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PATENTED APR. 28, 1903.

A. W. LA FRANCE & W. WRIGHT.

AERIAL APPARATUS.

APPLICATION FILED JULY 17, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

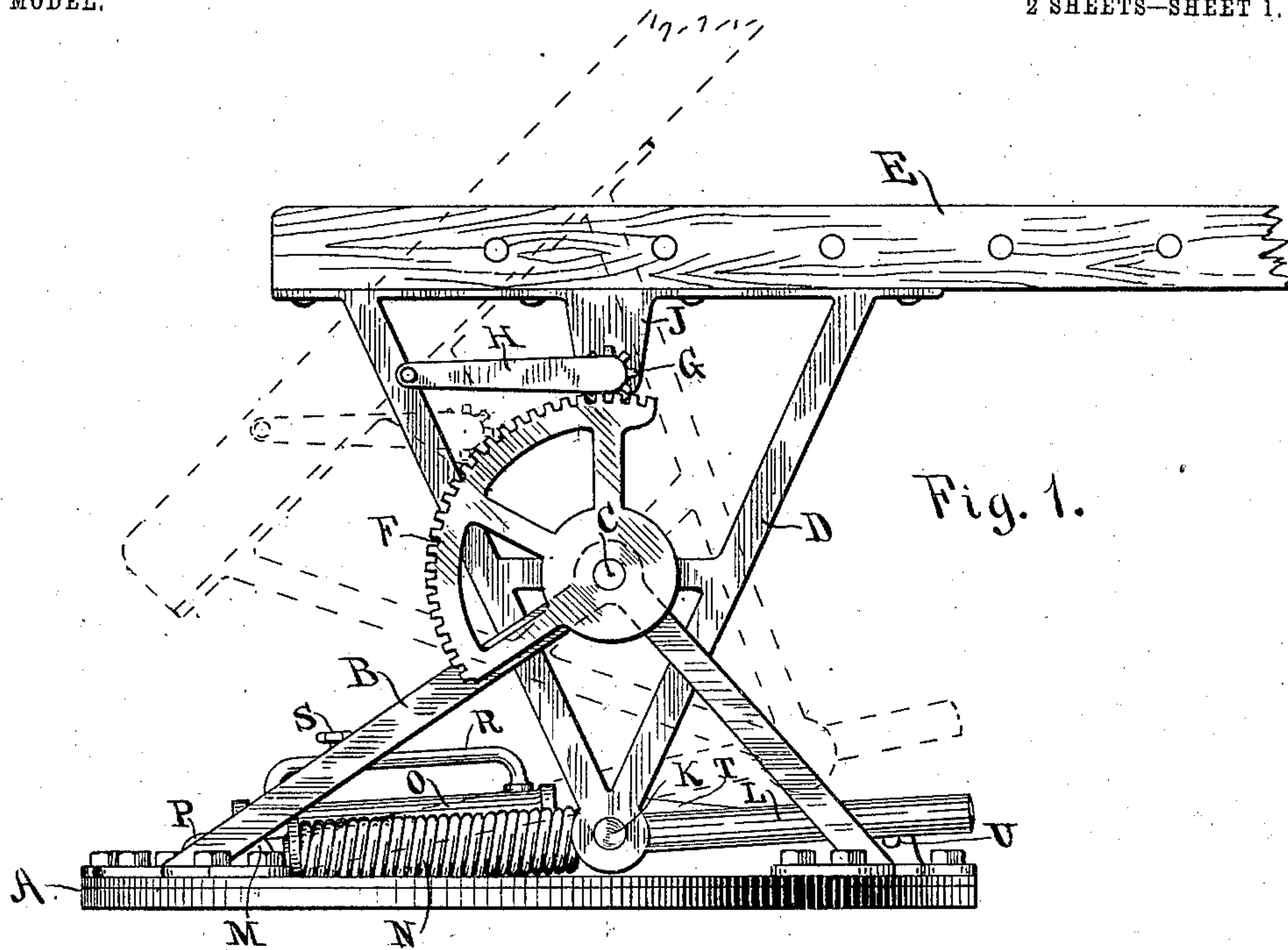
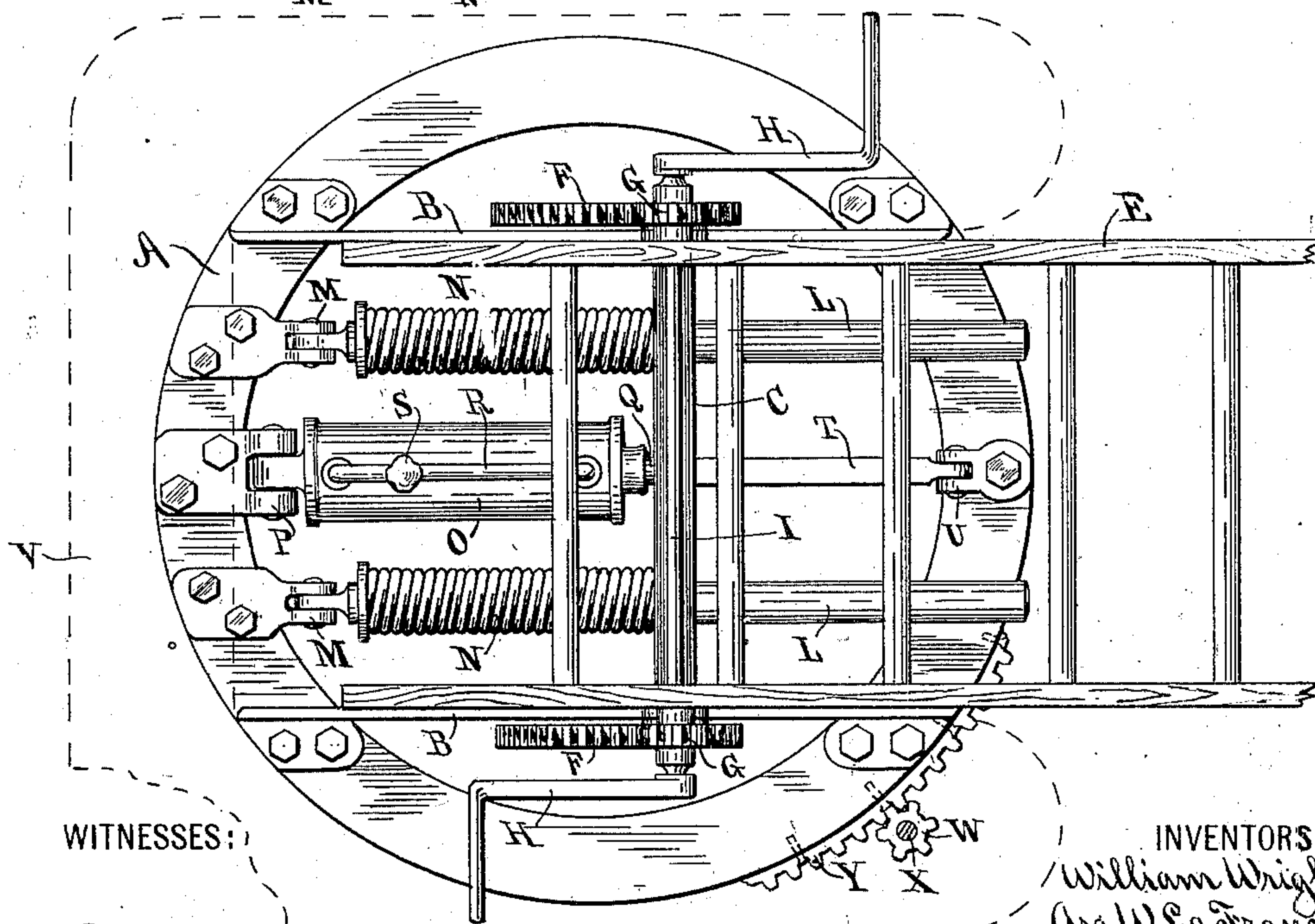


