S. S. VAUGHAN.

FIRE ESCAPE LADDER.

APPLICATION FILED FEB. 7, 1914.

1,102,461.

Patented July 7, 1914.

2 SHEETS—SHEET 1.

Fig. 1

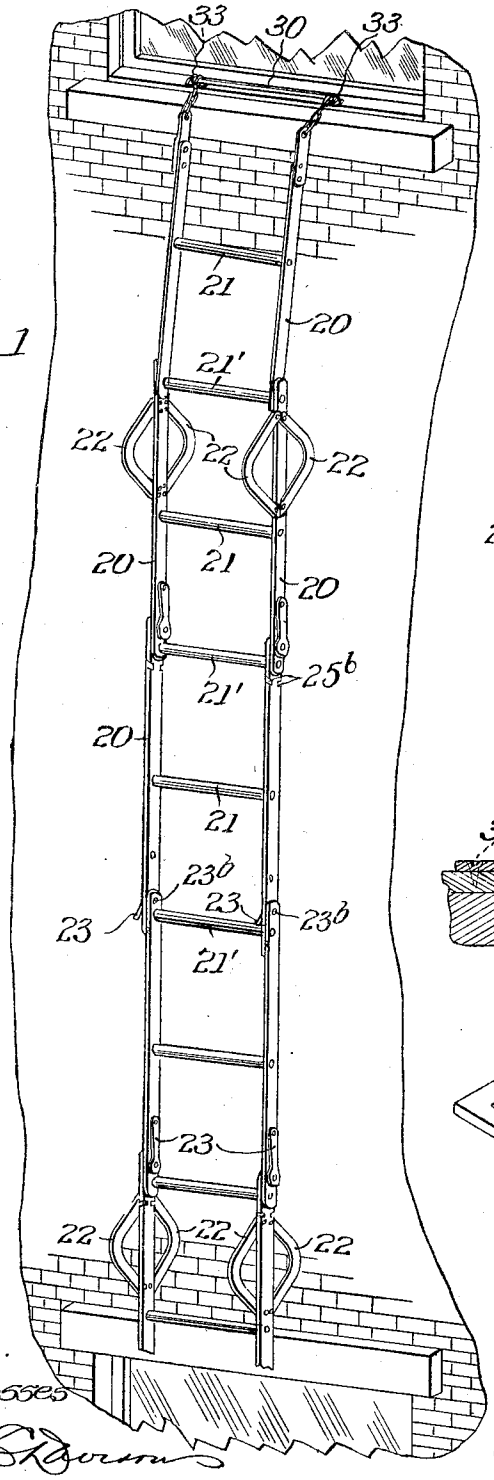


Fig. 2

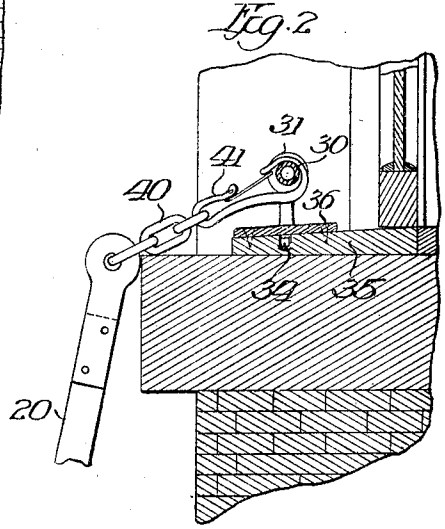


Fig. 3

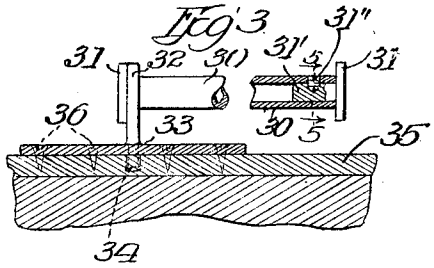


Fig. 4

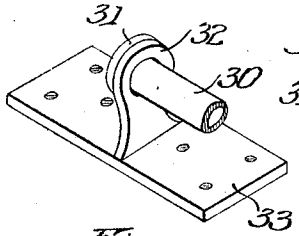
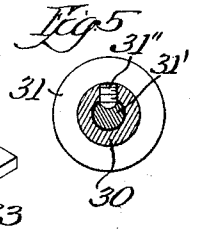


Fig. 5



Witnesses

Geo. C. Dorsey

Carl G. Anderson

Inventor

Sanford S. Vaughan

By Luther Johns Atty.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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2 SHEETS—SHEET 2.

