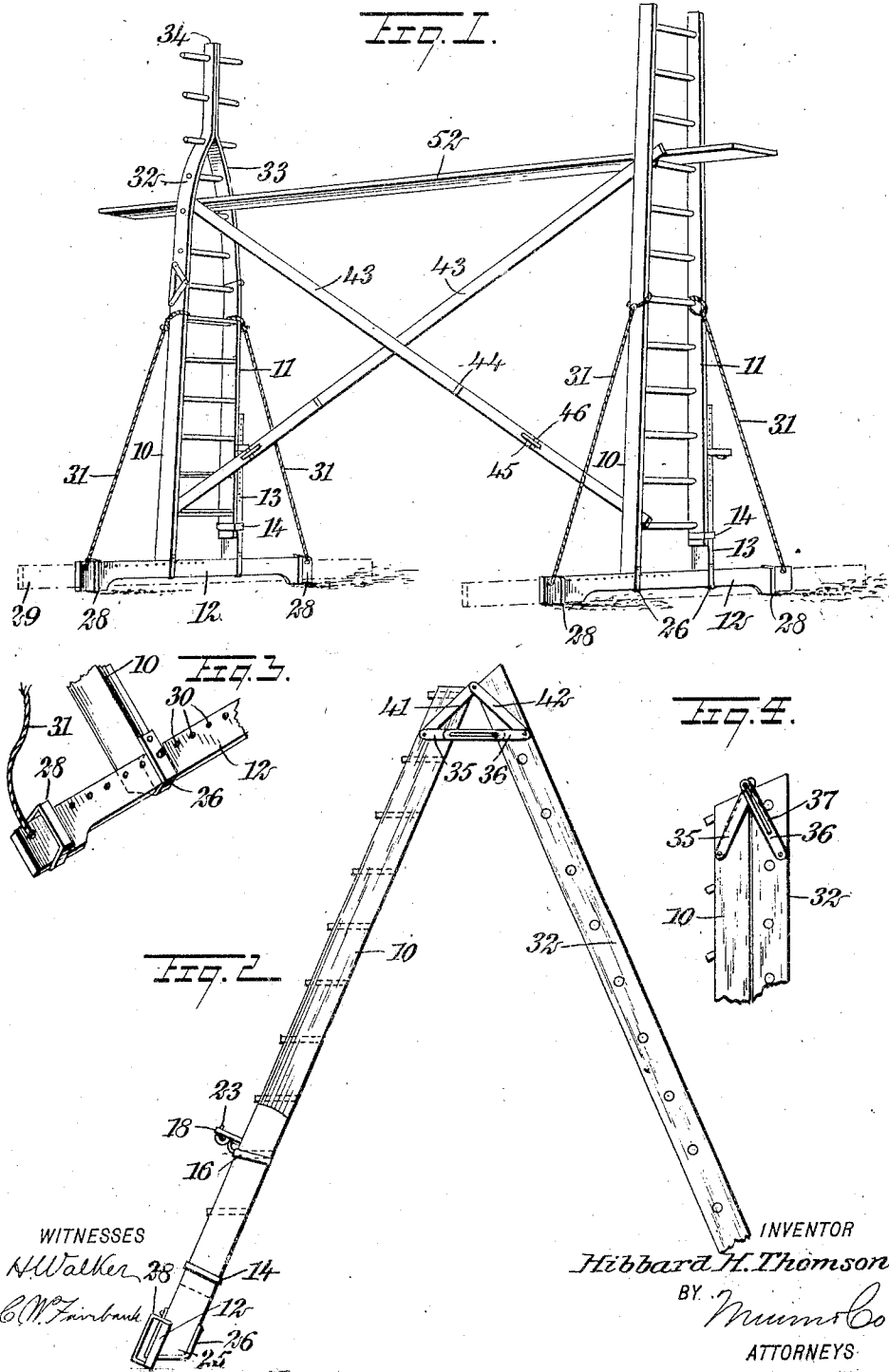


H. H. THOMSON.
 COMBINED LADDER, STEP LADDER, AND-SCAFFOLDING.
 APPLICATION FILED NOV. 1, 1907.

901,565.

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2 SHEETS-SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 5.

