

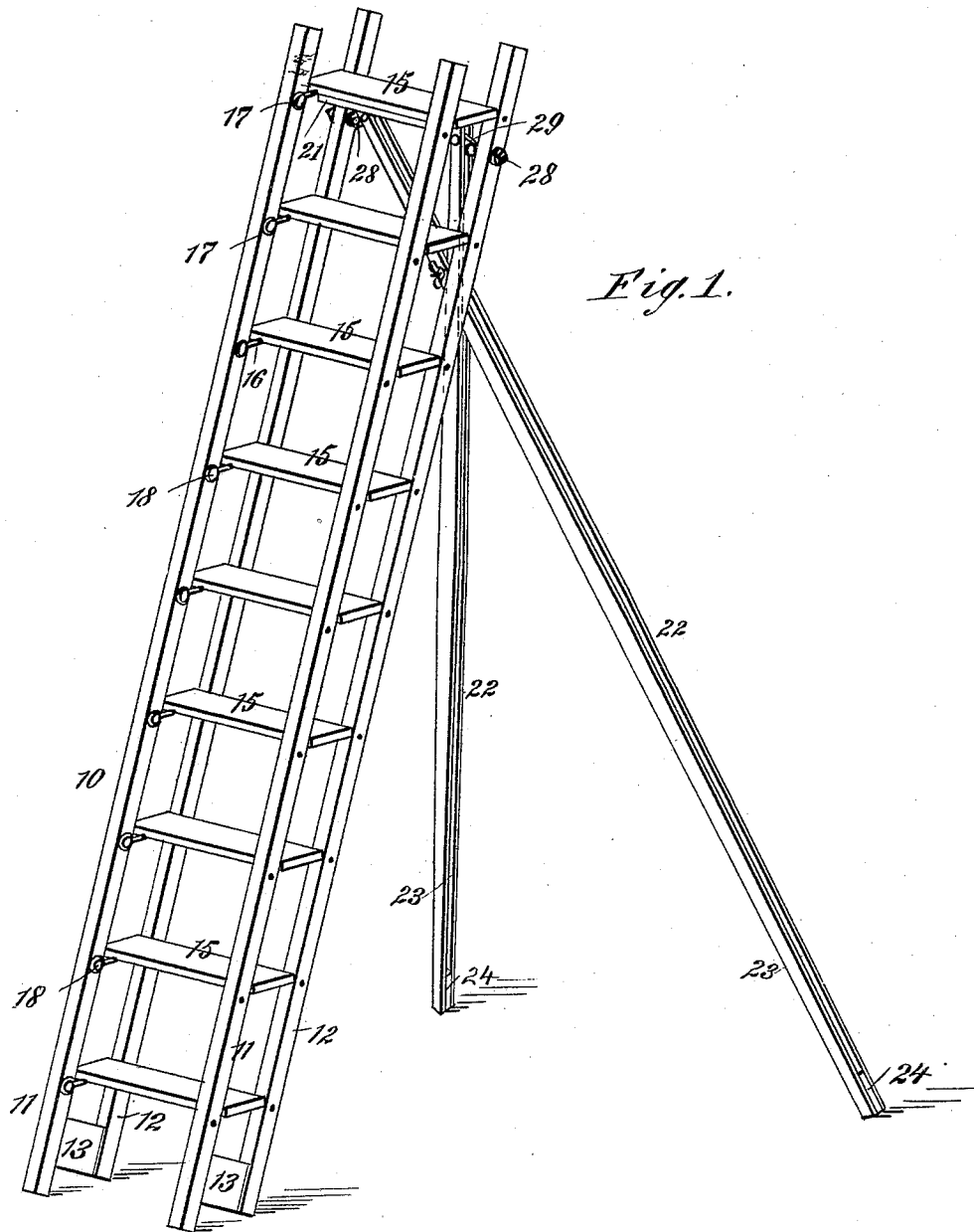
(No Model.)

3 Sheets—Sheet 1.

P. F. M. BURROWS.
FOLDING ADJUSTABLE LADDER.

No. 419,821.

Patented Jan. 21, 1890.



WITNESSES:

Donn Twitchell
C. Sedgwick

INVENTOR:

P. F. M. Burrows

BY

Munn & Co

ATTORNEYS.

(No Model.)

