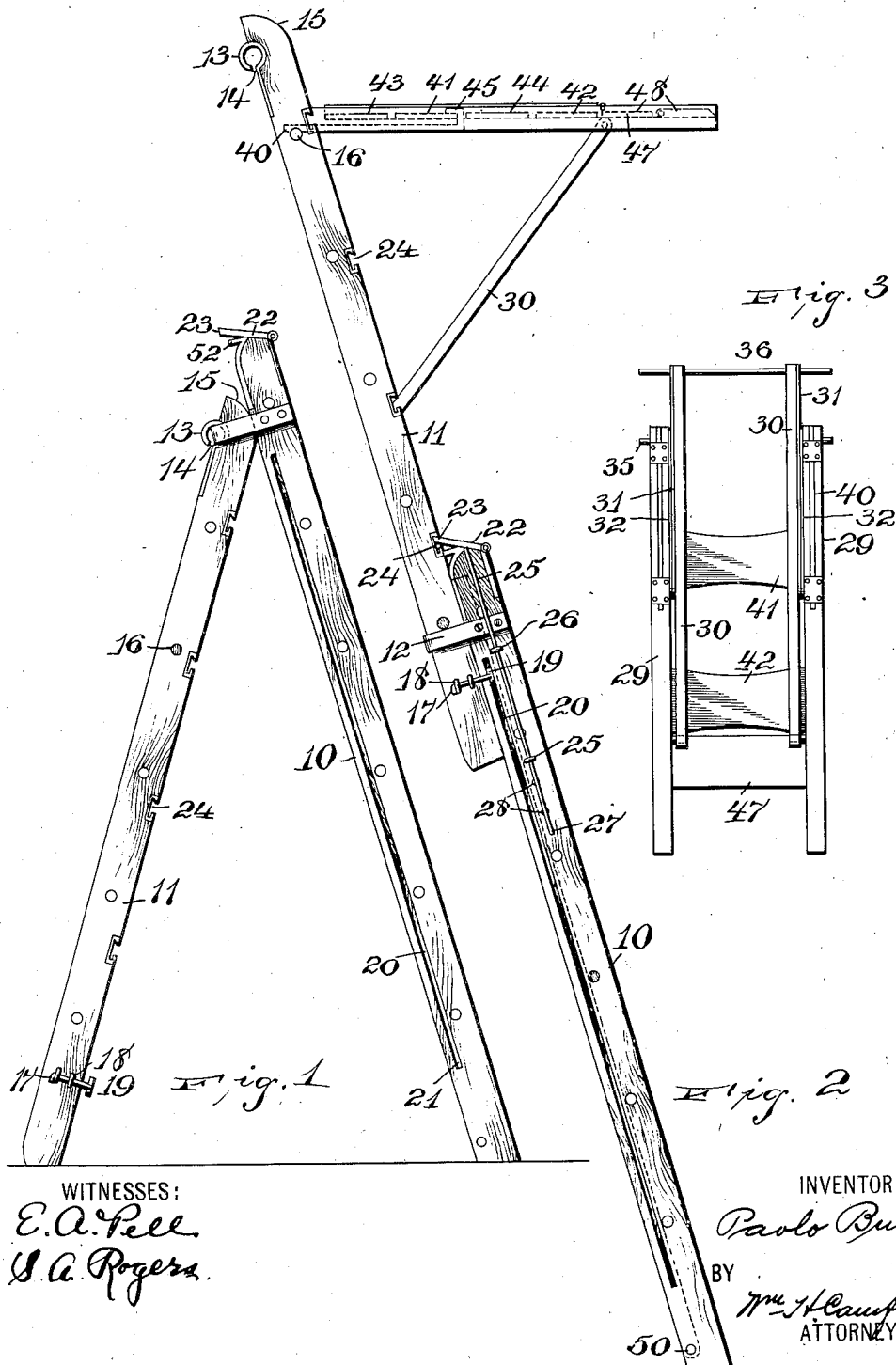


P. BUCCO.
 COMBINED EXTENSION LADDER, STEP LADDER, AND SCAFFOLD.
 APPLICATION FILED MAR. 12, 1908.

931,265.