Fig. 6

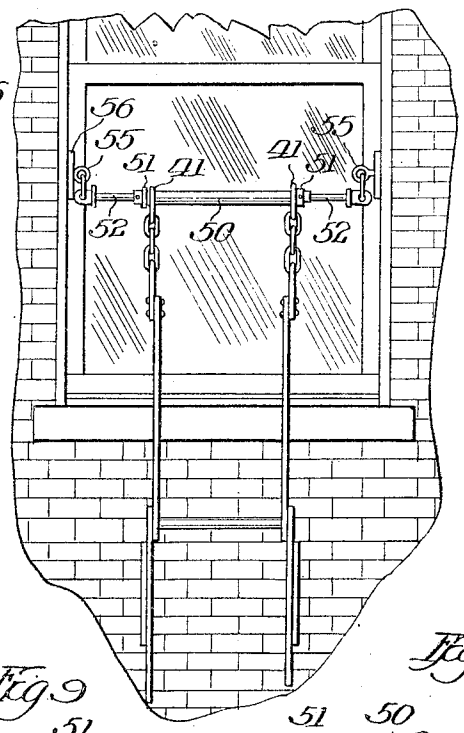


Fig. 7

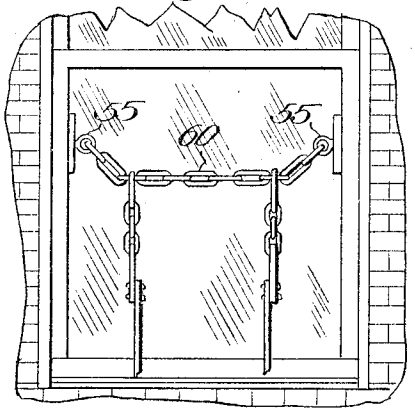


Fig. 8

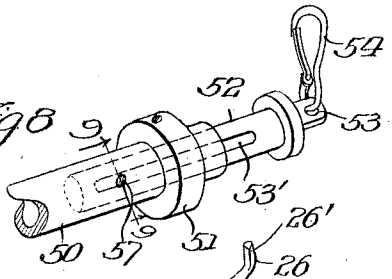


Fig. 9

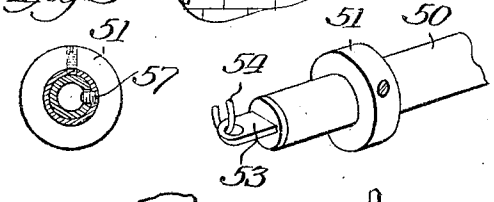


Fig. 13

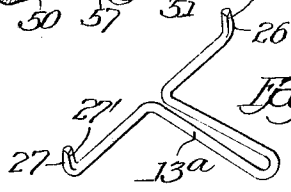


Fig. 10

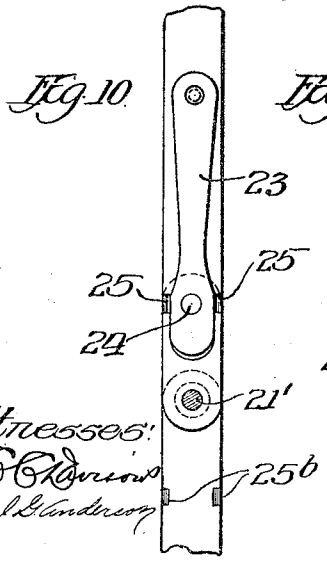


Fig. 11

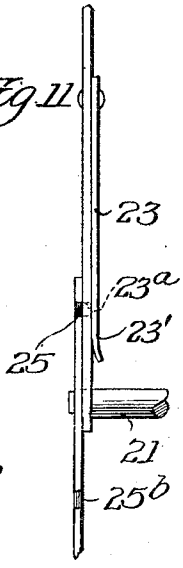


Fig. 12

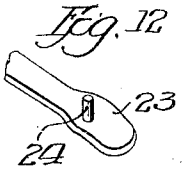
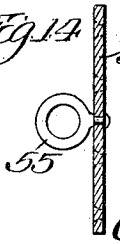


Fig. 14



Witnesses:
F. C. Dorsey
Earl Vandercook

Inventor:
Sanford S. Vaughan
By Luther Johns Atty

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

SANFORD S. VAUGHAN, OF OAK PARK, ILLINOIS.

FIRE-ESCAPE LADDER.

1,102,461. Specification of Letters Patent. Patented July 7, 1914.

Application filed February 7, 1914. Serial No. 817,027.

To all whom it may concern:

Be it known that I, SANFORD S. VAUGHAN, a citizen of the United States, and a resident of the village of Oak Park, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Fire-Escape Ladders, of which the following is a specification.

My invention relates to fire escape ladders, and more particularly to the portable and flexible type of ladder which may be lowered from a window or similar opening as occasion may offer.

