

(No Model.)

E. E. SIBLEY & C. ALLEN.

EXTENSION LADDER.

No. 374,561.

Patented Dec. 6, 1887.

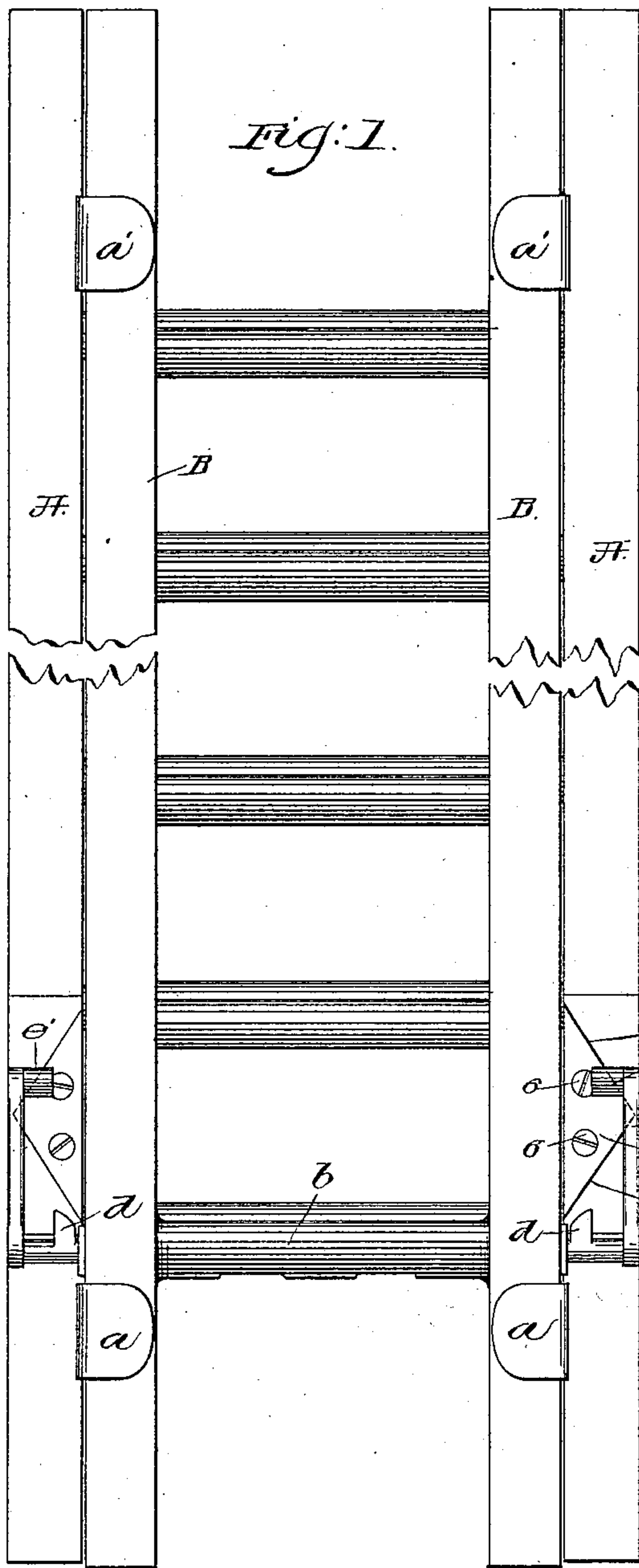


Fig: 2.