Patented Aug. 17, 1909.
 3 SHEETS—SHEET 1.



WITNESSES:
 E. A. Bell
 S. A. Rogers.

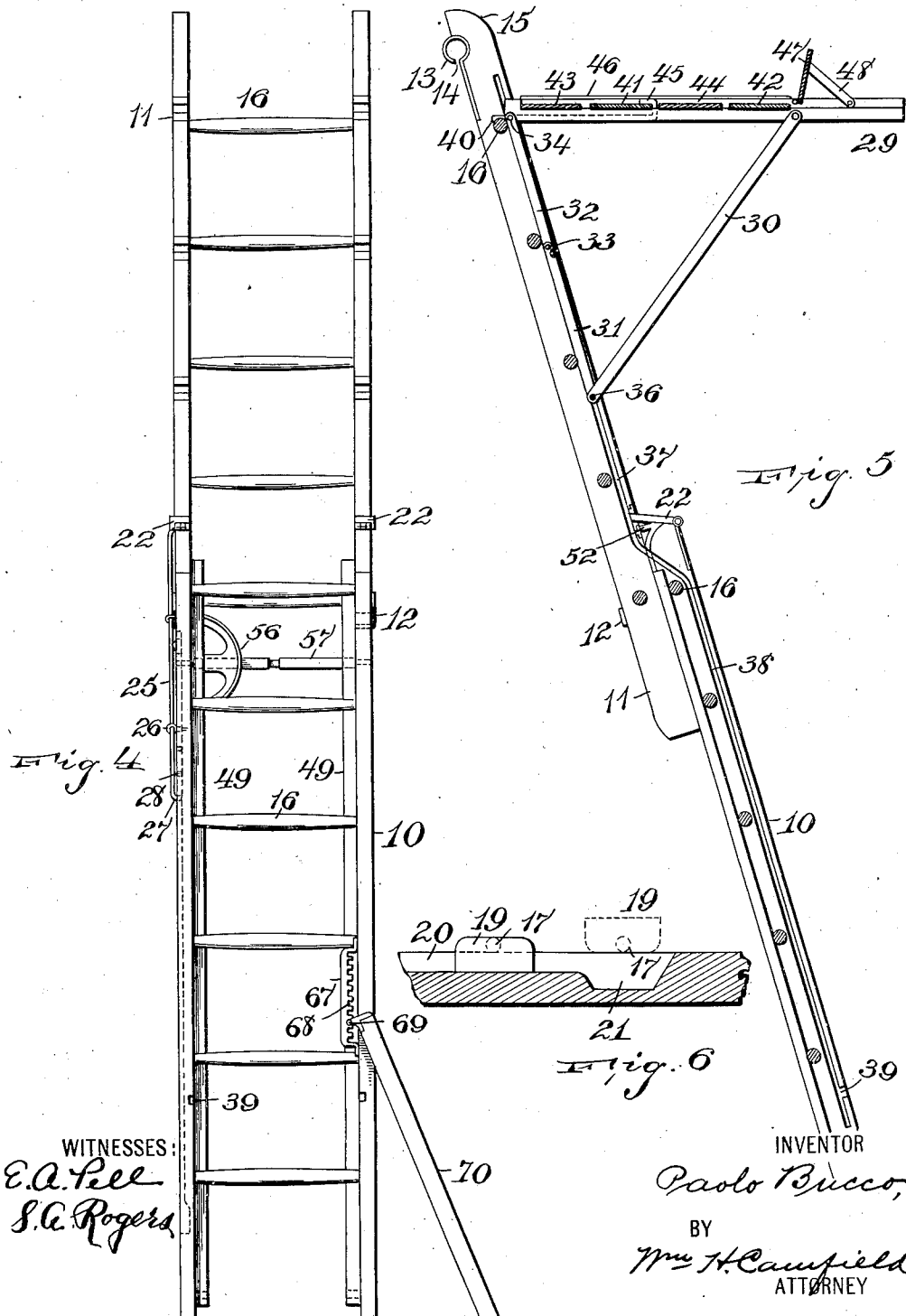
INVENTOR
 Paolo Bucco
 BY
 Wm. H. Campfield.
 ATTORNEY

