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A. W. SHAW.

AERIAL LADDER, ELEVATOR, OR LIFT.

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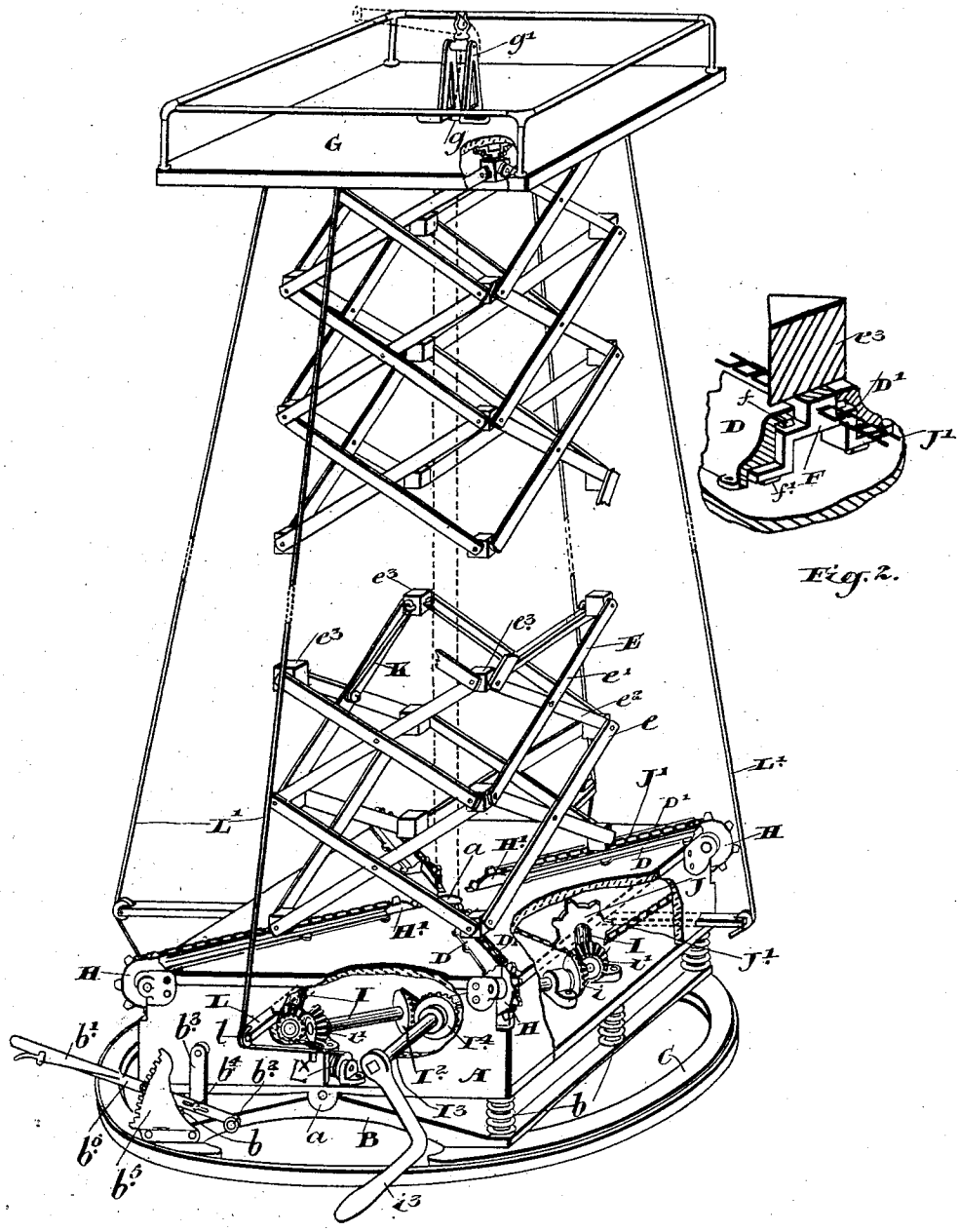


Fig. 1.

Fig. 2.

Witnesses.

A. J. Stamm

C. H. Burke.

Inventor:

A. W. Shaw.

by Fred. B. Fetherstonhaugh

Atty.

ANDREW. B. GRAHAM CO., PHOTO-LITHOGRAPHERS, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ANGUS WILLIAM SHAW, OF TORONTO, CANADA, ASSIGNOR TO ROBERT FLEMING, TRUSTEE, OF TORONTO, CANADA.

AERIAL LADDER, ELEVATOR, OR LIFT.

No. 797,077. Specification of Letters Patent. Patented Aug. 15, 1905.

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To all whom it may concern:

Be it known that I, ANGUS WILLIAM SHAW, of the city of Toronto, in the county of York, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Aerial Ladders, Elevators, or Lifts, of which the following is a specification.