3 Sheets—Sheet 2.

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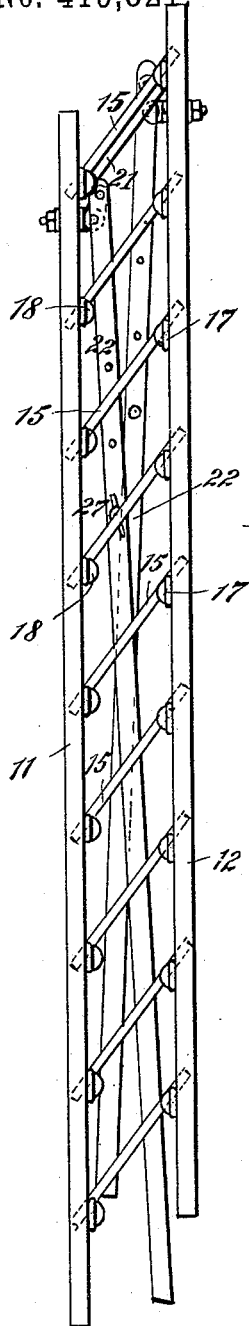


Fig. 2.

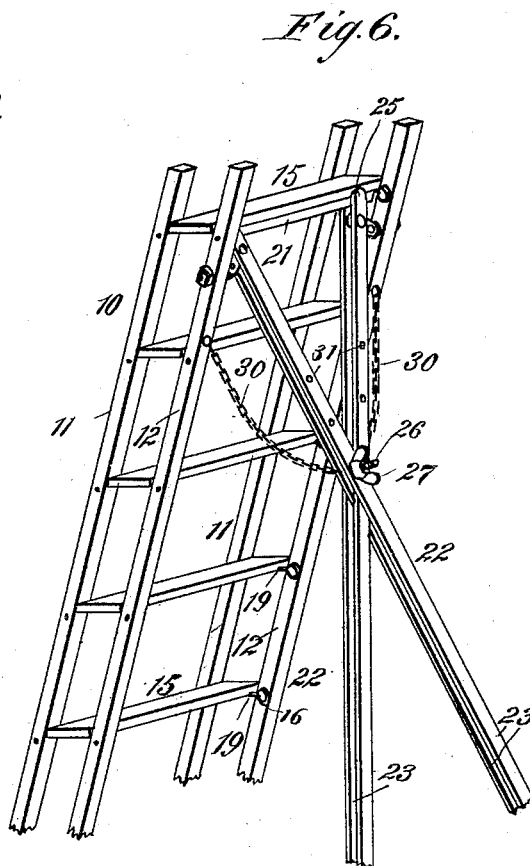


Fig. 6.

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(No Model.)

3 Sheets—Sheet 3.

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Fig. 3.