In the accompanying drawings, forming a part of this specification, I have illustrated preferred means, and modifications of certain features thereof, by which the general objects of quickness, certainty, and reliability of attachment of the ladder, and safety and ease of descent by persons thereby, are obtained. A ladder is thus provided also which is strong and durable, comparatively light, and which may be folded to occupy small space.

One very important object of the invention is to provide a ladder which may be readily attached to an appropriate fastening device and then thrown bodily out of the window or similar opening, regardless of which side of the ladder may be presented to the wall of the building, the ladder automatically becoming a rigid structure spaced from the building so as to provide a suitable foothold on the several rounds of the ladder for the person descending the same.

Other objects will appear hereinafter.

In these drawings Figure 1 represents a face view in fragmentary form of a building with my improved ladder, shown in fragmentary form, in position for use; Fig. 2 is an enlarged fragment, partly in section, of the upper end of the ladder and the preferred type of means for anchoring or securing same; Fig. 3 is a fragmentary front view, partly in section, of the ladder anchoring rod and associated parts shown in Fig. 2; Fig. 4 is a perspective of one end of this anchoring rod in association with one of the two plates secured to the window sill; Fig. 5 is an enlarged cross section on the line 5—5 of Fig. 3; Fig. 6 shows a modified form of ladder holding means in operative position between the window stiles; Fig. 7 shows another modified form of such means; Fig. 8 is a broken enlargement in perspective of the holding means shown in Fig. 6; Fig. 9 is a cross section substantially on the line 9—9 of Fig. 8; Fig. 10 is an enlarged fragment showing a side view of the ladder-section locking means; Fig. 11 is a fragmentary front view of the parts shown in Fig. 10; Fig. 12 is a perspective of a fragment of the locking element; Fig. 13 is a perspective of a tool adapted to unlock the ladder section when it is desired to fold the same; and Fig. 14 is an enlarged section of one of the permanent fastenings of Figs. 6 and 7.

In the preferred construction my improved ladder comprises a plurality of ladder sections having side members 20 and cross pieces, steps, rungs or rounds 21, certain of the steps 21′ having end portions thereof acting as pivots by which contiguous sections may be joined hingedly together, thus enabling the several sections to be folded one upon the other so as to occupy small space. The contiguous sections are so hinged that they may describe an arc with respect to each other of substantially 360 degrees about their pivotal connections. In other words, the contiguous sections may fold upon each other in either direction.

Rigidly secured to some of the sections are extensions 22 disposed substantially at right angles to the plane of the ladder when extended and constituting stops or spacing elements by which the ladder, when in operative position, is maintained away from the wall of the building whereby a good foothold may be had upon the rounds 21 and 21′. These spacing elements 22 are arranged to extend on both sides of the side pieces 20, and this for the important purpose of holding the ladder away from the wall whichever side of the ladder happens to be toward the building. These spacing elements 22 are preferably made of bow-shaped iron riveted to the side pieces as shown in the drawings, but the invention is not limited to this form.

When such a ladder is put into use it is highly advantageous that the same be as rigid as possible, particularly when used by persons not adept in feats of skill. In the present structure means preferably comprising a spring catch are provided for this purpose, this spring catch comprising a spring element 23 riveted to the side pieces, the free end of the spring carrying a locking pin 24 movable in an aperture 23^a (Fig. 11) in the side piece 20 to which the spring is

attached, and adapted to enter a registering aperture 23^b in the contiguous side piece of the adjacent ladder section (see Fig. 1). It will readily be seen that the pin 24 in these registering apertures will lock the two sections against bending at their pivot. As an important feature of the present invention is in the provision of a ladder which may be unfolded, as from a window, with either side of the ladder outward, means are provided in association with the locking element just mentioned whereby the locking pin 24 will come into registration with and slip into the desired locking recess or aperture when the contiguous ladder sections are brought into a substantial plane from either direction, these means comprising preferably a slanting or inclined groove or recess 25 on each side of the locking aperture 23^b so arranged that the locking pin 24 projecting through the locking aperture 23^a in the side piece will come into engagement with the groove or recess 25, riding therein and causing the spring 23 to be flexed away from the side piece 23 until the pin 24 comes into registration with the other locking recess or hole 23^b when the spring will cause the pin to enter the hole 23^b, thus locking the parts against further hinge-like movement. By these provisions the ladder will be found ready for use, rigid and properly spaced from the building regardless of the side of the ladder which happens to be toward the building. When it is desired to fold the ladder again the springs 23 must be flexed so as to withdraw the locking pin 24 from the locking recess or hole 23^b, and this may suitably be done by means of the tool 13^a pictured in Fig. 13, in which the prongs or fingers 26 and 27 having beveled edges 26′ and 27′ are adapted to be wedged under the springs 23 at a slightly outturned portion 23′ thereof (Fig. 11), simultaneously forcing the locking pin 24 on each side piece at one of the joints out of engagement with the locking recesses 23^b respectively.

