2 having an inwardly projecting rear flange 3 and an inwardly projecting front flange 4. The flanges 3 and 4 are slit transversely, near their lower ends, and are turned inwardly, whereby the lower portions of the bodies 2 of the side rails 1 form inwardly extended foot pieces 5 closing the lower ends of the side rails 1, the lower portions of the flanges 3 and 4 forming lips 6 which overlap the lower ends of the flanges 3 and 4, as shown in Fig. 1. Securing elements 7 connect the lips 6 with the flanges 3 and 4.

Any desired number of steps are provided and are in the form of channel members. The steps, the side rails 1 and other parts to be described hereinafter preferably are made of extruded metal, and aluminum or magnesium is mentioned as a proper metal, owing to its lightness.

The steps fit between the flanges 3 and 4 of the side rails 1, and each step comprises a tread 8, a front flange 9, and a rear flange 10, the flanges extending downwardly. Securing elements 11 connect the front flange 9 of each step with the front flanges 4 of the rails 1, and connect the rear flange 10 of each step with the rear flanges 3 of the side rails 1.

The treads 8 of the steps have depending intermediate flanges 12, and there may be any desired number of the flanges 12. As shown in Fig. 1, all of the steps saving the lowermost step are provided with a single intermediate flange 12, but the lowermost step has a plurality of such flanges, for instance two, such a construction being peculiarly desirable in connection with long ladders, strength being gained, and the weight of the ladder, as a whole being kept down. The several flanges 3, 4 and 12 are supplied at their lower edges with enlarged, longitudinal reinforcing ribs 14.

If the structure is to be embodied in a step ladder, a platform 15 is provided. This platform 15, as Fig. 4 will show, is a duplicate of the uppermost step and of all of the steps saving the lowermost step. It includes a tread 16, a front flange 17, a rear flange 18, and an intermediate flange 19, all constructed as hereinbefore described, and supplied at their lower edges with longitudinal reinforcing ribs 20, like the ribs 14. The tread 16 of the platform is placed in horizontal alignment with the tread 8 of the uppermost step, the depending front flange 17 of the tread 16 of the platform being placed against the rear surfaces of the rear flanges 3 of the side rails 1 of the body. The securing elements 11 which connect the rear flange 10 of the uppermost step with the flanges 3 of the side rails 1 also connect the front flange 17 of the platform 15 with the said rear flanges 3.

Top rails 21 are provided, and are angle members. Their horizontal flanges overlap the tread 8 of the uppermost step and the tread 16 of the platform 15. The vertical depending flanges of the top rails 21 extend downwardly, and close the uppermost step and the platform 15 at their ends, as shown in Fig. 4. Securing elements 22 connect the depending flanges of the top rails 21 with the bodies 2 of the side rails 1. Securing elements 23 connect the horizontal, inwardly projecting flanges of the top rails 21 with the tread 16 of the platform 15. The upper surfaces of the steps and of the platform 15 are grooved longitudinally, as at 24, to form anti-slipping ribs 25.

If the invention is embodied in the form of a step ladder, a prop P is provided, and includes side members 27, each in the form of a channel, including a front flange 28, a rear flange 29 and a body 30, the foot pieces 31 being formed in the manner hereinbefore described in connection with the foot pieces 5. The body 30 of each side member 27 of the prop P is extended upwardly above the flanges 28 and 29 to form an ear 32. The side members 27 of the prop P extend upwardly inside of the depending flanges of the top rails 21, the ears 32 being connected to the said flanges by pivot elements 33. The rear flanges 29 of the side members 27 of the prop P may be joined by as many transverse ties 34 as are considered necessary. Downwardly and outwardly inclined braces 35 connect the ties 34 with the rear flanges 29 of the side members 27 of the prop P.