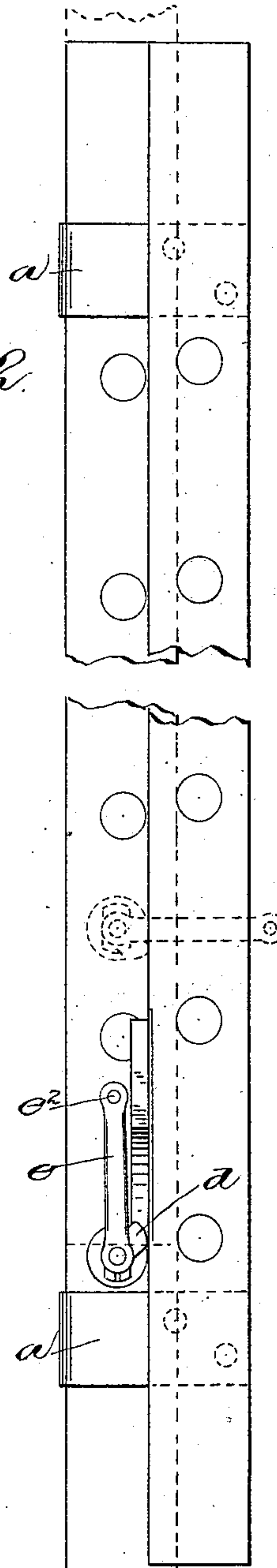
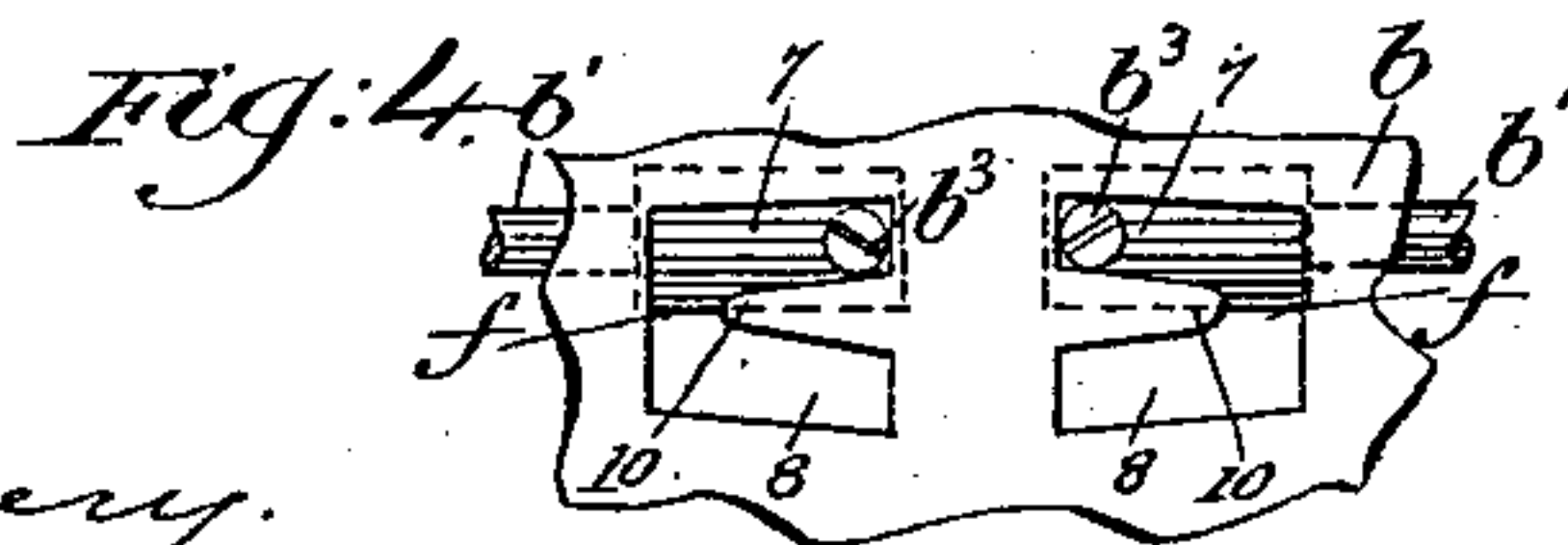
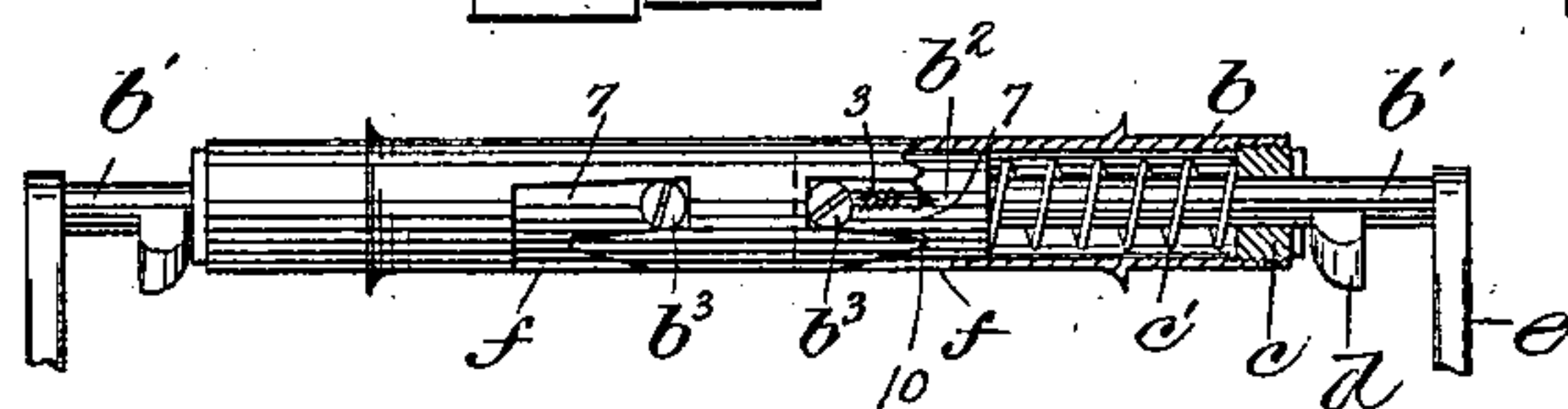