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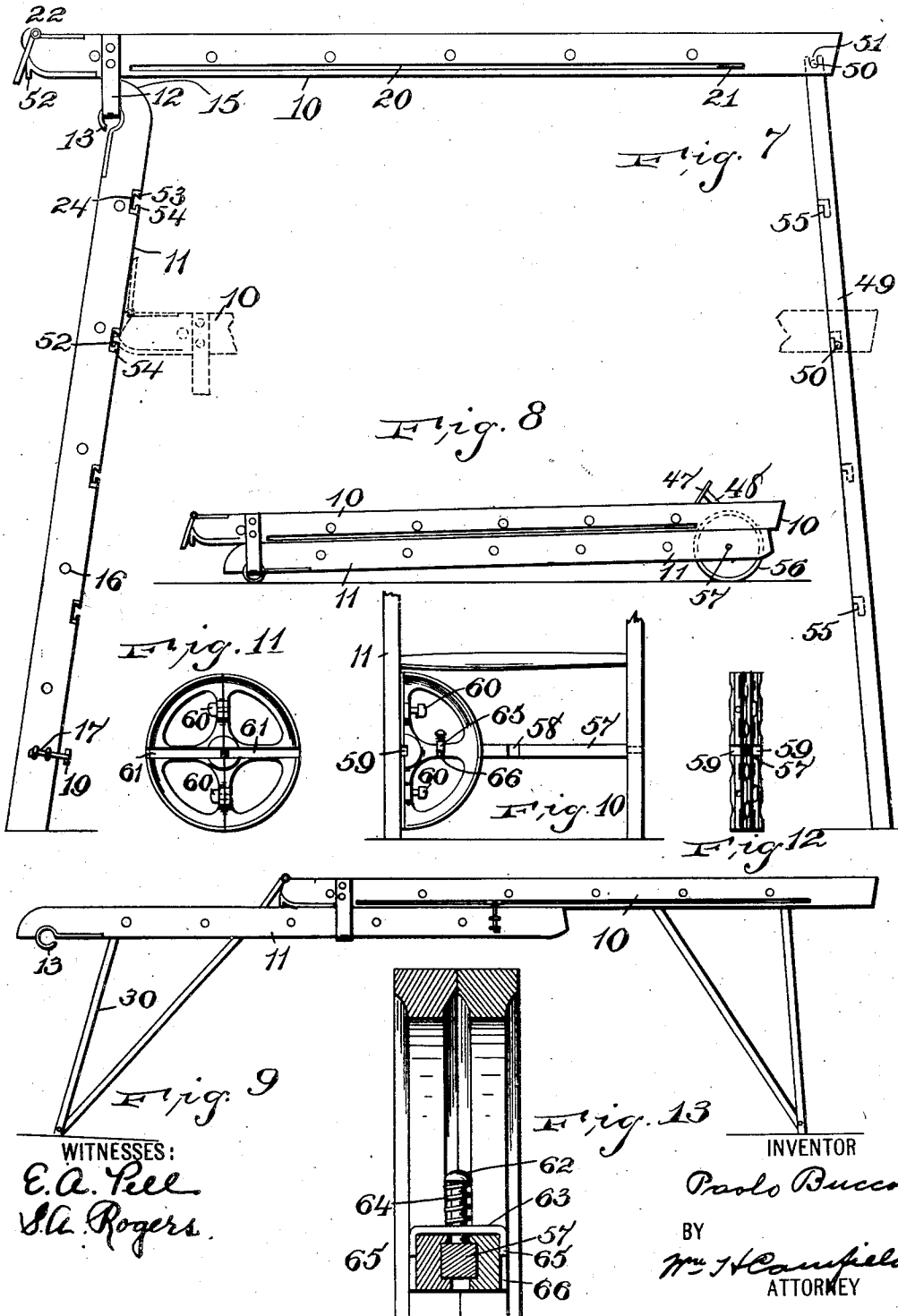


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3 SHEETS—SHEET 3.