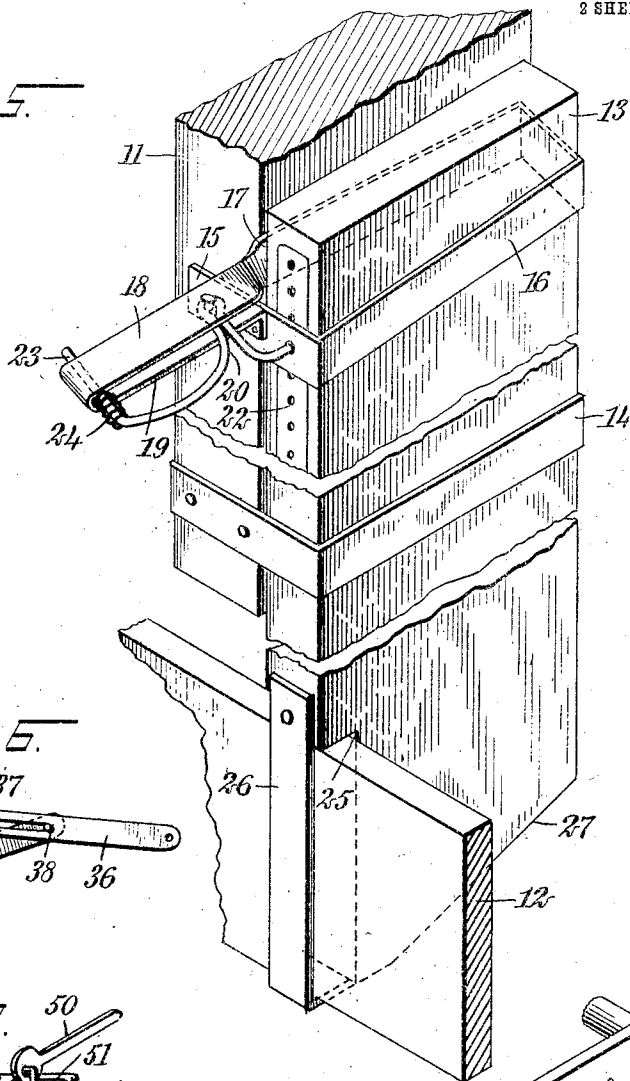


Fig. 6.

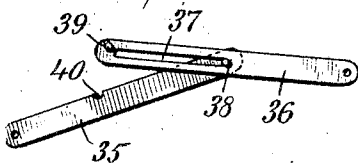


Fig. 7.

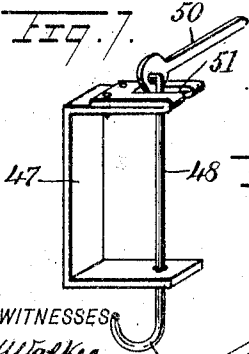
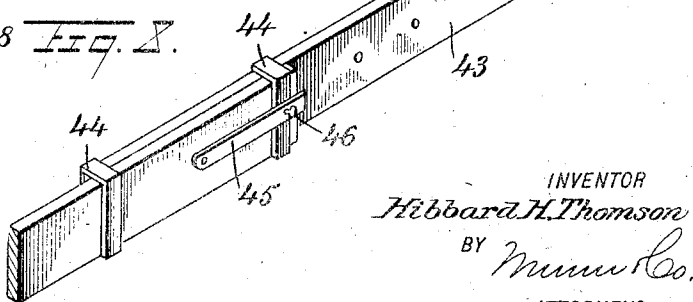


Fig. 8.



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HIBBARD H. THOMSON, OF LAWRENCE, KANSAS.

COMBINED LADDER, STEP-LADDER, AND SCAFFOLDING.

No. 901,565.

Specification of Letters Patent.

Patented Oct. 20, 1908.

Application filed November 1, 1907. Serial No. 400,145.

To all whom it may concern:

Be it known that I, HIBBARD H. THOMSON, a citizen of the United States, and a resident of Lawrence, in the county of Douglas and State of Kansas, have invented a new and Improved Combined Ladder, Step-Ladder, and Scaffolding, of which the following is a full, clear, and exact description.

This invention relates to certain improvements in ladders, whereby a ladder may be readily converted into a step ladder, or may be employed as a portion of a scaffolding.

The invention involves certain improvements over the ladder disclosed and claimed in my previous patent, No. 864,044, dated August 20, 1907, and these improvements involve means for varying the length of the base, means for holding the side bar in its adjusted position, means whereby the ladder may be converted into a step-ladder, and means whereby two ladders may be connected to serve as the support of scaffolding.

The invention consists in certain features of construction and combinations of parts, all of which will be fully set forth hereinafter and particularly pointed out in the claims.

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

Figure 1 is a perspective view of two of my improved ladders connected to form a scaffolding; Fig. 2 is a side elevation of a ladder having a jointed section, whereby it may be employed as a step-ladder; Fig. 3 is a perspective view of means employed for rigidly connecting the base member to one of the side members; Fig. 4 is a fragmentary end view of the step-ladder in collapsed form; Fig. 5 is a perspective view on an enlarged scale showing the improved means for holding the sections of the side member in adjusted position; Fig. 6 is a detail showing the brace employed in connection with the hinge; Fig. 7 is a perspective view of the clamp employed for securing the connecting bars to ladders in forming scaffolding; and Fig. 8 is a perspective view of one of these bars connected to a ladder round.