Fig: 3.



Witnesses
Fred L. Emery.
b. m. bone.

Inventors
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UNITED STATES PATENT OFFICE.

EDWIN E. SIBLEY AND CHARLES ALLEN, OF CHELSEA, MASSACHUSETTS,
ASSIGNORS TO THE AMERICAN FIRE HOSE MANUFACTURING COMPANY,
OF SAME PLACE.

EXTENSION-LADDER.

SPECIFICATION forming part of Letters Patent No. 374,561, dated December 6, 1887.

Application filed April 19, 1887. Serial No. 235,333. (No model.)

To all whom it may concern:

Be it known that we, EDWIN E. SIBLEY and CHARLES ALLEN, both of Chelsea, county of Suffolk, and State of Massachusetts, have invented an Improvement in Extension-Ladders, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

Extension-ladders as now made are composed of two or more ladders, which are made to slide one on the other in guides.

It is very essential for the production of a practical extension that the ladder which is moving be guided at all times in its movements, or else the ladder is apt to tip out of a straight line and get beyond the control of the operator as the ladder is being extended; and so, also, when the ladder is being closed, some difficulty is experienced in readily inserting the base of one of the auxiliary ladders in the guide to receive and hold the said base when the ladder is fully closed.

In the fire department it is essential and necessary that all apparatus used be so made as not to result in the loss of any time in its manipulation.

Extension-ladders in practice are composed of several ladders arranged to slide one on the other; but herein we have shown but two ladders, one of which we shall call the "main" and the other the "auxiliary" ladder; but we desire it to be understood that instead of having but one auxiliary ladder we may have two or more such ladders connected together, as are the main and auxiliary ladders herein to be described.

In accordance with our invention the auxiliary ladder is provided with an auxiliary guide, which, while the base of the auxiliary ladder is out of its guide attached to the main ladder, is caused to turn into such position as to embrace a part of the main ladder and constitute a guide for the auxiliary ladder, the said guide traveling with the auxiliary ladder. The auxiliary guide herein shown consists of a rod having at one end an arm which is provided with a roller, the said rod being extended into a hollow round of the auxiliary ladder,

where the rod is surrounded by a spiral spring which normally acts to push the rod into the round. This rod, outside the auxiliary ladder, has a lug or ear, which, co-operating with a cam projection attached to the main ladder, causes the rods to be moved outward, and also to be rotated for about ninety degrees, so that the roller at the end of the arm carried by the rod will pass under or engage the main ladder, while the base of the auxiliary ladder is out of the guide for it, which is attached to the main ladder.

Figure 1 is a top or plan view of an extension-ladder closed up ready to be used and having our improved auxiliary guide added thereto. Fig. 2, in full lines, is a side elevation of Fig. 1, the said figure by dotted lines showing the position occupied by the auxiliary guide when the auxiliary ladder is drawn out; Fig. 3, a partial section and elevation of the round receiving the guides, and Fig. 4 a developed detail showing the shape of the slot in the round of the ladder and the stud or projection and rod therein.