WITNESSES:

E. A. Peck
 H. Rogers.

INVENTOR

Paolo Bucco,

BY

Wm. H. Campfield
 ATTORNEY

UNITED STATES PATENT OFFICE.

PAOLO BUCCO, OF NEWARK, NEW JERSEY.

COMBINED EXTENSION-LADDER, STEP-LADDER, AND SCAFFOLD.

No. 931,265.

Specification of Letters Patent.

Patented Aug. 17, 1909.

Application filed March 12, 1908. Serial No. 420,569.

To all whom it may concern:

Be it known that I, PAOLO BUCCO, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Combined Extension-Ladders, Step-Ladders, and Scaffolds; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to figures of reference marked thereon, which form a part of this specification.

This invention relates to a ladder which is an extension ladder, but is also arranged to form a step-ladder, the two different positions being easily arranged from one to the other.

The invention further consists in a hinging attachment which allows the ladders to be swung apart when they are at their limit of movement toward each other, one of the hinging elements also acting to hold the extended section of the ladder, when the ladder is used as an extension ladder.

A further object of the invention is to make a ladder of this kind that can also be used as a scaffold, the height of the scaffold being adjustable.

Another improved feature of this invention is a wheel to be installed on the ladder, which wheel is collapsible, but which can be put together so as to support the ladder at one end, when the ladder is folded, and in this way the ladder can be used as a barrow or truck, the wheel when collapsed and slid to one side interfering in no way with the other functions of the ladder.

A still further object of the invention is an improved latch to hold the ladder sections together in sliding engagement, the latch being locked against release except at a point at the inward limit of movement of the ladder sections.

Another improved feature of this device is its adaptability for using scaffolding or platforms having locking means for locking them in place, the platforms being collapsible and being arranged to lie flat down against the ladder, when the ladder is transported or when it is desired to temporarily discontinue the use of the platforms.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side view of the ladder as it appears when used as a step-ladder, and Fig. 2 is a similar view showing the ladder used as an extension ladder and with a platform in place thereon. Fig. 3 is a bottom view of the platform when folded up. Fig. 4 is a face view of the ladder as an extension ladder, and Fig. 5 is a vertical section of the same. Fig. 6 is a detail showing the operation of a latch to hold the parts in sliding relation. Fig. 7 is a side view showing the ladder used as a scaffold. Fig. 8 is a side view on a reduced scale showing the ladder used as a barrow or truck. Fig. 9 is a reduced side view showing the ladder as used as a low scaffold. Fig. 10 is a detail showing the collapsible wheel in its folded position. Fig. 11 is a side view of the wheel in its operative relation. Fig. 12 is a face view of the wheel shown folded as it is in Fig. 10, and Fig. 13 is a section through the clamp for holding the two parts of the wheel against the ladder when they are folded.

The ladder consists of two ladder sections 10 and 11, and near the upper end of the ladder sections is a separable hinge, one hinge member being secured to each ladder section, and the preferred form embraces a pair of hook plates 12 secured on each side of the ladder section 10 and near the top thereof and near the top of the ladder section 11, on each side rail, are the eyes 13 having openings 14 for the entrance of the ends of the hook plates 12 which are bent at right angles to the plates themselves. It will be seen, from this description, that the ends of the hook plates that are turned to engage the eyes, form the pintles of the hinges and are adapted to rotate in the eyes 13. The upper end 15 of the ladder section 11 is curved to make it concentric with the eye 13 so as to allow the swinging of the parts.

