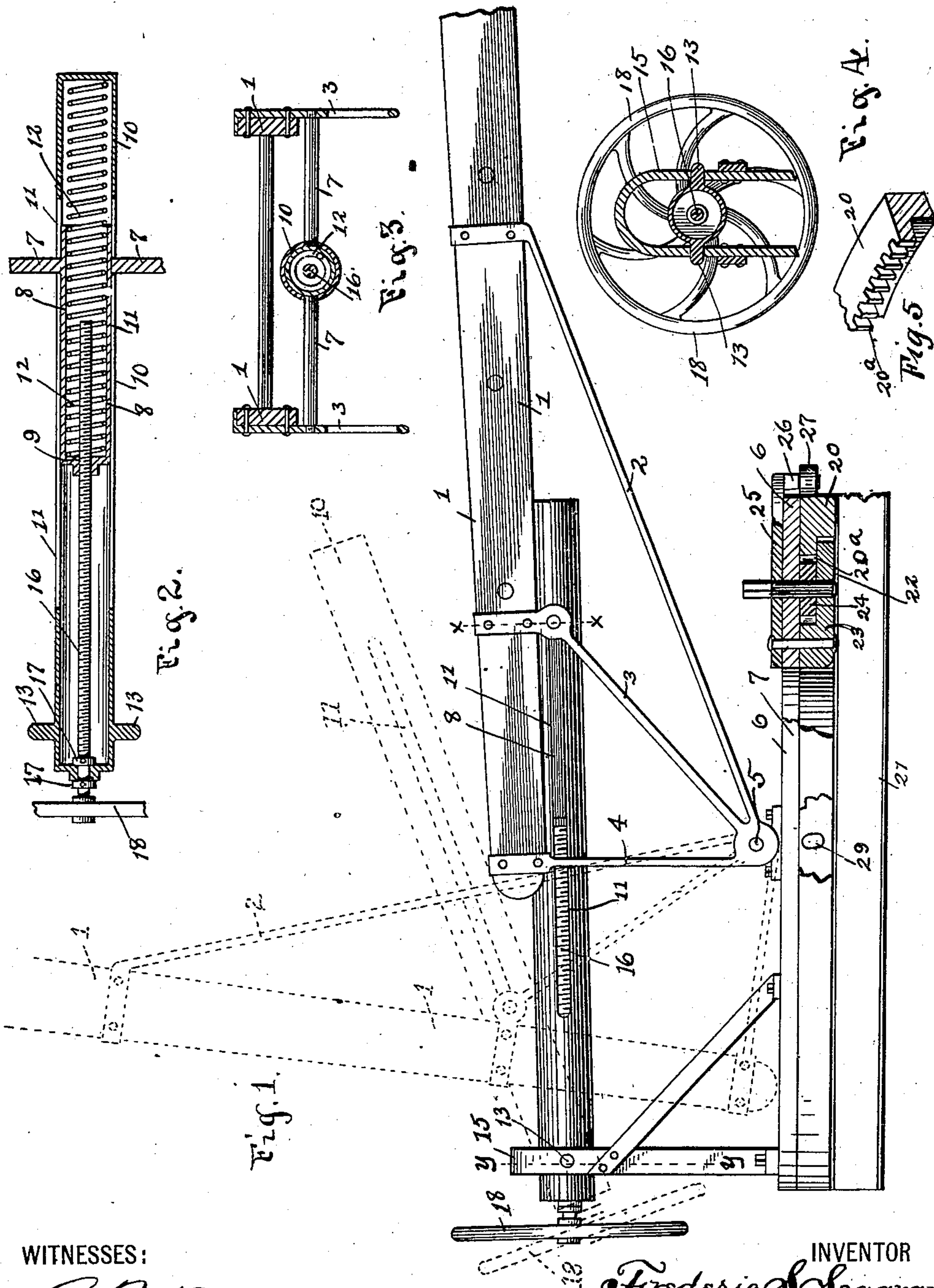


F. S. SEAGRAVE.
AERIAL LADDER.

APPLICATION FILED JULY 11, 1901.

NO MODEL.