As shown on Sheet 1 of the drawings the preferred form of ladder holding means comprises a rod or bar 30 having a head 31 at each end thereof, the rod being held in spaced relation to the window sill by a pair of brackets 32 rigidly secured to a plate 33, as by riveting, each plate preferably having a stud 34 adapted to interfit with a suitable recess in the window sill 35, the plate being firmly secured to the window sill by a plurality of screws or bolts, as 36, the stud 34 being adapted to coöperate in holding the plate firmly in position. The rod 30 may conveniently consist of a piece of iron tubing and one or both of the heads 31 may be provided with a stem 31′ adapted to fit within the end of the tubing 30 and be secured in position by means of a screw 31″. Means are thus provided for the easy assembling of these parts, the heads 31 maintaining the rod and the ladder on the rod against displacement. The upper ends of the ladder side pieces are preferably provided with short chains 40 respectively terminating in snap hooks 41 adapted to snap upon the anchoring rod 30. Such a snap hook connection is very easy of application and affords the desired security.

In Figs. 6, 8 and 9 I have illustrated an extension cross bar adapted to serve as anchoring means for the ladder, this cross bar comprising a piece of tubing 50 provided with collars 51 adapted to prevent the ladder from moving out of position on the support, and a rod 52 adapted to interfit telescopically with the tubing 50, at one or both ends thereof as desired, such rod or rods being preferably provided respectively with a reduced portion 53 carrying a snap hook 54 adapted to be snapped into the eye 55 rigidly secured by means of the plate 56 preferably to each of the window stiles. By this construction it will be seen that it is only necessary to provide the anchoring eyes 55 on the window frame of a building, and, although the windows may be wide or narrow within a comparatively wide range the ladder, carrying the bar 50 will be found adapted for use. The extension rod or rods 52 respectively may be provided with a slot 53 closed at its inner end whereby a stop, such as the screw 57 will prevent the total withdrawal of the rod. In Fig. 7 I have illustrated a chain 60 between the anchoring elements 55, and the ladder snapped upon the chain.

My improved ladder may conveniently be folded up and placed in a suitable case and stored conveniently in a closet until occasion for use should arise, when it is only necessary to carry same to a window provided with suitable anchoring means and snap the hooks (permanently upon the ladder) to such anchoring elements. The ladder may then simply be tumbled out of the window. Depending upon which end of the structure constituting the folded ladder was toward the window when the connection was made, and also depending upon the manner in which the ladder was folded, the ladder will straighten out as it unfolds with one or the other side thereof presented to the wall of the building. As contiguous ladder sections come into a plane with respect to each other they become locked against further hingelike movement at the pivots, and when the ladder is extended, as it necessarily must under the force of gravitation, the entire ladder structure from the chains downward (or, from the first section downward, as shown in Fig. 1) becomes firm and rigid, and a descent may safely be made.

When the ladder is folded the locking

pins 24 are in engagement with a suitable recess 25^b (Fig. 11), but are not locked therein, the recess being provided merely to permit the side pieces 20 to come closer together when in folded position.

All of the ladder parts and connections which I have illustrated may be made of iron or steel in ways well understood in the mechanic arts.

While I have illustrated and described preferred and modified embodiments of these improvements, various changes may be made in construction and arrangement of details without departing from the spirit of this disclosure. Reference should be had therefore to the appended claims to determine the scope of my present invention, and all modifications and changes are contemplated by me as fall within the scope of these claims.

I claim:

1. A fire escape ladder comprising in combination ladder sections hinged together in such manner that contiguous sections may fold one upon another in either direction from the plane of the ladder when extended, locking means comprising a spring catch adapted to lock contiguous ladder sections together substantially in a plane when unfolded in either direction from a folded position, and means for securing the ladder to a building.

2. A fire escape ladder comprising in combination a plurality of ladder sections hinged together in such manner that contiguous sections may fold upon each other in either direction from the plane of the ladder when extended, coöperating locking means on contiguous ladder sections adapted automatically to lock such contiguous sections substantially in a plane when the ladder is unfolded into operative position from a folded position, regardless of the direction in which the sections were folded together with respect to each other, ladder spacing elements on said ladder adapted to space the ladder from the wall of a building when in operative position whichever side of the ladder is presented to such wall, and means for securing the ladder to a building.

3. A fire escape ladder comprising in combination ladder sections hinged together in such manner that contiguous sections may fold one upon another from the plane of the ladder when extended, locking means comprising a spring catch adapted automatically to lock contiguous ladder sections together substantially in a plane when unfolded from a folded position, and means for securing the ladder to a building.

SANFORD S. VAUGHAN.

Witnesses:
M. M. KRIESAND,
FRANKLIN M. WARDEN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."