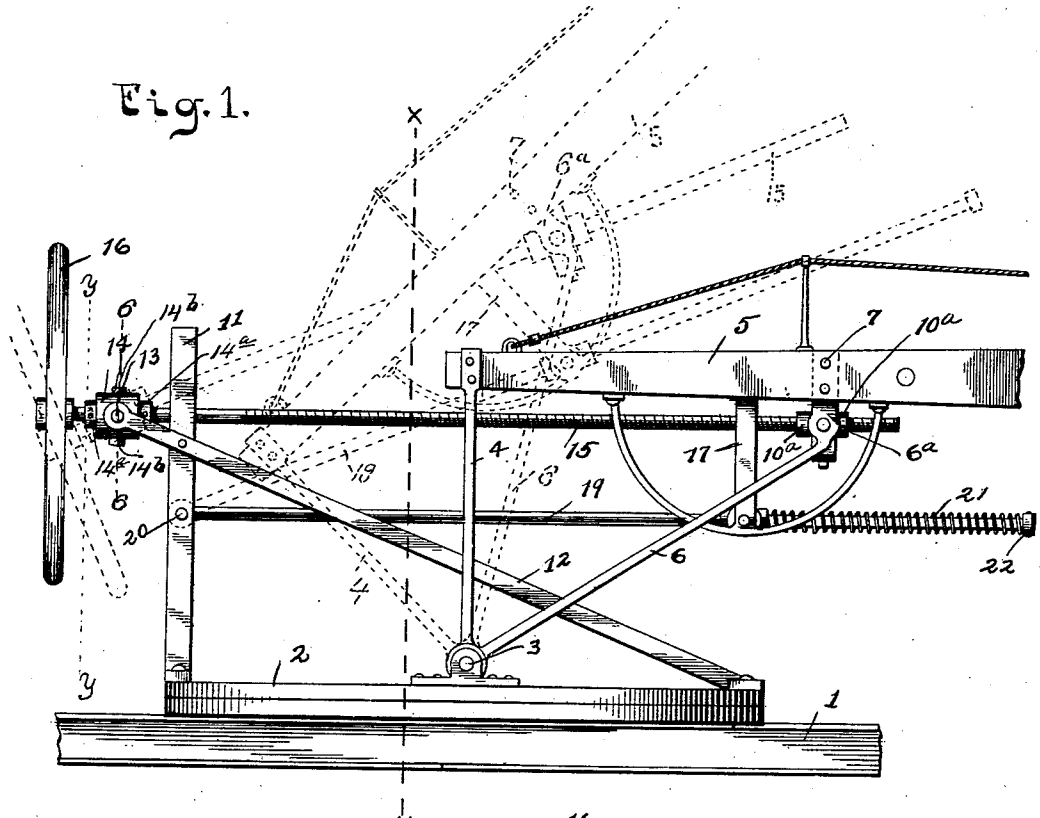
No. 677,282. Patented June 25, 1901.

F. S. SEAGRAVE.

AERIAL LADDER.

(No Model.) (Application filed Jan. 18, 1901.) 2 Sheets—Sheet 1.

Fig. 1.



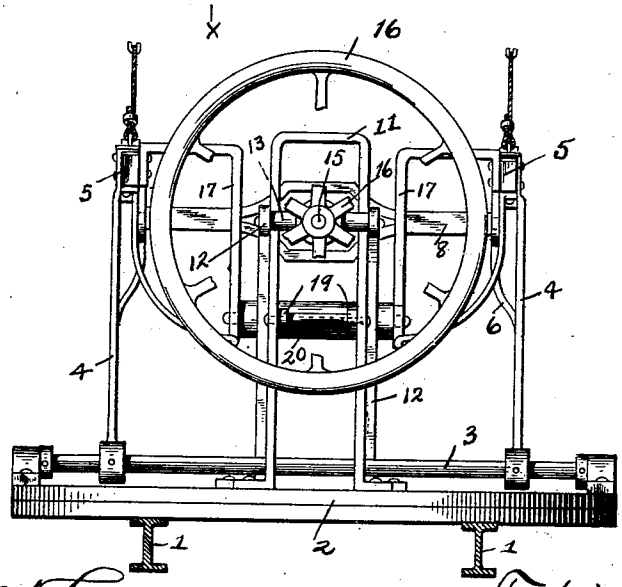


Fig. 2.

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Fig. 3.

