

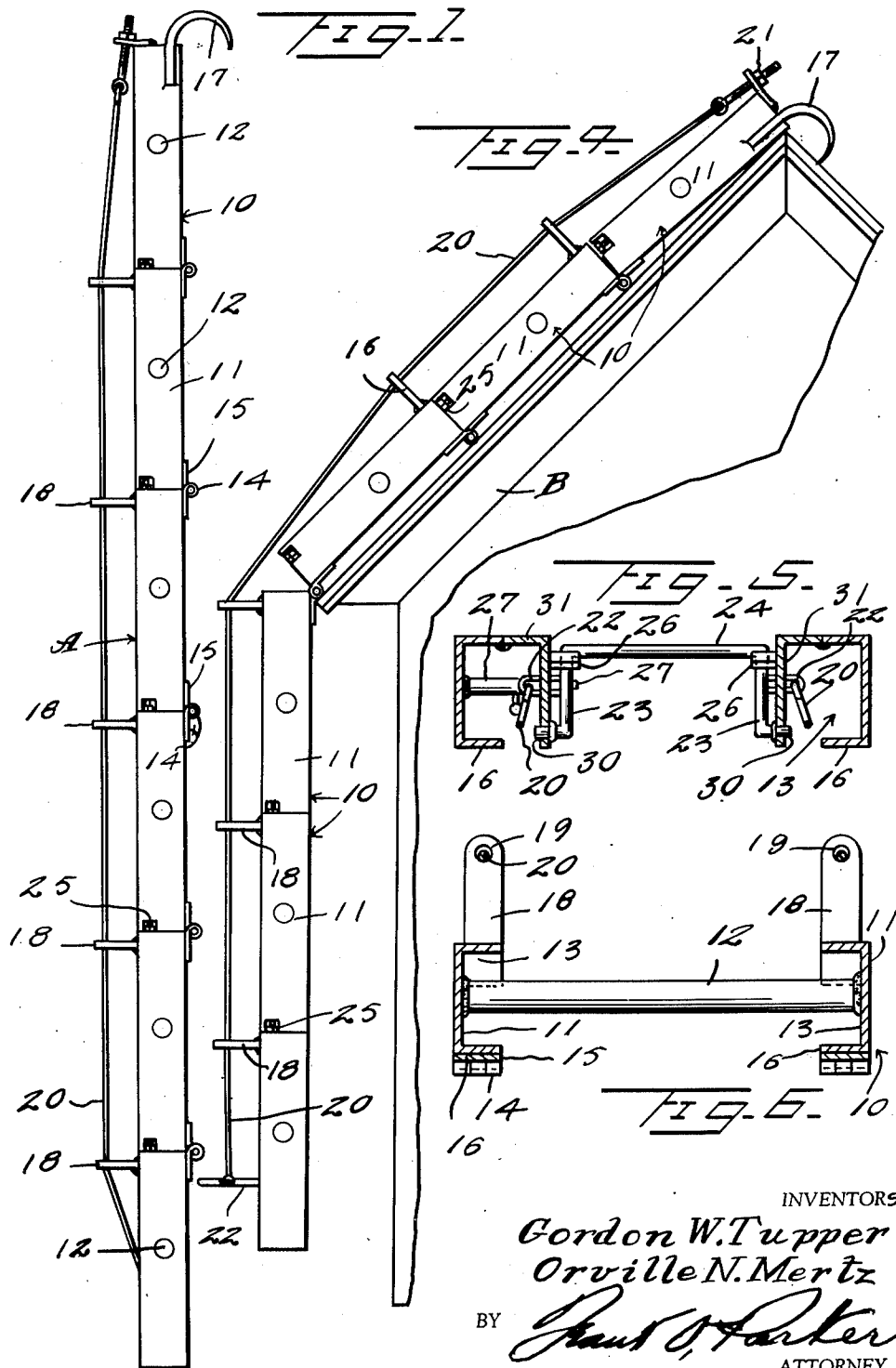
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LADDER CONSTRUCTION