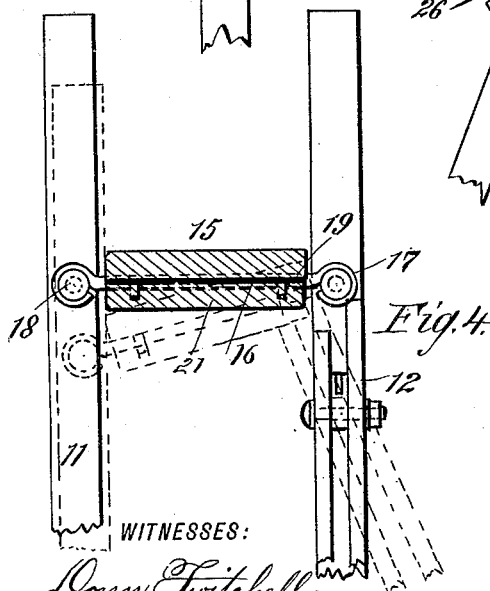
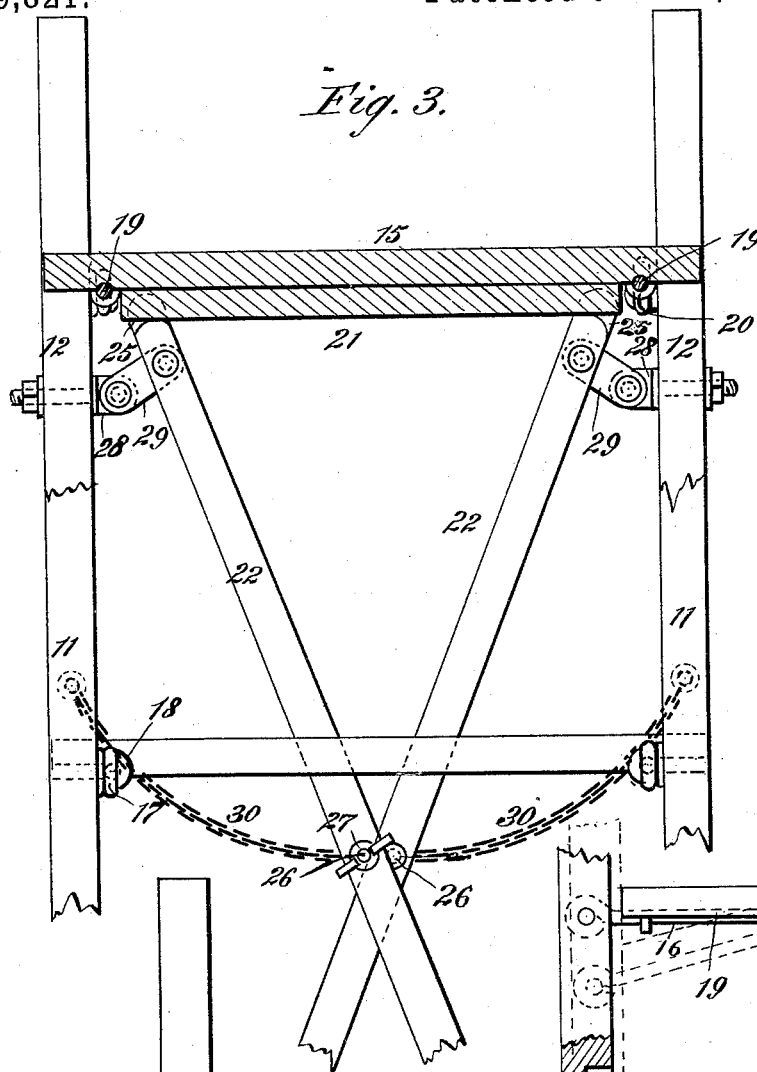
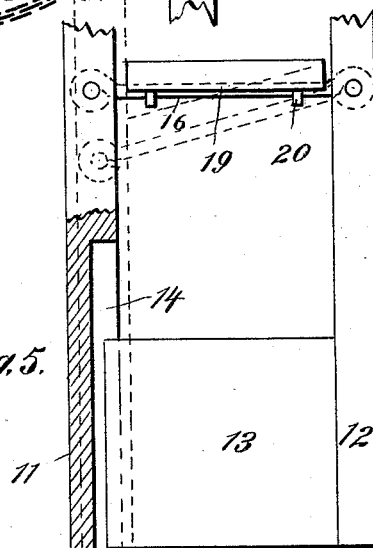


Fig. 5.



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UNITED STATES PATENT OFFICE.

PIERRE FINCH MARTINEAU BURROWS, OF AUCKLAND, NEW ZEALAND.

FOLDING ADJUSTABLE LADDER.

SPECIFICATION forming part of Letters Patent No. 419,821, dated January 21, 1890.

Application filed November 8, 1888. Serial No. 290,261. (No model.) Patented in New Zealand February 11, 1888, No. 2,805; in New South Wales November 15, 1888; in Queensland November 20, 1888, and in Victoria June 11, 1889.

To all whom it may concern:

Be it known that I, PIERRE FINCH MARTINEAU BURROWS, of Auckland, in the county of Auckland, New Zealand, have invented a new and Improved Folding Adjustable Ladder, (for which patents have been granted to me in New Zealand, February 11, 1888; New South Wales, November 15, 1888; Queensland, November 20, 1888, and Victoria, June 11, 1889,) of which the following is a full, clear, and exact description.

My invention relates to an improvement in ladders, and has for its object to provide a ladder which may be readily adjusted to the inequalities of the ground or other support, and which may be compactly and readily folded when not in use.

A further object of the invention is to provide a ladder which will stand upon any surface, will not overbalance or upset, and which will be light, strong, compact, and portable; and the further object of the invention is to provide a ladder capable of the above-named functions, which will be of a simple and durable construction, almost absolutely safe under all circumstances, and which can be conveniently and expeditiously manipulated.