2 SHEETS—SHEET 1.



WITNESSES:

H. B. Bradshaw
A. L. Phelps

INVENTOR

Frederic S. Seagrave

BY

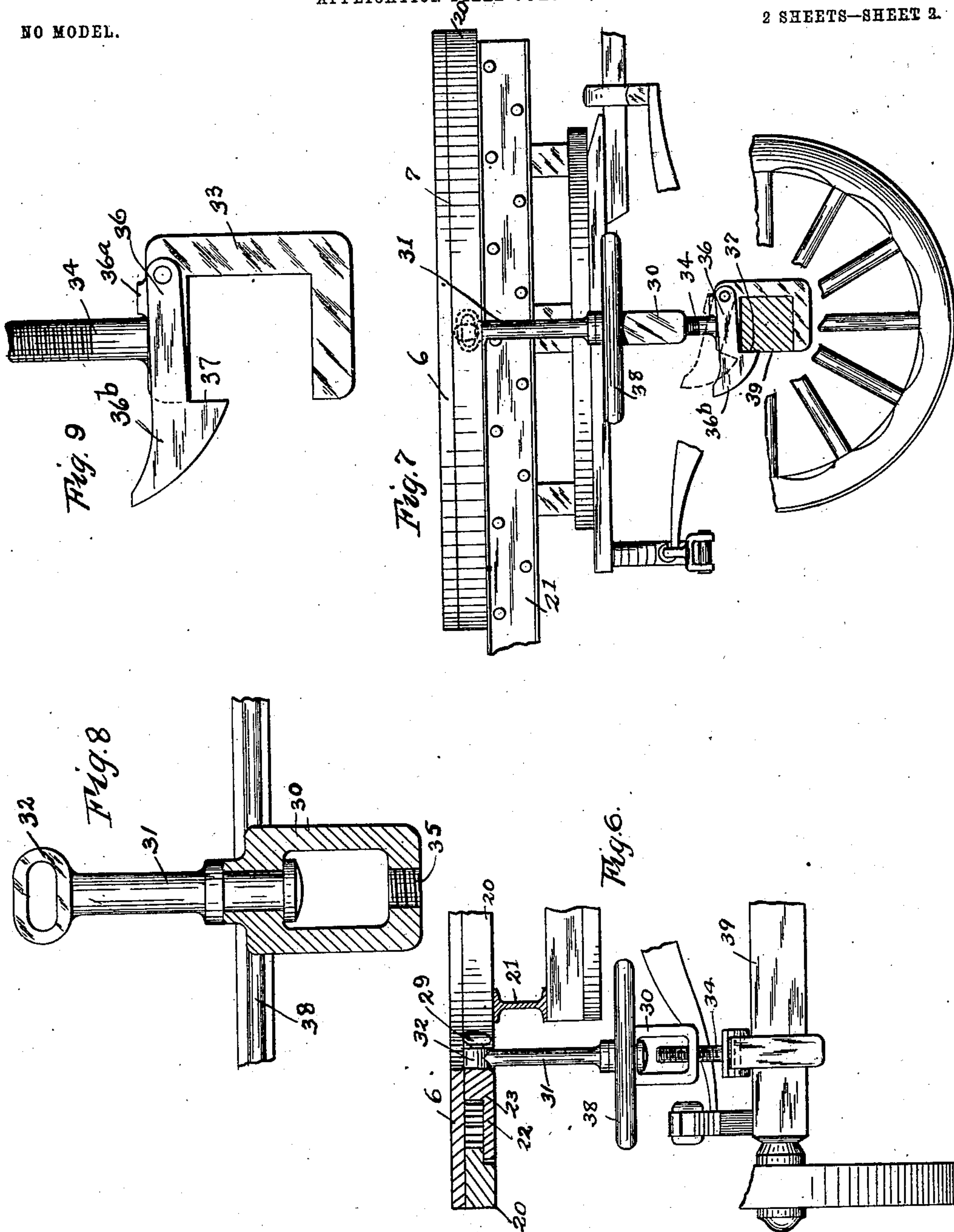
C. C. Shepherd
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2 SHEETS—SHEET 2.

NO MODEL.



WITNESSES:

J. L. White
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UNITED STATES PATENT OFFICE.

FREDERIC S. SEAGRAVE, OF COLUMBUS, OHIO.

AERIAL LADDER.

SPECIFICATION forming part of Letters Patent No. 724,513, dated April 7, 1903.