U-shaped, inwardly projecting brackets 36 are connected by securing elements 37 to the bodies 30 of the side members 27 of the prop P, as shown in Fig. 6. A rearwardly extended shelf S is provided and includes side strips 38, which are angle members. The inwardly extended horizontal flanges of the side strips 38 support a table 40, connected thereto by securing elements 41, the table 40 being supplied at its rear end with a depending lip 42 which extends downwardly over the rear ends of the side strips 38. Intermediate their ends, the depending flanges of the side strips 38 are connected to the brackets 36 by pivot elements 38. When the shelf S is in a horizontal position, the forward portions of the side strips 38 engage the lower edge of the rear flange 10 of the step next below the top step, and the side strips 38 of the shelf fit closely between the inner edges of the front flanges 4 of the side rails 1, as shown in Fig. 2. When the shelf S is turned on the pivot elements 38 into alignment with the prop P, the lower end of one of the side strips 38 of the shelf engage an inwardly projecting stop 48 (Fig. 2) secured as shown in Fig. 1 to the rear flange 29 of one of the prop members 27.

Foldable braces B hold the prop and the main portion of the ladder in the position shown in Fig. 1. The braces B include rear members 43, pivoted at 44 to the bodies 30 of the side members 27 of the prop P. The braces include forward members 45, pivoted at 46 to the bodies 2 of the side rails 1 of the ladder proper. Intermediate their ends the forward members 45 of the braces B are pivoted at 50 to the forward ends of the rear members 43 of the braces. As shown in Fig. 7, the forward member 45 of each brace B is supplied along its upper edge with a lateral lip 47 which engages the upper edge of the rear member 43 of the brace B and holds the parts 43 and 45 of the brace in the position shown in Fig. 1 of the drawings.

Especial attention is directed to the way in which the steps are joined to the side rails 1, and to the way in which the platform 15 is formed and held in place, as shown in Fig. 4, the platform 15 being a duplicate of the uppermost step.

By using extruded metal whenever possible, an advantage is gained over the use of fabricated sheet metal. The extruded metal can be purchased as an article of manufacture and can simply be cut off in proper lengths, it being unnecessary to form a channel as a step in the making of the ladder. The device forming the

subject matter of this application is simple in construction, light, and characterized by strength and ability to withstand hard and long continued use.

In Figs. 8 and 9, parts hereinbefore described are designated by numerals previously used, with the suffix "a". In this form of the invention, the side rails 1a, although channel-shaped, are made of angle members. The angle members which make up the side rails are connected near their upper ends by a gusset plate 100. They are connected near their lower ends by a gusset plate 101, and a U-shaped seat 102 is interposed between the angle members at their lower ends.

Having thus described the invention, what is claimed is:

1. A ladder comprising side rails having front and rear flanges, steps having their ends disposed between the flanges, the steps being in the form of channels having depending front and rear flanges, means for securing the front flanges of the steps to the front flanges of the side rails, a platform duplicating one step and disposed in alignment therewith, and means for securing the front flange of the platform and the rear flange of said one step to the rear flanges of the side rails.

2. A ladder comprising side rails having front and rear flanges, steps having their ends disposed between the flanges, the steps being in the form of channels having depending front and rear flanges, the depending terminal ends of said flanges being enlarged to provide reenforcing and strengthening means for said steps, means for securing the front flanges of the steps to the front flanges of the side rails, a platform duplicating one step and disposed in alignment therewith, and means for securing the front flange of the platform and the rear flange of said one step to the rear flanges of the side rails.

3. A ladder comprising side rails having front and rear flanges, steps having their ends disposed between the flanges, the steps being in the form of channels having depending front and rear flanges and intermediate depending flanges between said front and rear flanges, the depending terminal ends of all of said flanges being enlarged to provide reenforcing and strengthening means for said steps, means for securing the front flanges of the steps to the front flanges of the side rails, a platform duplicating one step and disposed in alignment therewith, and means for securing the front flange of the platform and the rear flange of said one step to the rear flanges of the side rails.

4. A ladder comprising side rails having front and rear flanges, steps having their ends disposed between the flanges, the steps being in the form of channels having depending front and rear flanges, and intermediate depending flanges between said front and rear flanges, the depending terminal ends of said flanges being enlarged to provide reenforcing and strengthening means for said steps, means for securing the front flanges of the steps to the front flanges of the side rails, a platform duplicating one step and disposed in alignment therewith, and means for securing the front flanges of the platform and the rear flange of said one step to the rear flanges of the side rails, and a prop pivoted to said platform and comprising rails having front and rear flanges.

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