As previously stated, the step-ladder involving the major portion of the present invention constitutes an improvement over that disclosed in my previous patent, said ladder including side members or rails 10 and

11, one of which is extensible and both of which are connected at their lower ends to a base member 12.

One feature of my invention involves the means for varying the length of one of these side members and for holding the member in its adjusted position. The side member is rendered adjustable by the employment of a leg 13 held parallel to the body portion of the side member 11 and slidable in respect thereto. Any suitable means, as, for instance, a strap 14, may be employed for holding the side member and extension leg together at one point, while at a distance therefrom I employ my improved extension means. As shown, this means involves a metal strap or bar having one end 15 rigidly secured to the edge of the side member and extending across the edge of the leg. The strap or bar is here bent to form a loop inclosing the extension leg, said loop having a portion 16 extending across the face of the leg, a transverse portion extending across the opposite edge, and a portion 17 lying intermediate the member and the leg and preferably secured to the frame. Adjacent the point at which the strap emerges from between the two, it is twisted to form an outwardly-extending bracket 18 lying in a plane at substantially right angles to the general length of the ladder. The terminal portion of the bar is bent backward toward the side member to form a portion 19 lying substantially parallel to the portion 18 and constituting the remainder of the bracket. The inner end of the portion 19 is preferably rigidly connected to the portion 15. It will thus be noted that a single strap is employed which has both ends thereof connected to the side member, forms a loop inclosing the extension leg, and also forms a bracket extending outwardly therefrom. This bracket constitutes a support for the locking member which preferably comprises a wire bent to form a loop 20 pivoted within the bracket and between the portions 18 and 19 of the strap, and having one of the terminal portions extending through an aperture in the strap and into one of a series of apertures in the edge of the extension leg or in a plate 22 carried by said edge. The opposite end of the wire extends through the bracket at its outer end and constitutes a handle 23 for the operation of the locking member. The wire preferably carries a spring 24, so disposed as to normally press the opposite end of the wire through

the strap and into the registering aperture of the extension leg. To apply this adjusting and locking means to a ladder does not involve any cutting or fitting of the parts, thus rendering it readily adaptable for use in connection with ladders already upon the market if it is desired to form one side member of the same extensible.

The base member 12 is pivotally connected to one of the side members of the ladder and pivotally and slidably connected to the other member, but to strengthen and reinforce the same and render it more readily adapted for application to ladders already manufactured, I preferably secure said base to the side members by cutting a recess 25 in one of the lower corners of each side member. The base member 12 extends through this recess and is held therein by a strap 26 having its ends connected, respectively, to the edge and to the end of the side member. The opposite corner of each side member is preferably cut away to form an inclined face 27, so that the corner will not engage with the supporting surface and interfere with the operation of the base. The base at its outer end preferably carries straps 28 forming loops through which a bar 29 may be extended, if it is desired to materially increase the length of the base member. Instead of providing a slot in the base member to accommodate for a variation in the length of one of the side members, I preferably provide a series of openings 30 adapted for the reception of a pin carried by the strap 26 of one of the side members. After the extension leg has been adjusted to the desired position, the pin is inserted through the registering apertures to more rigidly hold the parts against strain or accidental displacement. The outer ends of the base member are preferably connected to the side members at points intermediate the lengths of the ladder by means of cords or ropes 31, which ropes or cords also serve to render the structure more rigid.

My improved ladder having the supporting and adjusting means above described, is especially adapted for conversion into a step-ladder. The side members are preferably formed of two sections hinged together, and the upper ends of the two upper sections 32 and 33 are preferably so bent as to bring them together and form a single point of support when the ladder is leaned against a building or when the sections are bent to bring this end into engagement with the ground. The upper sections are preferably of substantially one-half the length of the ladder, so that when the ladder is bent, the upper terminal end 34 and the outer ends of the base member 12 form three points of support. The ladder may thus be firmly set up irrespective of the character or inclination of the supporting surface. One of the side members of the ladder may have its length

varied to bring the ladder to a substantially upright position, and the ladder may be folded intermediate its ends and inclined until the point 34 engages with the ground.

For holding the sections of the ladder in alinement or for holding the sections at an angle to each other to form the step-ladder, I preferably employ a connecting brace made up of two bars 35 and 36 pivotally connected to the sections of the ladder at points adjacent the hinge but upon the opposite edge therefrom. One of the bars, 36, is provided with a slot 37 adapted for the reception of a pin 38 on the other bar, and also carries a pin 39 adapted for reception in a recess 40 in the bar 35. With the ladder in its erected position, the bars of the brace are brought into the same straight line and the pin enters the recess 40. In the folding of the sections to form a step-ladder, the brace is first extended and later shortened, and when the sections assume the position illustrated in Fig. 2, the pin 39 will again enter the recess 40 and prevent the ladder from spreading.