The invention consists in the construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures of reference indicate corresponding parts in all the views.

Figure 1 is a perspective view of my improved ladder in position for use. Fig. 2 is a perspective view of the same when folded up for transportation or storage. Fig. 3 is a partial front elevation of the ladder, a portion of the frame being broken away and the upper step in section. Fig. 4 is a partial side elevation of the ladder, illustrating the upper step in transverse section. Fig. 5 is a similar view illustrating the construction of the lower brace and also support of the steps, and Fig. 6 is a perspective view of a portion of the interlocking rear braces and of the ladder.

In carrying out the invention the body of the ladder consists of four standards 10, ar-

ranged in pairs to form the sides. The front and rear standards 11 and 12 of each side are filled in at the bottom ends by a block or transverse brace 13, as best illustrated in the detail view of Fig. 5. The blocks 13 are rigidly attached at one end to the rear standards 12 in any approved manner, the opposite end being adapted to a longitudinal groove 14, produced in or upon the front standards 11, thus allowing the front standards to slide upon the blocks 13.

The pairs of standards 10 are united by a series of steps 15, the width of the said steps corresponding to the space intervening the front and rear standards and likewise the width of the several blocks 13. The steps and also the front and rear standards are held in position at proper intervals through the medium of supporting or bearing bars 16, which bars are attached, respectively, to the front and rear standard of each pair in any approved manner, the same being ordinarily accomplished by producing an eye 17 in the extremities of the rod, placing the eye in contact with the inner faces of the standards, and passing a bolt, pin, or screw 18 through the said eye and transversely through the said standards, as best illustrated in Figs. 1, 4, and 5.

The under surface of the steps 15 is provided with a transverse groove 19 near each end, which grooves are adapted to receive the rods 16, and the steps are held in connection with the said rods through the medium of staples 20 or other equivalent fastening device driven in the under face of the step and embracing the rod, as best illustrated in Figs. 3 and 5. The upper step upon the under side at the rear is provided with a longitudinal attached brace or fillet 21, as best illustrated in Figs. 3 and 4, and which may extend the full length of the step, the purpose of which brace or fillet will be hereinafter set forth.

It will be observed from the construction of the body set forth that the several steps are pivotally attached at their respective ends to the bearer or rods 16, which connect the front and back standards 11 and 12 of each pair of standards, whereby when the ladder is to be folded up for transportation

or storage one set of standards may be folded inward in direction of and to a substantial contact with the opposing set of standards, as best illustrated in Fig. 2, and when set up
5 for use the pivoted steps and rods give adjusting movements to the standards.

The back stays or braces 22 consist of two limbs, each of which limbs is composed of two parallel and spaced strips 23 of wood or other
10 suitable material, as best illustrated in Figs. 1 and 6, the lower ends of the said strips being connected by an interposed block 24. The rear strip of each limb is of greater length than the forward strip at the top, as
15 best illustrated at 25 in Fig. 3.

In attaching the limbs to the body they are made to interlock or cross each other, as clearly shown in the detail view of Fig. 6, and each limb is provided at or near the top with
20 an adjusting-stop 26, the adjusting-stop of one limb being essentially in transverse alignment with the stop of the opposite limb, as shown in Fig. 3. The said adjusting-stop preferably consists of a bolt passing through
25 the several strips of each limb, threaded at one end and provided with a wing or thumb-nut 27, the said nuts being preferably located at the rear or forward sides of the respective limbs. The upper ends of the limbs
30 are connected to the respective rear standards of the body by a swivel or universal joint, which joint preferably consists of a rigid member 28, firmly attached to the rear standard below the upper step, and to the inner
35 projecting end of the said member 28 a link 29 is pivoted at one end, the opposite end of the said link being pivoted between the opposing strips of the limbs through the medium of a pin or bolt passing through the
40 said limbs and a suitable aperture in the link, as fully illustrated in Fig. 3.