2,629,532

Filed March 15, 1950

2 SHEETS—SHEET 1



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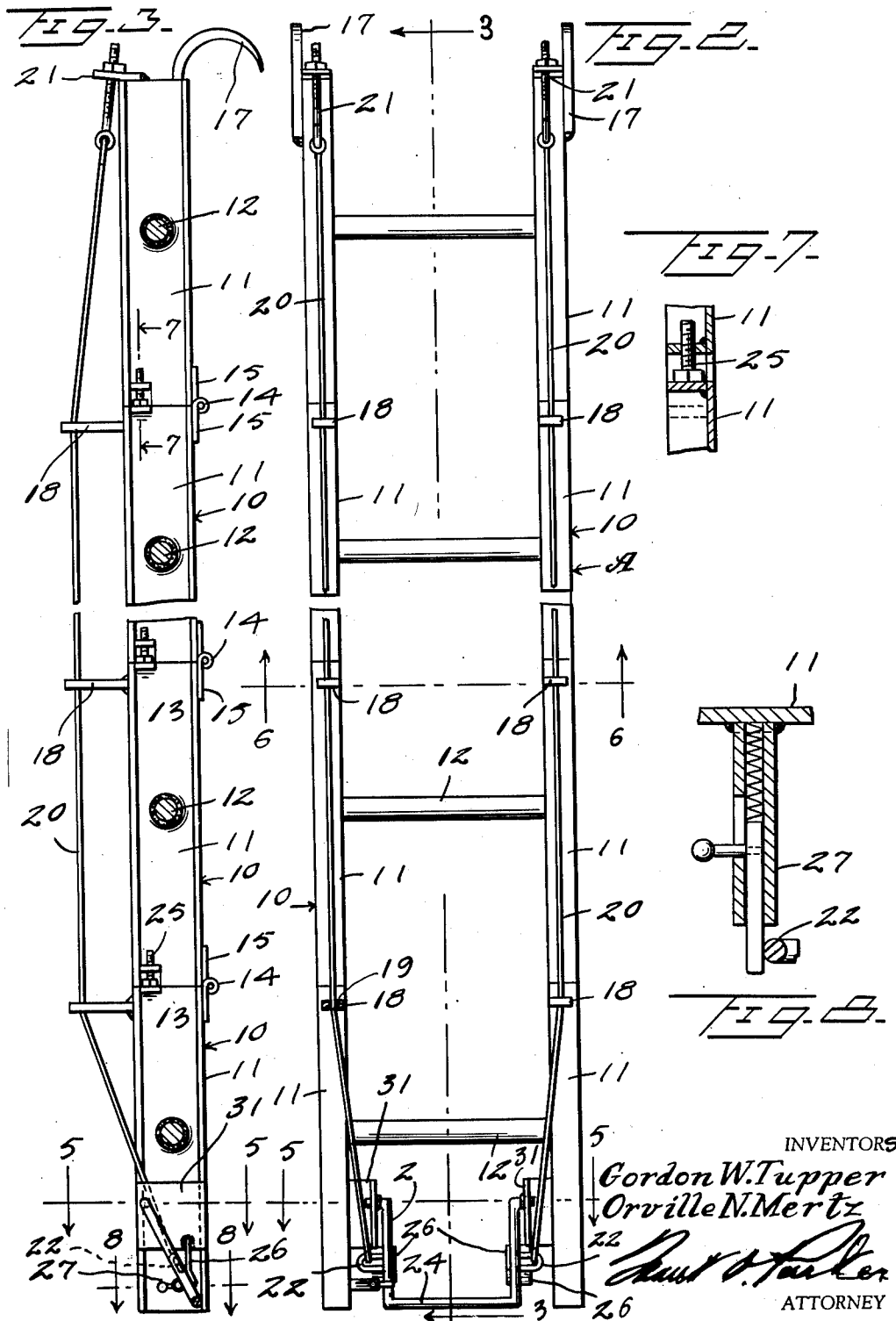
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2 SHEETS—SHEET 2



## UNITED STATES PATENT OFFICE

2,629,532

## LADDER CONSTRUCTION

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3 Claims. (Cl. 228—44)

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The invention relates to a ladder, and more especially to a flexing ladder construction, designed more particularly for use as a fire escape in fighting fires or for shingling and repairing of a roof of a building or the like.

