No. 768,700. PATENTED AUG. 30, 1904.

F. S. SEAGRAVE.

AERIAL LADDER.

APPLICATION FILED DEC. 28, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

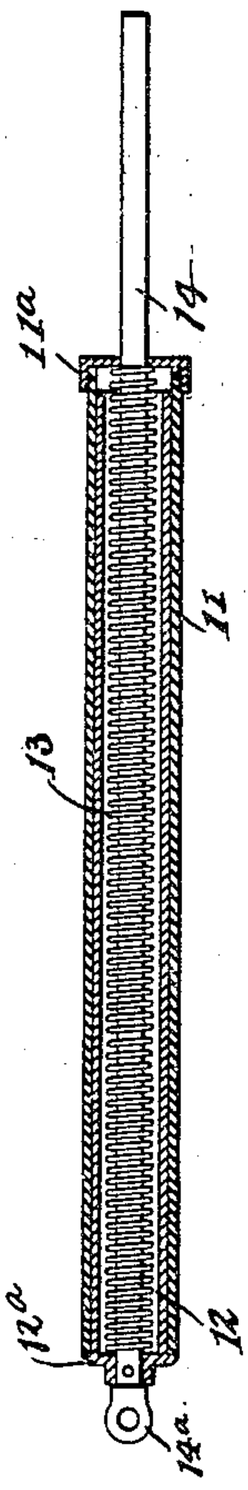

Fig. 2.

Fig. 1.

WITNESSES:

H. B. Bradshaw

Louise Shepherd

INVENTOR

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NO MODEL. 2 SHEETS—SHEET 2.

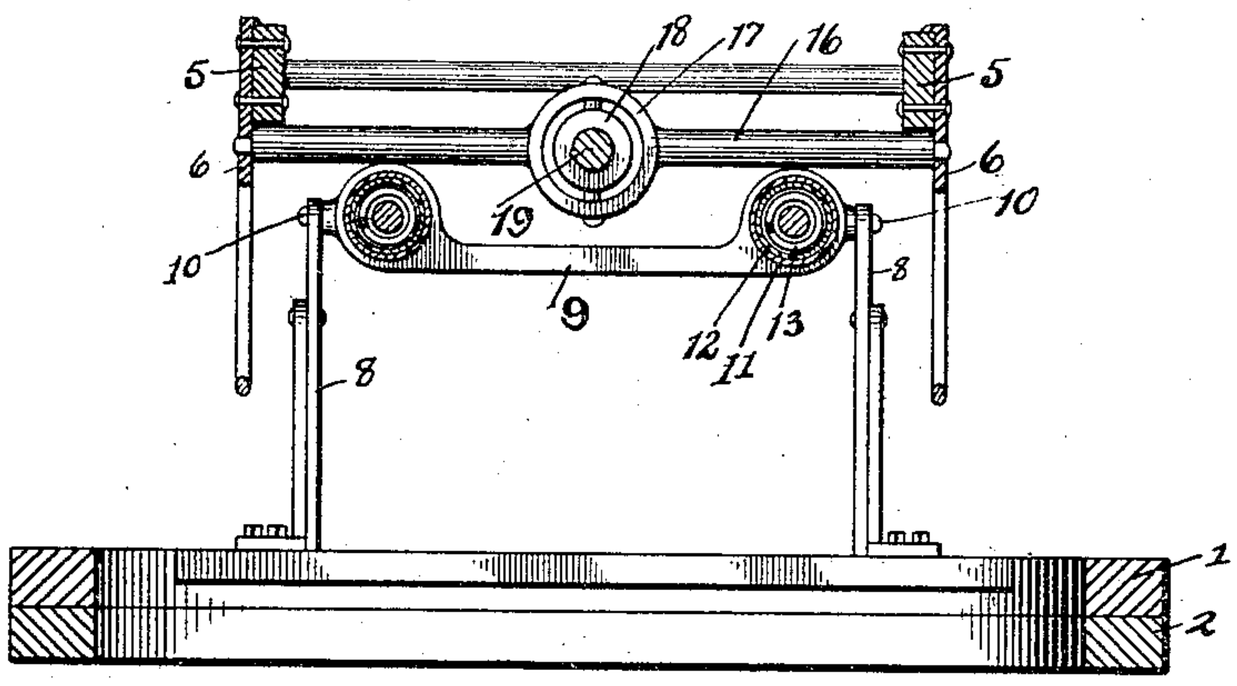

Fig. 3.