The ladder sections can be placed as in Fig. 1, that is at an angle and can be used as a step-ladder, each section being provided with the usual rungs 16. When the ladders are placed in line, that is folded together, the opening 14, in each eye 13, comes in line with the right-angled end of the hook plate 12 with which it is in engagement, and the ladder sections can be slid apart or extended and thus form an extension ladder as is

shown in Figs. 2, 4 and 5, the right-angled end of the hook plate 12 engaging the ladder section 11 on each side. In addition to the holding insured by the hook plate, I provide a latch 17 preferably secured by the staples 18 to the ladder section 11, and the ladder section 10 is provided with a slot 20 in which the head 19 of the latch is adapted to ride. The head 19 can not turn when it is passing through the slot as shown in Figs. 1 and 6, since the head 19 is placed eccentrically on its stem 17 and thus cannot turn to enable the ladder sections to be drawn apart. However when they are to be made into a step-ladder, or spread for any reason, I provide the slot 20 with a depression 21 deep enough to enable the head 19 of the latch to be turned over, which brings the top of the latch underneath and level with the edge of the side rail of the ladder section 10, and the ladder sections can be drawn apart. It will be seen that they cannot be assembled or drawn apart unless they are at the limit of movement toward each other, at which point also it is only possible to swing the ladders apart in hinged relation, since that is the only point where the elements of the hinge are in swinging relation.

To secure the ladder in its extended position, I provide the top of the section 10 with a pawl 22 pivoted to the ladder section 10, and with its end 23 extending to engage recesses 24 placed at suitable intervals in the side rails of the ladder section 11. To raise the pawls 22 to allow the ladder section 11 to descend, the ladder 11 is slightly raised and then the pawl is raised by means of a rod 25 which can slide in suitable staples 26, and has its end 27 bent inward to engage and be sprung into the perforations 28 in the side rail 10. This raising and lowering means for the pawl is shown in Figs. 2 and 4, the latter view showing one, but it is of course understood that one is installed on each side of the ladder. Any other means can be used to operate the pawls 22 by the operator of the ladder, but this structure embodies an economical device. The ladder can be equipped with a platform or platforms which, if two ladders are used, can be connected by planks to form scaffolding at any height desired within the limits of the ladder. The platforms are arranged to be slid on the ladder, and can be passed from one ladder section to another from the bottom to the top thereof, and a workman can precede the platform and fix it in place and then step thereon, which makes it more convenient and also quicker than if the platform had to be placed in its position and it was then necessary to climb around the side of the ladder to mount on the platform. The platform I prefer to use comprises side rails 29 which have, hinged thereto, braces 30 which are rigid

and are pivoted on the end opposite the rails 29 to the brace 31 which is one of a pair of braces, the other one 32 being hinged at 33 to the brace 31, and at 34 to the inner end of the side rails 29. On the outside of each side rail 29 is secured a pin 35 shown in Fig. 3, and the brace 31 on the arm 30 on each side of the platform is hinged on the bar 36, and the bar 36 and the pins 35 are arranged to slide in the slots 37 and 38 in the ladder sections 11 and 10 respectively, they being admitted to the slot from the front of the ladder by entering through the recess 39, shown near the bottom of Fig. 5. To secure a platform in place at any particular rung, I provide each side rail with a bar 40 which fits in the side rail and has an end arranged to be projected to have its end fit over the rung next below it, the bar 40 being shown projected in Figs. 2 and 5, but being shown in its withdrawn position in Fig. 3. To cause the locking and unlocking of these bars 40, on each side of the platform, I have installed the following mechanism.

Each platform is provided with the rigid foot strips 41 and 42 which are not movable. In addition thereto I have equipped the platform with the sliding strips 43 and 44 to be slid on top of the strips 41 and 42 respectively, in which case they would be in register therewith, as shown in Fig. 3 where they are hid by the strips 41 and 42. In the position, shown in Fig. 3, the edge of the strip 43 in the groove 44 between the strip 46 and the top of the side rail 29, on each side of the platform, engages the hook 45 of the rod 40 and forces it back, whereby the projecting end of the rods 40 are drawn into the side rails 29. When the platform is to be secured in place, it is elevated to its proper height, which can be done by the workman mounting the ladder and pulling the platform behind him, and when the braces are unfolded to extend the platform, the strip 43 can be slid into its place shown in Fig. 5 and then the strip 44, when shoved into place, will engage the back end of the hook 45 and push the projecting end of the bar 40 out in the path of the rungs 16, and the next lowest rung will engage the bar and hold the platform in its place. These strips must be moved to work the platform and they also make a good floor for the platform, and the workman can move around with a certain degree of safety.