If desired, when attaching the back-stays to the back standards, the position of the members composing the swivels may be reversed, the link 29 being pivoted to the rear
45 face of the standards and the rigid member 28 being made to pass through and firmly attached to the two members forming each limb of the brace. The back stays or braces 22
50 are limited in their movement from the body by a length of chain 30, attached to the said braces below their connection with the standards and to the standards, to which they are connected. The stops 26 are fixtures, and
55 when necessary only the thumb-nuts are to be unscrewed, the limbs of the back-stay 22 being then released, and where adjusted, as required by the surface upon which they stand, the thumb-nuts may be screwed up
60 again, the several members composing the back-stays becoming rigid by attrition. The fillet or brace 21, attached to the lower face of the upper step, is purposed to be engaged by the bird's mouth formed by the two unequal
65 ends of the back-stays when the same are extended, the projecting strip being outside. A further purpose of the fillet is to counter-

act the effect of the upward thrust of the back-stays upon the rods which support the top step. It will be observed that when the ladder is placed in position and is dragged along
70 the surface supporting the same the strain will be relieved from the swivel or pivotal joint connecting the back-stays and the body by the stop-chain 30 and also by the fillet or
75 brace 21.

In operation, when the above-described ladder is to be used, it must be set perpendicular and opened out from its closed position and the back-stays are spread from the bottom
80 until their further spread is prevented by the stops 26. The ladder is then set where wanted and the body shifted to the right or left, as required, until its sides are plumb, when it, as likewise the back-stay, will take a firm
85 bearing upon the ground. If the ground is very rough, the back-stays themselves may be adjusted by unscrewing the stops 26, shifting one of the limbs until they both take a firm bearing, and then clamping them with
90 the stops. When the adjustment has been effected, the ladder may be mounted, as the full weight of the ascending person is thrown on the front edge of the steps, and the steps being pivoted on the bearer or rods and the
95 bearers to the standards forming the sides, both the steps and the body will adjust themselves to the plane of the surface on which the body of the ladder rests. The ladder structure being thus in equilibrium and the
100 various parts tightly jammed together by the weight, it follows that the greater the weight and the higher that the weight ascends it is more directly brought over the line of gravity and the ladder is rendered more safe and
105 rigid.

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

1. In a ladder, the combination, with parallel standards arranged in pairs, blocks secured to the lower end of the rear standards, the front standards sliding upon the contiguous face of the blocks, and steps pivoted upon
110 bearers between the opposing faces of the pairs of standards, of interlocking back-stays or braces universally connected with the upper ends of the respective rear standards of each pair, substantially as shown and described.
120

2. In a ladder, the combination, with parallel standards arranged in pairs, a base-block fixed at the lower end of the rear standards, the front standards sliding upon the contiguous face of the base-blocks, and steps pivoted
125 upon bearers between the opposing faces of the pairs of standards, of interlocking stays or braces, one back-stay universally pivoted at the upper end to the rear standard of each pair of standards, and adjustable stops passing through the respective back-stays, limiting their lateral movement, substantially as and for the purpose specified.
130

3. In a ladder, the combination, with par-

allel standards arranged in pairs and a series of steps of a width equal to the space between the opposing faces of the several pairs of standards and provided with transverse grooves upon the lower face, of supporting-bars uniting the front and rear standards of each pair entering the grooves in the step, and means, substantially as shown and described, for retaining the steps in connection with the said bars, as and for the purpose specified.

4. In a ladder, the combination, with parallel standards arranged in pairs, a series of steps of a width equal to the space between the opposing faces of the several pairs of standards and provided with transverse grooves upon the lower face, and supporting-bars uniting the front and rear standards of each pair entering the grooves in the step, of interlocking back-stays or braces universally connected with the respective rear standards of each pair, and stop-pins passing through the said braces, limiting their lateral movement, substantially as shown and described.

5. In a ladder, the combination, with parallel standards arranged in pairs, blocks rigidly secured to the lower end of the rear standards, the front standards sliding upon the contiguous faces of the base-block, and steps of a width equal to the space between the opposing faces of the front and rear standards, provided upon the under face with transverse grooves, of supporting-bars secured transversely to each pair of standards entering the grooves in the step, strips attached to the steps and embracing the said supporting-bars, and interlocking back-stays or braces universally connected with the respective rear standards of each pair, and stop-pins adjustably secured to said stays or braces, limiting the lateral movement of the same, substantially as shown and described.

PIERRE FINCH MARTINEAU BURROWS.

Witnesses:

JNO. TYLER CAMPBELL,
JOHN MITCHELL.