The primary object of the invention is the provision of a ladder of this character, wherein it is made up of hinged or otherwise swingingly connected sections, so that the said ladder will flex in accordance with the contour of the roof and side wall of a building or the like when it is hung in position for service, and thus eliminating the necessity to put up staging or scaffolding or cleats on the roof as is customary. Additionally, the ladder may be used as a straight rigid one for any purposes that may be desired.

Another object of the invention is the provision of a ladder of this character, wherein the swinging sections thereof may be locked to firmly and safely hold said ladder in a rigid condition when it is in a straight condition, and on flexing the said ladder it can be maintained in serviceable condition, the ladder when used for fighting fires being handy therefor where such fire is between the eave and the hip of the roof.

A further object of the invention is the provision of a ladder of this character, wherein the construction thereof is unique and novel in its make-up, as it can be brought into action with ease and dispatch, and is safe in its uses.

A still further object of the invention is the provision of a ladder of this character, wherein its construction enables the same, when in use upon a roof of a building or the like having a peak in said roof, to extend down a downwardly extending roof portion and be held safely in place for working on the roof portion, with ease and dispatch.

A still further object of the invention is the provision of a ladder of this character, which is simple in construction, thoroughly reliable and efficient in operation, strong, durable, readily and easily handled as a straight ladder or a flexed ladder, conveniently adjusted for either service, unique in its assembly, assured of safety during use, possessed of few parts, and inexpensive to manufacture.

With these and other objects in view the invention consists in the features of construction, combination and arrangement of parts as will be hereinafter more fully described in detail, illustrated in the accompanying drawings, which disclose the preferred embodiment of the invention, and as pointed out in the claims hereunto appended. It is of course understood that

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changes, variations and modifications may be made in the invention as fall properly within the scope of the appended claims, without departing from the spirit of the said invention or without sacrificing any of its advantages.

In the accompanying drawings:

Figure 1 is a side elevation of the ladder constructed in accordance with the invention in a straight rigid condition of adjustment.

Figure 2 is an elevation of the ladder in its rigid straight condition under the adjustment as illustrated in Figure 1.

Figure 3 is a sectional view taken on the line 3—3 of Figure 2 looking in the direction of the arrows.

Figure 4 is a fragmentary outline of a building with its roof showing the ladder flexed in its applied position thereto.

Figure 5 is a sectional view taken on the line 5—5 of Figure 3 looking in the direction of the arrows.

Figure 6 is a sectional view taken on the line 6—6 of Figure 2 looking in the direction of the arrows.

Figure 7 is a sectional view taken on the line 7—7 of Figure 3 looking in the direction of the arrows.

Figure 8 is a sectional view taken on the line 8—8 of Figure 3 looking in the direction of the arrows.

Similar reference characters indicate corresponding parts throughout the several views in the drawing.

Referring to the drawing in detail, A designates generally the ladder as a whole constructed in accordance with the invention, while B denotes generally a portion of the outline of the side wall and roof of a building or the like, respectively, and the said ladder comprises a plurality of runged rigid sections 10, each being made from channeled side rails 11 and tubular cross-rungs 12, respectively, the latter being preferably welded at their ends to the side rails 11, to be disposed midway of the channels 13 inwardly of the latter. Each section 10 is of a predetermined length and it is preferable to have these sections of uniform length and of any required number according to the desired stretch of the ladder A as a whole for use. In the present instance the rungs 12 are uniformly spaced apart and one to each section 10, yet this arrangement may be altered if found desirable.

The sections 10 of the ladder A at their ends adjacent to each other are connected together by hinges 14, these being located at the narrow

longitudinal edges of the sections 10 and on one side only of the said ladder, so that the latter can flex in but one direction, the leaves 15 of the hinges 14 having fixed connection with the flanges 16 of the respective sections 10, as should be clearly apparent from the drawing.