It will be observed that when the ladder is not extended the platform is slid down into the section 11, and the braces 31 and 32 can be folded in, they being of narrow metal, and they will then occupy the positions shown in Fig. 3, and the arms 30, folded in in line with the side rails 29 and the end strips, will lie in flat against the rungs of the ladder. Because the strips 43 and 44 are slid out of the way as in Fig. 3, the folded

platform offers no serious obstruction to the mounting of the ladder, since it gives plenty of room for the enlargement of the rungs by the feet of the workman. A hinge strip 47 is mounted near the outer edge of the platform and can be laid flat and used as a part of the floor thereof, or can be elevated as shown in Fig. 5 to prevent the losing of tools and so forth, being held in place by a pair of braces 48, one of which is secured to each side rail 29. This hinge strip 47 is also used when the ladder is employed as shown in Fig. 8, in this case acting to hold articles on the structure, when it is used as a barrow or truck.

The ladder can be extended to any extent, and when secured to a couple of platforms makes a handy low scaffold or table, and can be utilized as a work bench by laying some planks or boards thereon, this application of the device being illustrated in Fig. 9, the hook plates 12 and the latch 17, in conjunction with its slot 20, acting to hold the ladder sections in line. When a high scaffold is desired, the ladder sections are brought to their inward limit of movement, that is the limit of movement toward one another, and the ladder sections are then swung apart as shown in Fig. 8, the ladder section 10 forming the top or staging of the scaffold, and the ladder section 11 acting as a support to one end. The other support consists of a pair of supports 49, each support fitting normally on the inside of the ladder section 10 as shown in Figs. 2 and 4, and being hinged on one end near the bottom thereof to a pin 50. The preferred form is to provide the end of each support 49 with a slot 51 to engage the pin 50, and when the supports are in their folded position they can be held by any suitable form of catch or hook or spring plate. To make the height of the scaffold adjustable, I arrange to separate all the parts, that is the two ladder sections and the supports, and on one end of the ladder section 10 is a nose 52 which can enter any of the recesses 24 in the ladder section 11, each recess having a metal plate therein which has an upper lip 53 to be engaged by the pawl 22 on each side of the ladder, each recess having a finger 54 arranged to receive the nose 52 as shown in dotted outline in Fig. 8. Right-angled slots 55 in the supports 49 serve to lock the pin 50 in the other end of the ladder section 10 so as to make the scaffold adjustable. If necessary, suitable braces of wire or rope can be used to prevent the uprights from spreading.

To permit the use of the ladder for its own transportation to and from a place where it is to be used, and also to provide a barrow or truck whereby the materials the painter or carpenter, or who ever is using the ladder, wishes to take with him, I assemble the ladder as shown in Fig. 8, and to allow the traction I supply one of the sec-

tions, preferably the section 11, with a wheel 56. The wheel 56 is mounted on an axle 57 which rotates in the side rails of the ladder section. The wheel 56 is made in halves, when it is desired to make it so that it can be assembled out of the way, and when these halves are assembled they embrace the axle 57 which is slightly cut away on opposite sides as at 58 to prevent the side motion of the wheel, each wheel half or section having a recess 59 to receive the portion 58 of the axle 57. The assembled wheel is shown in Fig. 11, and the two halves are held together preferably by set screws 60.