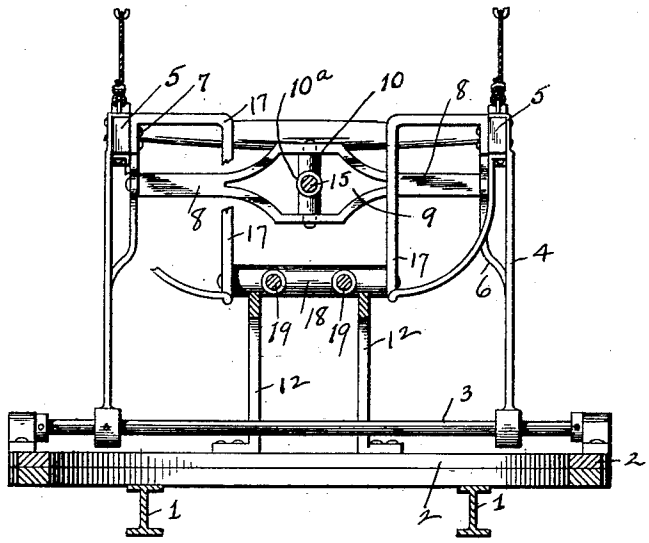
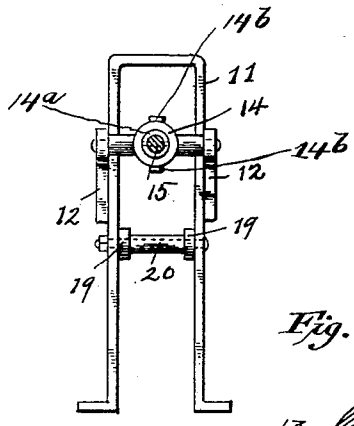


Fig. 4.



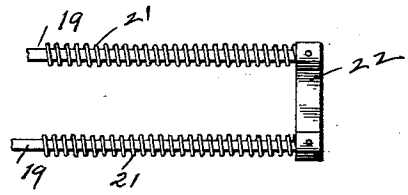
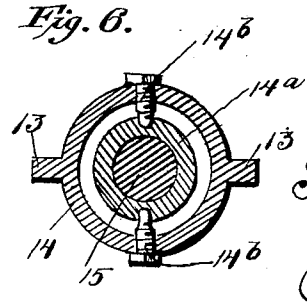


Fig. 5.

Fig. 6.



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UNITED STATES PATENT OFFICE.

FREDERIC S. SEAGRAVE, OF COLUMBUS, OHIO.

AERIAL LADDER.

SPECIFICATION forming part of Letters Patent No. 677,282, dated June 25, 1901.

Application filed January 18, 1901. Serial No. 43,702. (No model.)

To all whom it may concern:

Be it known that I, FREDERIC S. SEAGRAVE, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented a certain new and useful Improvement in Aerial Ladders, of which the following is a specification.

My invention relates to the improvement of aerial ladders, and has particular relation to mechanism for elevating the same from the turn-table of a ladder-truck.

The objects of my invention are to provide improved mechanism for imparting an upward swinging or elevating movement to a ladder and to provide in conjunction therewith improved means for assisting in the elevating operation and to produce certain improvements in details of construction, which will be more fully pointed out hereinafter. These objects I accomplish in the manner illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of an aerial-ladder-truck turn-table, showing the rear portion of a ladder movably mounted thereon and showing my improved mechanism for operating the same. Fig. 2 is a rear end elevation of the same. Fig. 3 is a vertical section on line $x\ x$ of Fig. 1. Fig. 4 is a sectional view on line $y\ y$ of Fig. 1, the parts in rear of the rear frame-yoke being omitted for the sake of clearness. Fig. 5 is a plan view of the rear portions of spring-carrying rods, which I employ in the manner hereinafter described; and Fig. 6 is an enlarged sectional detail on the line 6 6 of Fig. 1.

Similar numerals refer to similar parts throughout the several views.

1 represents the parallel sills of a suitable form of aerial-ladder truck, and 2 the usual turn-table, which is mounted thereon. Journaled on the turn-table 2 is a transverse shaft 3, from opposite sides of the center of which rise ladder-supporting bars 4, the upper end of each of which is rigidly connected with the rear end of one of the legs 5 of an aerial ladder.

6 represents upper and forwardly-inclined bars, which extend from the shaft 3 to points below the ladder-legs 5 and in front of the bars 4. At these points the bars 6 are extended upward and secured, as indicated at 7, to the inner sides of the ladder-legs 5. The vertical end portions 6^a of the forwardly-inclined bars 6 have pivoted therein the ends of a transverse frame-bar 8, the latter having its central portion, as indicated more clearly in Fig. 3, enlarged and provided with a central opening 9, between the upper and lower sides of which is pivoted vertically a short bar 10, this bar 10 being in the nature of a boxing-piece, which is provided on its forward and rear sides with outwardly-projecting internally-threaded boxing extensions or hubs 10^a, which form extensions of an internally-threaded central opening in said bar 10. Rising from the turn-table 2 is a vertical yoke-frame 11, and with the upper portion of the sides of this yoke-frame are connected the rear portions of forwardly and downwardly extending brace-bars 12, the forward ends of which are secured to the turn-table, as shown. The bars 12 are provided with rearward extensions, between which is journaled the laterally-extending trunnions 13 of a boxing 14. Within this boxing 14 there is a sleeve or boxing 14^a, which is mounted for movement relatively to the outer boxing 14 by means of the pivot points or bearings 14^b, as seen best in Fig. 6, which pass through the boxing 14 and into sockets in the sleeve 14^a, so that the parts constitute a universal boxing or bearing. Through this sleeve 14^a within the boxing 14 extends the unthreaded rear portion of a normally horizontal operating-screw 15, on the outer or rear end of which is mounted a large hand or balance wheel 16. The screw 15, which extends forwardly beneath the rear portion of the ladder, passes through and engages the threads of the hubs 10^a of the pivoted bar 10.