For reinforcing the ladder adjacent the hinge and brace, the hinge straps 41 and 42 are preferably extended from the hinge pin to the outer ends of the brace and are rigid with their respective sections of the ladder. When the ladder is collapsed to the position shown in Fig. 4, the bars of the brace lie substantially parallel to these hinge straps.

Inasmuch as my improved ladder is adapted for firm and steady support upon any kind of a surface, and as the rounds of the ladder may be brought to a horizontal position irrespective of the character of said supporting surface, I may, if desired, employ two of the ladders as supports for a scaffolding. For holding the ladders rigid in respect to each other and in an upright position, I preferably provide two or more connecting bars 43, each of which is extensible and adapted to be rigidly connected to a round of the ladder. Any suitable means may be employed for varying the length of each of the bars, for instance, that employed for varying the length of the side member of the ladder, or the simpler mechanism illustrated in Fig. 8. This simpler mechanism involves merely two straps 44 carried by one section of a connecting bar and inclosing the other section, while one of the sections carries a spring 45 having a pin 46 at its free end adapted to extend through one of the straps and apertures in both of the sections of the connecting bar.

For rigidly securing each end of the connecting bar to the round of a ladder and to render the same readily adjustable, I preferably provide the mechanism illustrated in Figs. 7 and 8. A substantially U-shaped metal clamp 47 is provided, adapted to receive the end of the connecting bar, and the ends of the clamp are preferably of spring metal and movable slightly toward and from

each other. A bolt 48 is provided, having one end extending through one of the spring ends of the clamp and terminating in a hook 49 for the reception of the ladder round, and carrying at the other end a cam lever 50 for drawing the bolt longitudinally and firmly binding the round, connecting bar and clamp together. The end of the bolt carrying the cam lever preferably extends through a slot 51, so that the bolt may be moved longitudinally out of engagement with this end of the clamp to facilitate the insertion of the round and the connecting bar. The end bearing said slot is preferably reinforced by bending the terminal portion back upon itself, said terminal portion being riveted in place. The inner end of the rivet preferably extends inward a slight distance, whereby it may engage with the connecting bar to prevent the latter from slipping longitudinally. Two or more of these connecting bars may be employed in connection with two ladders, as illustrated in Fig. 1, and the ladders thus converted into supports for a scaffolding. A suitable plank 52 forming the platforms of the scaffolding, may be supported upon the ladder rounds.

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

1. A ladder, comprising two side bars, one of said side bars composed of two members slidably connected together, a strap encircling one of said members but unattached thereto, said strap being rigidly secured to the other member and having a portion thereof extending outwardly to form a bracket, and a pin carried by said bracket and movable in respect thereto and adapted to engage with the member encircled by said strap and prevent longitudinal movement thereof.

2. In a ladder, a bar composed of two members slidably connected together, a metal strap completely encircling one of said members and rigidly secured to the other member, said strap having a portion thereof extending outwardly to form a bracket and having an aperture therein adjacent the base of said bracket, and a locking pin carried by said bracket and movable through said aperture to prevent longitudinal movement of one member in respect to the other.

3. A ladder, comprising two side bars, one of said side bars composed of two members slidably connected together, a strap com-

pletely encircling one of said members and having its ends connected to the other member, a portion of said strap constituting a bracket, and a spring-pressed locking pin carried by said bracket and adapted to engage with one of the members and prevent longitudinal movement thereof.

4. A ladder, comprising two side bars, one of said side bars being composed of two members slidably connected together, a metal strap completely encircling one of said members and having its ends connected to the other of said members at one edge thereof, a portion of said band forming a bracket, and a spring-pressed pin pivotally mounted upon said bracket and having one end thereof adapted for engagement with the member encircled by the strap, and the other end of said pin being disposed at the outer end of the bracket and constituting a handle.

5. In combination, two ladders, each having two side bars, means for adjusting the length of one of said side bars to each ladder, whereby the ladder may assume a vertical position irrespective of the inclination of the supporting surface, connecting braces for holding said ladders rigid in respect to each other, and means for connecting said braces to said ladders, each of said means comprising a substantially U-shaped clamp adapted to encircle the brace, and a bolt carried by said clamp and having a hook at one end thereof adapted to engage with a round of the ladder, and having means at the opposite end thereof for moving said bolt longitudinally to lock the round and brace to the clamp.

6. In combination, two ladders, connecting braces for holding said ladders rigid in respect to each other, and means for connecting said braces to said ladders, each of said means comprising a substantially U-shaped clamp adapted to encircle the brace, and a bolt carried by said clamp and having a hook at one end thereof adapted to engage with a round of the ladder, and having means at the opposite end thereof for moving said bolt longitudinally to lock the round and brace to the clamp.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HIBBARD H. THOMSON.

Witnesses:

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CHAS. R. POE.