Fixed to the side rails 11 of one outermost end section 10 of the ladder A are standard roof-ladder hooks 17, and this allocates the said end section as the head of the ladder A in the use thereof for fire fighting or for roofing purposes. The ladder hooks 17 are made secure in place in any suitable manner.

Extending outwardly from the side rails 11 of the ladder A at opposite points with respect to both rails is a plurality of spaced cable supports 18, each being preferably welded to its rail and is disposed close to the hinged end of each section 10 and at substantially right angles to the said section, next to its hinged breaking area, each support being provided with a guide eye terminal. Loosely trained through the eye terminals 19 of the supports 18 are independent stretches of cables 20, each having one end anchored at 21 to the head end section of the ladder A, while the other end of the said cable 20 is fastened to an eye 22 formed on the side arm 23 of the cranked tightening shaft, lever or loop member 24, it being axled or journaled at 30 in the bearing plates 31 on the side rails 11 of the other outermost end section 10 of the ladder. Thus this shaft or member 24 when turned in one direction, namely, counter-clockwise, tightens the cables 20 to hold the sections 10 of the ladder longitudinally aligned with each other to have the latter in a straight rigid condition.

When the shaft or member 24 is turned in a reverse, clockwise direction, the cables become slack and the sections 10 at their hinged ends are free to permit the ladder A to be flexed for the pointing-up of the said ladder to the contour of a building or the like and its roof for service, as will be apparent from Figure 4 of the drawings.

On the turning of the cranked shaft or member 24 to have the eyes 22 on its arms 23, during counter-clockwise movement, pass the center rotating axis of the said shaft or member 24 for the tightening of the cables 20, these will be held in this condition, stops being provided as at 26 to limit this movement of the shaft or member 24. Also there is provided a suitable latching means 27 for releasably holding the shaft or member 24 against the stops 26 to prevent possible accidental release of the said member or shaft for the slackening of the cables 20. At the meeting hinged ends of the sections 10 are adjustable take-up devices 25, which serve to hold the said sections true in alignment when the ladder A is straight, and also to compensate for wear at these hinged points.

Suitable reinforcements are provided in the ladder construction A, as exemplified at 28 and 29, respectively, as may be required for strength and longevity.

As has been stated the ladder A can be dis-

posed over the peak of a roof or other protruded areas to have the said ladder extend downwardly on either or both sides of the peak or the like according to the slanting characteristics thereof, the hooks 17 at the head of the ladder A being for the purpose of hanging the ladder suspended from an elevated area, as should be obvious from the drawings.

What is claimed is:

1. A ladder of the kind described, comprising a plurality of runged-sections swingingly connected together end-to-end for flexing action with respect to each other, and an adjustable flexible means connected to the outmost sections of the plurality thereof for holding these in alignment with each other against flexing action, a rotatable lever secured on one of said outmost sections, one end of said flexing means being connected to said lever.

2. A ladder of the kind described, comprising a plurality of runged-sections swingingly connected together end-to-end for flexing action with respect to each other, an adjustable flexing means connected to the outmost sections of the plurality thereof for holding these in alignment with each other against flexing action, and means included in the last named means for releasably locking the same when holding the sections in aligned condition rigid with respect to each other, a rotatable lever secured on one of said outmost sections, one end of said flexing means being connected to said lever, and stop means on said one section against which said lever is releasably held by said locking means.

3. A ladder of the kind described, comprising a plurality of runged-sections swingingly connected together end-to-end for flexing action with respect to each other, an adjustable flexing means connected to the outmost sections of the plurality thereof for holding these in aligned rigid straight condition with respect to each other against flexing action, means included in the last named means for releasably locking the same when holding the sections in aligned condition rigid with respect to each other, a rotatable lever secured on one end of said outmost sections, one end of said flexing means being connected to said lever, stop means on said one section against which said lever is releasably held by said locking means and adjustable aligning means positioned between the sections for maintaining said sections in true alignment.

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