Application filed July 11, 1901. Serial No. 67,857. (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 the objects of my invention are to provide simple, reliable, and effective mechanism whereby an aerial ladder, water-tower, or other similar structure may be rapidly raised by the employment of comparatively slight power, to so combine the lifting mechanism with the body to be raised as to admit of the movement of the former independent of the latter, to provide improved means for locking the ladder-truck axle in connection with the turn-table, and to produce other improvements the details of construction of 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 the rear portion of an aerial ladder, showing my improved lifting mechanism in connection therewith. Fig. 2 is a central longitudinal section of the lifting device shown detached. Fig. 3 is a transverse section on line *xx* of Fig. 1. Fig. 4 is a similar section on line *yy* of Fig. 1. Fig. 5 is a detail view in perspective of a portion of a rack-ring which I employ in the manner hereinafter described. Fig. 6 is a partial end elevation of a truck having my improvement and showing a portion of the turn-table in cross-section. Fig. 7 is a side elevation of a portion of the truck. Fig. 8 is a detail view, partly in elevation and partly in section, of the turnbuckle and its stem, which I employ in the manner hereinafter described; and Fig. 9 is a side elevation of the axle catch-hook.

Similar numerals refer to similar parts throughout the several views.

1 represents the side frame-pieces of a ladder-body, which are provided with converging brace arms or bars 2, 3, and 4, which at their point of convergence are hinged or pivoted upon a shaft 5, mounted from the upper ring 6^a of a truck turn-table 6. The brace-

arms 3 have their upwardly-extending terminations connected with the ladder sides, and the bases of these upward extensions are provided with oppositely-located bearings, 55 within which are journaled the ends of trunnions 7, which project from opposite sides of a spring-containing tube 8, the latter having its rear end portion provided with a threaded opening 9. As shown in the drawings, the tube or spring-casing 8 is contained within a longer external casing or frame 10, the latter having formed therein oppositely-located longitudinally-arranged slotted openings 11, through which the trunnions 7 pass loosely. 65

12 represents a coiled spring, one end of which bears against the inner end of the spring-casing 8 and the remaining end of which is adapted to bear against the outer or forward end of the external case or frame 10. 70 The outer casing 10, adjacent to its rear end, is provided with laterally-projecting trunnions 13, which are pivotally supported in the vertical arms of a standard bracket 15, which rises from the turn-table 6. Entering the casing 10 through its rear end portion and passing through the threaded opening 9 of the spring-casing 8 is a screw 16, the latter terminating within the spring 12. This screw is prevented from outward or inward movement by the employment of stop-shoulders 17 thereon, the same being arranged on opposite sides of the rear end of the casing 10. On the outer end the screw is provided with a comparatively large hand or balance wheel 18. When 85 the ladder, water-tower, or other body to be raised is in its lowered position, it will be observed that the spring 12 is under compression; but in the operation of raising the ladder, which consists in the rotation of the hand-wheel 18 and screw 16, causing the casing 8 and the ladder-body to move rearwardly, the pressure of the spring on the inner end of the casing 8 materially assists in the raising operation. 95

Owing to the fact that the trunnions 7 are arranged to move within the slotted openings 11 of the outer casing, it will be seen that no direct connection of the ladder and casing is had—such, for instance, as that shown in my former application for patent, Serial No. 43,702, filed January 18, 1901—and that the

ladder may be thus swung upward, while the lifting mechanism remains in the comparatively lowered position.

In the construction of the turn-table I provide the lower ring-section 20, which is rigidly mounted upon the truck side frames 21, with inwardly-projecting teeth 20^a, this inwardly-projecting toothed portion bearing upon the outturned lip 22 of a ring 23, which is secured in connection with the under side of the moving ring 6. Above the lip 22 I pivot at a desirable point a pinion 24, the teeth of which mesh with those of the rack-ring 20. At a desirable point on the upper ring 6 I secure an outwardly-extending arm or plate 25, from the projecting end portion of each of which depends a pin 26, on which is rotatably mounted a friction-roller 27, the latter bearing and running against the ring-section 20. When the pivot-pin of the pinion 24 is rotated, it is obvious that the traveling engagement of the teeth of the pinion with the teeth of the rack-ring must result in the desired rotation of the upper and movable ring-section.

From the construction and operation described it will readily be understood that the combined action of the screw and spring renders the raising of a comparatively long and heavy ladder or other body a comparatively easy operation and admits of the same being raised rapidly.