Fig. 1.



WITNESSES:

Ad. Diven
W. E. Verbeck.

Fig. 2.

INVENTORS
William Wright
Asa W. LaFrance
BY
Eugene Diven
ATTORNEY

UNITED STATES PATENT OFFICE.

ASA W. LA FRANCE AND WILLIAM WRIGHT, OF ELMIRA, NEW YORK.

AERIAL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 726,543, dated April 28, 1903.

Application filed July 17, 1902. Serial No. 115,961. (No model.)

To all whom it may concern:

Be it known that we, ASA W. LA FRANCE and WILLIAM WRIGHT, citizens of the United States, residing at Elmira, in the county of Chemung and State of New York, have invented certain new and useful Improvements in Aerial Apparatus, of which the following is a specification.

Our invention relates to improvements in aerial apparatus intended more particularly for fire-fighting purposes, such as aerial-ladder trucks, water-towers, and the like.

The objects of our improvements are to provide improved mechanism for elevating the pivotal member of the apparatus, whereby the labor required to elevate said member shall be materially decreased and the time requisite for raising said member from a horizontal to a vertical position shall be materially lessened.

A further object is to provide a safety-check, whereby said pivotal member may be retained with certainty in any given position when released by the operators and whereby the speed with which said member can be raised or lowered may be readily governed and controlled.