When the ladder is not to be used as a truck or barrow, the set screws 60 are unfastened and the two wheel sections can be assembled side by side on each side of the axle 57, a close fitting thereto being insured by the slots 61, one slot being cut in the adjacent sides of each of the wheel sections, and they thus fit against the axle as shown in Fig. 13, are preferably secured to one side of the ladder where they will not interfere, particularly, with the tread of the workman, as will be seen from Fig. 4. To hold the ladder sections in place, I provide the axle 57 with a stud 62 on which slides a staple 63 normally pressed down by a spring 64. The staple has its ends 65 arranged to engage slots 66 on the opposite edges of the wheel sections, which prevents the wheel sections from moving along the axle 57, as will be seen from Figs. 10 and 13.

If desired I may brace the ladder against side slipping or tilting, and one of the means for doing this is shown in Fig. 4 where I show, on one side of the ladder, it of course being understood that this attachment is adapted for both sides, a plate 67 having slots 68 therein which are adapted to receive a pin 69 on a brace 70. These slots allow the place of the pin 69 to be regulated, and the distance that the bottom of the brace 70 is from the ladder is thus determined. When the pin is in the top notch of the plate, the brace 70 is adapted to be close up against the ladder and in line therewith.

This structure embodies a compact device to be put to a multiplicity of uses, and the combination of hinged ladder sections swinging to make a step-ladder with these same ladder sections capable of being extended as an extension ladder, makes up a structure that fills a want of the average mechanic. The movable platforms are also thought to lend considerable utility and novelty to the ladder, and its adaptability as a truck or means of transportation is an advantage not possessed by ladders as now constructed.

Having thus described my invention, what I claim is:—

1. A ladder comprising ladder sections adapted to extend, hinge elements on the ladder sections adapted to be placed in oper-

ative connection and act as a stop when the ladder sections are at their limit of movement toward each other, and a latch for locking the sections in parallel relation for their full sliding relation, and means for unlocking the latch only when the hinge elements are in engagement.

2. A ladder comprising ladder sections having a hinge connection and adapted to swing for 180 degrees in parallel relation at both extremes, the hinge sections being separable only at each of the limits of the swinging movement of the ladder sections.

3. A ladder comprising ladder sections, one ladder section having hook plates projecting therefrom to form pintles of a hinge, and eyes on the second ladder section to engage the hook plates of the first ladder section, each eye having an opening in its periphery for the passage of its hook plate.

4. A ladder comprising a pair of ladder sections, one ladder section having hook plates, eyes on the second ladder section, each eye having its center in line with the outer edge of its ladder section and having an opening in its periphery for the passage of its hook plate, the opening in each eye being flush with the edge of the ladder section.

5. A ladder comprising ladder sections adapted to slide one on the other, a hinge having elements on the sections and adapted to be operative with each other when the ladder sections are slid together, a latch on one ladder section, the second ladder section having a slot for receiving the latch, and a head on the latch to fit the slot and fitting against turning, the slot having a depressed

portion to permit the turning of the latch to disengage the head thereof and permit the separation of the ladder sections.

6. A ladder comprising ladder sections arranged to slide one on the other, the ladder sections comprising side rails and rungs, a platform adapted to slide on the ladder sections and fold against the ladder sections when not in use, a wheel on one end of the assembled ladder sections adapted to permit the use of the ladder as a barrow, the wheel being adapted to be separated and having means for fastening the sections in line or in parallel relation on a rung, a hinged strip on the folded platform, and means for locking the hinged strip in an elevated position to act as a guard when the ladder is used as a barrow.

7. A ladder comprising ladder sections arranged to slide one on the other, a platform adapted to slide in the ladder sections and fold against the ladder sections when not in use, a wheel on one end of the assembled ladder sections adapted to permit the use of the wheel as a barrow, the wheel being made of two sections hinged in their relation to each other and adapted to be swung in parallel relation, a hinged strip on the folded platform, and means for locking the hinged strip in an elevated position to act as a guard when the ladder is used as a barrow.

In testimony, that I claim the foregoing, I have hereunto set my hand this 7th day of March 1908.

PAOLO BUCCO.

Witnesses:

WM. H. CAMFIELD,

E. A. PELL.