My invention consists, further, in improved means for locking a turn-table in connection with a truck-axle, this construction being illustrated more clearly in Figs. 6, 7, 8, and 9 of the drawings, and may be described as follows: From the turn-table projects laterally a stud or pin 29, which is preferably provided with an elongated head, as shown. Of my improved coupling or connecting device, 30 represents a turnbuckle, with the upper end of which is rotatably connected an upwardly-extending arm or pin 31, the latter having its upper termination in the form of an elongated open head or flattened ring 32. 33 represents a hook-body, which is in the form of a squared yoke, having its opening or mouth at the side. This catch or hook body 33 is provided with an upwardly-extending threaded stem or fixed screw 34, the upper portion of which passes through and engages a threaded opening 35 in the lower end of the turnbuckle. Pivoted on opposite sides of the upper portion of the hook-body 33 are the rear ends of outwardly-extending catch-fingers 36, the latter being connected in their rear portions by a transverse bar 36^a, which is adapted to rest upon the upper side of the hook-body 33 and limit the downward movement of said fingers. The outer end portion of each of the fingers 36 has an enlarged catch-head 36^b, the increased depth of which results in the formation of a shoulder 37 at the junction of the head and body of said finger. This shoulder portion 37 normally projects in front of the upper portion

of the mouth of the hook-body 33. Formed with or secured to the upper portion of the turnbuckle 30 is the central portion of a comparatively large hand-wheel 38.

In utilizing my device for forming a desirable lock or coupling between the turn-table and the axle 39 of the truck the connecting device is first so turned as to permit the vertically-disposed head of the pin 31 to be received by the correspondingly-shaped horizontal opening in the head of the pin or stud 29. This being accomplished, the coupling-body is allowed to swing downward, resulting in the head of the pin 31 being locked into engagement with the head of the pin 29 and permitting three sides of the axle 39 to be embraced by the hook-body 33. It will be observed that the enlarged head of each of the catch-fingers 36 is provided with an inclined or curved outer face, so that when the face of the axle is brought into contact therewith said fingers will be raised until the axle is within the hook 33, when said fingers will be permitted to drop downward by gravity until their shoulder portions 37 are in front of the upper portion of the axle-body, thereby preventing any danger of disengagement of the hook from the axle.

By proper rotation of the hand-wheel 38 it is evident that the turnbuckle 30 will take up the screw 34, resulting in the formation of a rigid coupling or lock between the turn-table and axle and locking said parts against independent movement.

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

1. In a raising mechanism for aerial ladders and other pivoted bodies, the combination with the body 1 having a pivotal support in its rear portion, of a tube 8 having laterally-extending trunnions journaled in said body 1, and a spring adapted to exert a rearward pressure on said nut or tube, of a screw 16 engaging the threads of said nut or tube and provided with a hand-wheel 18, said screw being held against longitudinal movement, substantially as specified.

2. In a lifting mechanism for aerial ladders and similar bodies, the combination with a body 1 having its rear portion pivoted and adapted to swing upward, a case or frame 10 arranged adjacent thereto and having its rear portion pivotally supported, said casing having longitudinally-arranged slotted openings therein, of a nut or tube 8 arranged within said casing or frame and having laterally-projecting trunnions journaled in said body 1, a spring exerting a rearward pressure on said nut or tube, a screw extending within said casing 10 and engaging the threads of said nut or tube and a hand-wheel on the outer end of said screw, substantially as specified.

3. In a ladder-truck, the combination with the truck-frame, axle and ground-wheels and a turn-table mounted on said truck, of an

- axle and turn-table coupling comprising a turnbuckle 30, a stem extending therefrom and rotatably mounted therein, a hook-body having a threaded stem portion engaging a threaded opening in said turnbuckle, said turnbuckle having a hand-wheel rigidly connected therewith and means for detachably connecting the turnbuckle-pin with said turntable, substantially as specified.
4. In a ladder-truck, the combination with a truck-frame and its running-gears comprising ground-wheels and axles and a turn-table mounted on said truck-frame, of a coupling for said turn-table and one of said axles, said coupling comprising a turnbuckle having a hand-wheel 38, a stem or pin 31 rotatably mounted in said turnbuckle and adapted to be detachably engaged with said turn-table, a hook-body 33 adapted to engage a truck-axle and having shouldered catch-fingers 36 pivoted thereto, the heads of said fingers adapted to drop over a portion of the mouth of said hook-body and a threaded stem for said hook-body engaging a threaded opening in said turnbuckle, substantially as specified.

FREDERIC S. SEAGRAVE.

In presence of—

A. L. PHELPS,

W. L. MORROW.