A further object is to so arrange and construct our elevating mechanism that it may be put into operation immediately upon the arrival of the apparatus at a fire without the necessity of detaching the horses therefrom; and a still further object of our improvements is to provide means whereby all the manipulations of the pivotal member may be accomplished by the men stationed upon the turn-table or upon a platform supported thereon, by which we mean to include not only the elevation and adjustment of the pivotal member in its vertical plane, but also the adjustment of said member upon the turn-table at any angle to the body of the truck.

We attain the several objects of our improvements by means of the construction and arrangement of the several parts as illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of so much of an aerial-ladder apparatus as is necessary to illustrate our invention; Fig. 2, a plan view of the same; Fig. 3, a rear elevation, and

Fig. 4 a sectional detail showing certain portions of the invention.

Like letters of reference designate similar parts in the several views.

A designates a turn-table, which in practice is supported upon the shears or side bars of a truck-frame in the usual manner. Supported upon the upper member of this turn-table are two V-braces B B, carrying a pivot-shaft C, upon which are hung two inverted-A braces D D.

E indicates the main or butt ladder, which is secured to the bases of the A-braces D. Stationary segment-gears F F are secured upon the outwardly-projecting ends of the pivot-shaft C, which is also stationary, and pinions G G, operated by cranks H H on the shaft I, which is journaled in the hangers J J, impart motion to the ladder E about the pivot C when the cranks are operated by the men upon the turn-table. Instead of a ladder the pivotal member E may be the mast of a water-tower or other appliance.

Joining the apexes of the A-braces is a cross-head K, adapted to turn therein. Through suitable bearings in this cross-head pass the bars L L, the forward ends of which are pivotally attached to the turn-table, as indicated at M M. Supported upon these bars are coiled springs N N, which exert a pressure upon the cross-head K, so as to assist in elevating the pivotal member E, it being our intention to so proportion these springs that they will counterbalance the weight of the member E, which must otherwise be overcome by the men at the cranks H when elevating said member. As these springs are extended the force exerted by them upon the cross-head will decrease; but since the lever-arm from the center of gravity of the member E as it swings upwardly around the pivot C will constantly approach said pivot the weight to be overcome by said springs will also steadily decrease, by reason of which it will be apparent that these springs can be readily proportioned so as to exert a pressure at all times upon the cross-head commensurate with the weight opposed thereto by the pivotal member E. In practice the bars L will be, preferably, tubular in order to attain the requisite diameter to fit the core of the springs

N and at the same time provide for lightness in weight.

Between the bars L is a cylinder O, pivoted to the turn-table at P. This cylinder contains a piston, the rod Q from which projects out from a suitable stuffing-box in the rear head of the cylinder and is attached to the cross-head K. This cylinder is to be filled with oil or other non-freezing liquid, and a by-pass or run-round R connects one end of the cylinder with the other, so that as the piston moves in one direction or the other the liquid will move from one end of the cylinder into the other at a velocity dependent upon the set of the valve S. It will be readily understood that by setting the valve S more or less open the speed of raising or lowering the member E can be governed and controlled and by closing the valve said member may be held fixed in any position. The by-pass may be through the piston itself instead of by way of the outside pipe, an arrangement well known in this type of controller, without departing from the spirit of our invention. By means of this cylinder a safety-check is put upon the pivotal member, so that even if one or both of the springs were to break when the member E is in elevated position and the cranks H are not in the hands of the men manipulating the truck the rapid descent of said member, and the consequent damage to the apparatus or injury to the men upon it at the time, will be prevented.

In order to relieve the pivotal member E from the action of the springs N when said member is in its lowered position, we provide a lock-bar T, which is pivotally attached to the upper member of the turn-table at U, so as to be thrown down into engagement with the cross-head to lock it against the pressure of the springs, as indicated in Fig. 4 of the drawings. By thus locking the cross-head against the springs the member E is caused to rest quietly in the truck-braces and the truck-frame is relieved from pressure tending to buckle it by reason of the unrelieved back pressure of the member E against the spring N.

By broken lines in Fig. 2 and full lines in Fig. 3 we have indicated a platform V, which we propose to attach to the upper member of the turn-table A, upon which the men can stand in manipulating the ladder, and in order that the turn-table may be swung around by the men while standing on this platform we provide a pinion W, attached to a shaft X, supported in a suitable bearing or socket in the platform V. The pinion W meshes with the teeth of a rack Y, which may be either formed on the stationary member of the turn-table or bolted thereto. The shaft X is turned by means of a hand-wheel Z, secured thereon at a suitable distance above the platform V. The construction of the stationary and movable members of the turn-table A is indicated at a' and a , respectively, in Fig. 4. It may be desirable to reverse the position of these

members a' and a —that is to say, to locate the stationary member at the inside of the turn-table instead of at the outside—and in that event the rack Y will be placed on the inner periphery of said stationary member instead of the outside periphery, and the pinion W and its controlling-shaft X will be located accordingly. We do not, therefore, confine ourselves to the precise position of these members as illustrated in the drawings.