Depending from the inner sides of the ladder-legs 5 are parallel bars or arms 17, the downwardly-extending portions of the latter extending in rear of the cross-bar 8. In the lower end portions of these arms 17 is pivoted a cross-piece 18, and through openings formed in said cross-piece extend loosely the forward portions of parallel rods 19, the rear end portions of these rods being pivotally connected at 20 with the side standards of the yoke-frame 11. In front of the arms 17 each of the rods 19 is surrounded by a coiled spring 21, the outer or forward end of this spring abutting against a transverse cross-bar 22, which con-

nects the forward ends of said rods. The springs 21 are when the parts are in the position indicated in the drawings—that is, with the ladder in its lowered or normal position—under compression.

In order to raise or swing the ladder upward, it is obvious that the operation will consist in rotating the hand or balance wheel 16, causing the boxing-hubs 10^a to move rearwardly on said screw and resulting in a consequent upward swinging movement of the ladder on its pivot or supporting-shaft 3. In this operation it will be observed that the pressure exerted by the springs 21 upon the cross-piece 18 will assist in imparting the rearward movement to the rear portion of the ladder-body, thus contributing aid in the operation of the screw.

It will be observed that owing to the fact that the cross-bar 8 is pivotally connected with the frame-bars 6 said cross-bar is permitted to assume such angles as the raising of the ladder must occasion, while the pivotal support of the screw bearing-piece 10 will permit of any desirable lateral swinging motion of the ladder.

Importance is attached to the fact that the pivot 3 of the ladder is disposed near the movable portion of the turn-table, that the screw is on a higher plane, and that the universal bearings of the said screw are upon opposite sides of this pivot, as is clearly shown in Fig. 1, as by this construction I secure an ever-increasing leverage as the ladder is raised, and it will be readily seen that when the ladder has been raised to an angle of, say, sixty or seventy degrees the greater portion of its weight has been thrown beyond a vertical line through its pivotal point, and from this point on the ladder will move to its vertical position without the aid of the screw, being thus aided by its own weight.

By means of the universal joints or bearings at or near the opposite ends of the screw I provide against stripping of the threads of the screw or other injury thereto, as is liable to occur where the screw is not thus supported on uneven surfaces, which causes the ladder to sway sidewise, and consequently throw the parts out of alinement.

Having now fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In an aerial ladder, a ladder having its pivot located at a point in proximity to its turn-table, combined with an operating-screw disposed above its pivot, and universal bearings for said screw upon opposite sides of said pivot, as set forth.

2. In an aerial-ladder-elevating mechanism, the combination with a truck and a ladder having its rear portion hinged thereon, of a pivoted transverse bar 8 supported from the ladder, arms 17 depending from said ladder, an operating-screw having a threaded connection with said bar 8 and provided with an operating hand-wheel, rods 19 having a pivotal support at their rear ends and having their outer portions supported by the arms 17 and springs 21 interposed between said arms 17 and enlargements at the ends of the rods 19, substantially as specified.

3. In an aerial ladder, a ladder having a low-down pivot, combined with an operating-screw disposed above said pivot in universal bearings disposed upon opposite sides of said pivot, and a spring for assisting in raising the ladder, as set forth.

4. In an aerial ladder, a ladder mounted on a low-down pivot, combined with an operating-screw mounted in universal bearings, disposed upon opposite sides of said pivot, a balance-wheel on one end of the screw, and a spring acting upon the ladder upon the opposite side of the pivot, as set forth.

5. In an aerial-ladder-elevating mechanism, the combination with a truck-body and a ladder having its rear portion hinged in connection with said truck, of a pivoted transverse bar supported from the ladder, a vertical pivoted bar in said transverse bar, a screw passing through and engaging threads in the opening in the vertical bar, a universal boxing for the rear portion of said screw, and a hand or balance wheel on the screw beyond said universal boxing, as set forth.

6. In an aerial ladder, a bearing for the rear end of the screw, the same consisting of a boxing mounted on horizontal pivots, and a sleeve mounted within said boxing and upon vertical pivots, and adapted to receive a screw, as set forth.

7. In an aerial ladder, a bearing for the rear end of the screw, the same comprising a ring mounted at diametrically opposite points on horizontal pivots, and a sleeve within said ring and mounted upon diametrically opposite pivots, at right angles to and traversing the plane of the first-mentioned pivots and adapted to receive the unthreaded portion of the screw, as set forth.

8. The combination with a screw, of a bearing therefor, consisting of a ring mounted for to-and-fro movement upon diametrically opposite pivots, and a sleeve concentric with said ring and within the same, and pivots for the said sleeve disposed in planes at right angles to those of the ring and adapted to receive the unthreaded portion of the screw, as set forth.

FREDERIC S. SEAGRAVE.

In presence of—
A. L. PHELPS,
W. L. MORROW.