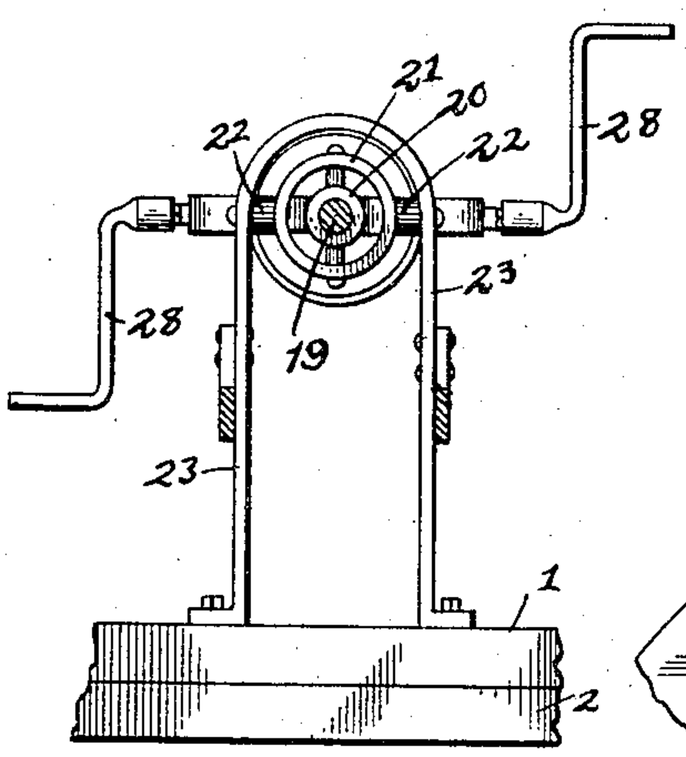

Fig. 4.

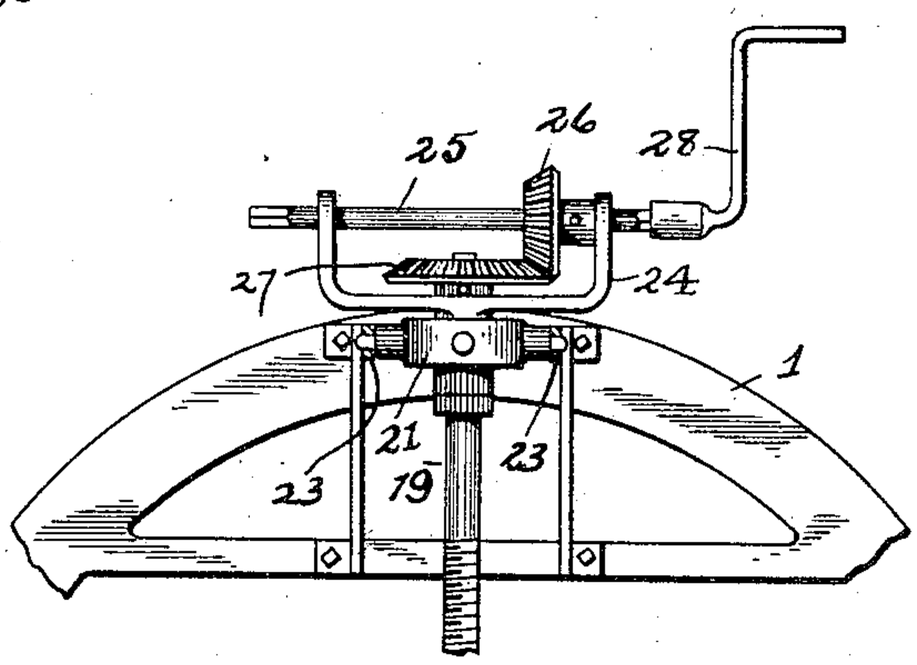

Fig. 5.

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No. 768,700. Patented August 30, 1904.

UNITED STATES PATENT OFFICE.

FREDERIC SCOTT SEAGRAVE, OF DETROIT, MICHIGAN.

AERIAL LADDER.

SPECIFICATION forming part of Letters Patent No. 768,700, dated August 30, 1904.

Application filed December 28, 1903. Serial No. 186,792. (No model.)

To all whom it may concern:

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

My invention relates to aerial ladders; and the objects of my invention are to provide, in conjunction with an aerial ladder, improved means for raising or swinging the same upward and to so construct my improved raising mechanism and means as to permit of an aerial ladder being easily and rapidly raised without the expenditure of unnecessary or undesirable power and with comparatively slight effort on the part of the operator. These objects I accomplish in the manner illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of the rear or lower end portion of an aerial ladder, showing the same mounted upon the turn-table and showing my improved operating mechanism in conjunction therewith. Fig. 2 is a central longitudinal section of one of the spring casings or tubes, which I employ in the manner hereinafter described. Fig. 3 is a sectional view on line *x x* of Fig. 1. Fig. 4 is a sectional view on line *y y* of Fig. 1, and Fig. 5 is a plan view of the rear portion of the screw-shaft and its supports.