While we have shown for the purpose of more clearly illustrating the several members of our device cranks H H for manipulating the pinion G and the shaft I, we will preferably in practice provide hand-wheels instead of said cranks, by which the men may more readily operate the pivotal member.

By hanging the pivotal member above the pivot-shaft and applying the force of the springs at the opposite side of said shaft the pivot-bearings will be relieved of the weight of the pivotal member to a great extent, so that said member will turn very easily upon its bearings, and by reason of our arrangement of pinion and segment-gear the elevation of said member can be accomplished with little expenditure of energy and very quickly, as it requires but few turns of the crank or hand-wheel to bring the pivotal member to its upright position.

Having thus described our improvements, what we claim as our invention, and desire to secure by Letters Patent, is—

1. In an aerial apparatus, the combination of a pivotal member, a stationary segment-gear having its center coincident with the center of rotation of said pivotal member, a pinion meshing therewith journaled on said member above the pivot-shaft, means for rotating said pinion to elevate the pivotal member, and a spring acting upon said member upon the opposite side of the pivot-shaft to assist in so elevating said member.

2. In an aerial apparatus, the combination of a pivotal member carried upon supports above a pivot-shaft, a spring acting upon said supports below the pivot-shaft in opposition to the weight of the pivotal member, and means for rotating said pivotal member upon the pivot-shaft.

3. In an aerial apparatus, the combination of a pivotal member carried upon supports above a pivot-shaft, a cross-head connecting the supports below the pivot-shaft, a bar passing through said cross-head and pivotally mounted upon the supporting-base, a spiral spring carried upon said bar and acting upon the cross-head in opposition to the weight of the pivotal member, and means for rotating said pivotal member upon the pivot-shaft.

4. In an aerial apparatus, the combination of a pivotal member carried upon supports above a pivot-shaft, a cross-head connecting the supports below the pivot-shaft, bars passing through said cross-head and pivotally mounted upon the supporting-base, spiral

springs carried upon said bars and acting upon the cross-head in opposition to the weight of the pivotal member, a stationary segment-gear at each side of the pivotal member having its center coincident with the center of rotation of said member, pinions meshing therewith journaled on said member, and means for rotating said pinions to elevate the pivotal member.

5. In an aerial apparatus, the combination of a turn-table base, V-braces rising therefrom, a pivot-shaft carried thereby, inverted-A braces hung thereon, a pivotal member secured upon the bases of said A-braces, a cross-head connecting the apexes of said braces, bars passing through said cross-head and pivotally mounted on said turn-table, spiral springs carried by said bars and acting upon the cross-head in opposition to the weight of the pivotal member, and means for rotating said pivotal member upon the pivot-shaft.

6. In an aerial apparatus, the combination of a ladder pivotally mounted upon a supporting-base, means for applying power to said ladder to elevate or depress it, and a safety-check or governor between the ladder and its supporting-base comprising a cylinder pivotally mounted on the supporting-base, a piston within said cylinder, a piston-rod passing out therefrom and coupled to the ladder, a by-pass from one end of the cylinder to the other and a valve therein to regulate and control the flow of a liquid in both directions from one side of the piston to the other, whereby the ladder may be locked in

any position and the speed of its rise and fall governed.

7. In an aerial apparatus, the combination of a pivotal member carried upon supports above a pivot-shaft, means for rotating said member to elevate or depress it, a cross-head connecting the supports below the pivot-shaft, springs acting upon said cross-head in opposition to the weight of the pivotal member, and a safety-check or governor between the pivotal member and its supporting-base comprising a cylinder pivotally mounted upon the supporting-base, a piston within the cylinder, a piston-rod passing out therefrom, attached to said cross-head, and means for regulating the flow of a liquid from one side of the piston to the other.

8. In an aerial apparatus, the combination of a pivotal member carried upon supports above a pivot-shaft, a cross-head connecting the supports below the pivot-shaft, springs acting upon said cross-head in opposition to the weight of the pivotal member, and a lock-bar pivoted upon the supporting-base and adapted to be thrown down into engagement with the cross-head to relieve the pivotal member from the action of said springs.

In testimony whereof we have affixed our signatures in presence of two witnesses.

A&A W. LA FRANCE.
WILLIAM WRIGHT.

Witnesses:

GEO. W. ROCKWELL,
M. E. VERBECK.