The main ladder A, the auxiliary ladder B, and the guides $a a'$, attached to the main ladder, and in which guides the auxiliary ladder slides, are and may be of usual construction. The lowermost round b of the auxiliary ladder is in accordance with our invention preferably made as a tube, having at its under side V-shaped slots. (Shown best in Fig. 4, where the tube is developed.) An auxiliary guide is used at each side of the auxiliary ladder; but both guides being alike we need describe specifically but one of them. Each auxiliary guide, as herein shown, is composed of a rod, b' , having a head, collar, or projection thereon, as b^2 , and a lug or ear, d , the rod b' having attached to its outer end an arm, e , provided at its end with a roller or other stud, e' . The round b referred to at each end has a bearing-block, c , which is screwed into the round or otherwise suitably attached thereto, and the rod b' is free to slide in the said bearing-block, the projection b^2 of the rod being acted upon by a spring, c' , which rests at one end against the bearing-block c , so that the tendency of the spring is to push the rod b' into the round. The main

ladder at its upper side has attached to it a cam plate or projection, d^2 , having, as herein shown, two inclined sides, 2 and 3, the cam plate or projection being attached to the main ladder, as herein shown, by screws 6; but it may be attached in any other usual or suitable manner. The rod b' at its inner end, or the head attached to it, is provided with a screw, pin, or projection, b^3 , which travels in the V-shaped slot f , having two branches, 7 8, it moving in the block 7 in the direction of the arrow, Fig. 3, when the cam-plate is acting upon the lug or ear d to move the rod b' out from the round, the spring c' at such time being pressed; but as soon as the rod b' is turned slightly about its longitudinal center, as is the case when the lug or ear d passes the high point or apex of the cam-plate, the pin or stud b^3 is carried across the point 10, left by cutting the V-shaped slot f , and immediately thereafter the spring c' , assuming control of the rod b' , pushes the same back into the round b , and the stud or pin b^3 travels in the inclined part 8 of the slot f , and in so doing further rotates the rod b' , the said rotation being sufficient to carry the roller or other stud e' from the upper side of the main ladder into the dotted-line position, Fig. 2, wherein it will be seen that the roller or other stud e' occupies a position at the under side of the main ladder, where it can act as a guide while the auxiliary ladder is being moved on the main ladder and while the base of the auxiliary ladder is removed from the guides a of the main ladder, the auxiliary guide at such time preventing the base of the auxiliary ladder from being tipped away from the main ladder or out of the proper straight line in which it should go.

When the auxiliary ladder is to have its base pushed down again into the guide a , the roller or other stud e' of the auxiliary guide remains below or at the under side of the main ladder until after the base of the auxiliary ladder enters the guide a ; but such entrance having been made the lug or ear d strikes the inclined side 3* of the cam-plate, which again causes the rod b' to be moved outwardly far enough to carry the roller or other stud e' laterally from under the main ladder, and in such outward movement of the rod b' the pin or stud b^3 , traveling in the inclined part 8 of the V-shaped slot of the round b , turns the rod b' about its longitudinal center until the roller or other stud e' is brought to the upper

side of the main ladder and the pin or stud b^3 is carried across the point 10 and placed in line with the part 7 of the V-shaped slot referred to, and at such time, the lug or ear d having passed the high point or apex of the cam-plate, the spring c' again assumes control of the auxiliary slide and presses the rod b' into the round b .

We have herein shown the V-shaped slot as chiefly instrumental in partially rotating the rod b' ; but we wish it to be understood that we do not desire to limit our invention to the exact devices employed for partially rotating the rod b' in order to carry the roller or other stud e' of the guide from the upper to the lower side of the main ladder, or vice versa, for instead thereof we may employ any other well-known equivalent device.

We claim—

1. In an extension-ladder, a main ladder having guides and an auxiliary ladder adapted to slide thereon in said guides, combined with an auxiliary guide attached to and moving with the auxiliary ladder, and with a cam plate or projection to operate the said auxiliary guide, whereby the said auxiliary guide is made to grasp the main ladder and serve as a guide for the auxiliary ladder, substantially as described.

2. The main ladder, its attached guides $a a'$, and the auxiliary ladder having the hollow round and a cam plate or projection attached to the main ladder, combined with an auxiliary guide composed of a rod having a lug or ear, an arm having an attached roller or other stud, and a spring, the combination being and operating substantially as described.

3. The main ladder, its attached guides $a a'$, the auxiliary ladder having the hollow round slotted as described, and a cam plate or projection attached to the main ladder, combined with the rod b' , having a stud or pin, as b^3 , and a lug or projection, as d , the spring c' , surrounding the rod, and the arm e , having the roller or other stud e' , the combination being and operating substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

EDWIN E. SIBLEY.
CHARLES ALLEN.

Witnesses:

G. W. GREGORY,
F. L. EMERY.