Similar numerals refer to similar parts throughout the several views.

1 and 2 represent, respectively, the rotating and fixed sections of a suitable form of turn-table, such as is ordinarily carried upon the framework of an aerial-ladder truck. Journaled transversely in suitable bearings in the upper side of the turn-table section 1 is a shaft 3, from which extend bars 4, the latter being secured at their outer ends to the lower rear portions of the legs or side frame-pieces of a ladder 5. I also cause to extend from the shaft 3 a desirable number of inclined brace rods or bars, such as are indicated at 6 and 7, which are secured at suitable points to the ladder-frame.

Rising from the outer portion of the upper turn-table member 1 are suitably-braced opposing standards 8, and extending between these standards is a bar 9, (see Fig. 3,) the latter being provided with terminal pin projections 10, which are pivoted in the upper ends of said standards 8. Through each of the enlarged ends of the bar 9 extends a casing or tube 11, within which is inserted from the rear end thereof an internal casing 12. (See Fig. 2.) The inner casing 12 is preferably provided on its outer end with a slightly-enlarged head or shoulder portion 12^a, against which the end of the external casing normally abuts. Within the internal casing I provide a coiled spring 13, which bears between the outer end cap 11^a of the external casing and the inner end of the inner casing, this spring being when said casings are closed together or toward each other in a compressed condition. I preferably cause to extend through the internal casing and through the cap 11^a a guide bar or rod 14, which is secured, as indicated, to the inner end of the inner casing and which has an outwardly-projecting bearing extension or I-piece 14^a. These projections 14^a are pivoted on a transverse rod 15, which connects the supporting-arms 4 at a point beneath the ladder end. It will thus be seen that the parallel spring-containing tubes are supported adjacent to and substantially parallel with the ladder when the latter is in its lowered position, as shown in full lines in Fig. 1.

Pivoted between the upper portions of the brace-bars 6 and adjacent to the under side of the ladder-legs is a transverse shaft 16, which is intersected centrally by a ring 17, within which is pivoted the opposing trunnions of a nut 18. Passing through this nut 18 is a rearwardly-extending screw-threaded rod 19, the unthreaded rear portion of which bears in a suitable tubular boxing 20, which is pivotally mounted within a ring 21, which in turn has its opposing trunnions 22 pivoted in the upper portion of a yoke-like frame 23, which rises from the upper section of the turn-table. Connected with the bearing or boxing 20 is the central portion of a yoke-like bracket 24, (see Fig. 5,) the rearwardly-extending arms of which have journaled therein a shaft 25, which carries a bevel-pinion 26, the teeth of which mesh with a bevel gear-wheel 27, which

is carried on the outer end of the screw shaft or rod 19. The shaft 25 may be provided with a suitable operating crank or handle 28.

It will be understood that the compressed springs within the tubes 12 and 13 are intended to operate as a motive power in elevating the ladder and that when the screw shaft or rod is turned into the nut 18 and the distance between the pivot-point of the nut and the pivot-point of the shaft is thereby shortened the ladder will through power exerted by the springs 13 be permitted to swing toward an upright position. In this connection it will be observed that the screw-shaft is employed simply for the purpose of controlling and determining the position of the ladder and that the elevating movement is the result of the compression of said spring. It will thus be seen that a comparatively small degree of power is expended by the operator in raising a comparatively heavy ladder to an upright or partially-upright position. It will also be understood that the manner of support of the spring-containing tubes is such as to result in said tubes assuming when the ladder is elevated slightly-inclined positions, as indicated in dotted lines. It is also obvious that the outer end of the screw-shaft will move in a comparatively short arc of a circle, as indicated. During the elevating operation it will be seen that the compression of the springs will be gradually decreased, owing to the fact that the pivot-points of the outer tube-sections are stationary and the further fact that the inner tube is connected with the supports 4 and that the latter in their swinging movement with the ladder will cause, as shown in dotted lines, a partial separation of the inner and outer tubes.

While I have described in detail particular means for swiveling the screw shaft or rod, I desire it understood that such particular means are not essential to the operation of my device, inasmuch as any well-known form or constructions of swivel-joints might be employed.

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

In an aerial ladder, the combination with a turn-table, a ladder and brace-bars for pivotally supporting the ladder from the turn-table, of a pair of telescoping sections each comprising an external and an internal casing, rods passing through the inner casings fixed to the heads thereof and pivotally connected to the brace-bars, and coiled springs surrounding the rods and normally held under compression within the casings, means extending from the turn-table for pivotally supporting the outer casings, and means for controlling the degree of elevation of the ladder.

FREDERIC SCOTT SEAGRAVE.

In presence of—

MARGARET R. MOFFAT,

FRANK R. FISHER.