My invention relates to improvements in aerial ladders, elevators, or lifts; and the object of the invention is to construct a device of this class which may be raised to any desired height expeditiously, and thereby in case of a fire enable it to be used as a fire-escape as well as a means for enabling the firemen to combat the fire by being able to reach the required height to utilize their hose, which may be also used as an elevator for removing building materials or other articles to any desired height, and which may be used as an adjustable support for scaffolding, whereby it may be raised and maintained at any desired height, and for various other uses which it is not necessary here to enumerate; and it consists, essentially, of a hollow base supported on a suitable turn-table designed, preferably, to be located on a wagon or vehicle, an expansible standard comprising sides made up of crossed bars pivotally connected at their centers and to blocks at their ends, the upper end of the standard being provided with a platform and the lowermost blocks of the standard being located adjustably within diagonal grooves in the base, and mechanism for imparting an upward-and-downward movement to the blocks, whereby the standard may be raised or lowered, the parts being otherwise constructed and arranged in detail, as hereinafter more particularly explained.

Figure 1 is a general perspective view of my ladder, partially broken away to exhibit its interior construction. Fig. 2 is an enlarged detail view of shoe for supporting the expansible standard.

In the drawings like letters of reference indicate corresponding parts in each figure.

A is the hollow base.

B is an arch platform at the apex of which is supported and connected, by means of the hinged joint a, the hollow base A.

b represents compression-springs secured beneath the base A upon the platform B in proximity to its sides. The springs are designed to support the base A normally in a horizontal position.

C represents shoes secured beneath the platform B and designed to rest on a suitable turn-table. I do not show the means for turning the shoes upon the turn-table, as any suitable means may be used to accomplish this purpose.

b' is a slotted lever pivotally connected at b^2 to the platform B.

b^3 is a link pivotally connected to the base A and connected to the lever by a pin b^4, extending through the slot thereof.

b^5 is a toothed quadrant secured to the platform B, and b^6 is a plunger coöperating with the quadrant.

By means of the lever and quadrant the platform A may be tilted for a purpose which will hereinafter appear.

The slot in lever b' is provided to prevent the pin b^4 from binding when the platform is tilted to a high position.

D D′ are diagonally-arranged guideways secured on the top of the base A.

E is the expansible standard, preferably rectangular in form. The sides e of the standard are composed of a series of crossed bars e' e^2, pivotally connected together centrally of their length. The ends of each pair of bars are pivoted to the corresponding ends of the adjacent pair of cross-bars located vertically above or below the said crossed bars. The sides of the standard are connected together by corner-blocks e^3, interposed between the pivotally-connected ends of two adjacent pairs of one side and the pivotally-connected ends of two adjacent pairs of the adjacent side. The lowermost blocks e^3 are provided with bearing-shoes F (see Fig. 2) and with a double set of bearing-rollers f f', the lowermost set bearing against the top of the base A. The uppermost set bear against the guideways D D′.

G is a platform supported on and connected to the standard by a similar set of guideways and shoes to those connecting the standard E to the base A.

I will now describe the means by which the standard E is raised and lowered.

H represents a series of sprocket-wheels journaled in suitable bearings at the corners of the base A and at the outer end of the guideways D and D′.

H′ represents a series of sprocket-wheels journaled in proximity to the center of the platform A and at the inner end of the guideways D and D′.

I represents a series of shafts journaled within the hollow base A, arranged crosswise of the corners of the base and provided with end bevel-gears $i\,i'$, designed to mesh with the corresponding gear of the adjacent shaft.

I^2 is a bevel-gear secured on one of the shafts I intermediate of its length.

I^3 is a crank-shaft journaled in the side of the base and provided at its outer end with a crank-handle i^3 or other operating device and at its inner end with a bevel-gear I^4, designed to mesh with the bevel-gear I^2 on the shaft I.

J represents sprocket-wheels secured to the shafts I intermediate of their length, and J′ is a sprocket-chain extending from the shoe F over the sprocket-wheels H and H′ and under the sprocket-wheel J.

By means of the crank-handle i^3 the shafts I are given a rotary motion, so as to carry the sprocket-chain J′, and consequently the block e^3, attached thereto, in an inward or outward diagonal direction. By this movement the crossed bars $e\,e^2$ are expanded or contracted, thereby expanding or contracting the length of the standard.

K represents helper-springs substantially V-shaped in form and coiled round a central pin at the intersection of the cross-bars $e'\,e^2$. The ends of the springs are attached to opposite blocks e^3. The normal tendency of the springs is to come to a closed vertical position, and thereby aid the cross-bars $e'\,e^2$ to close during the ascent of the standard.

L represents arms extending out from the base A, provided with pulley-rollers l.

L′ represents guy-wires secured at the top to the platform b and extending down and around the rollers to a spring winding-drum $L^\times$, designed to take up the slack as the standard descends.

If it is desired to use a hose-line, it may be passed up through the openings a and g in the base A and platform G, as shown by dotted lines in the drawings, and held in a suitable supporting-standard g', as shown.

If it is desired to tilt the standard to bring the platform into proximity to a window, it is accomplished by means of the lever b', which tilts the platform on its pivot a against the tension of the springs b.

It will be seen from this description that I have provided an aerial ladder or lift which may be raised or lowered with great facility to any desired height.

What I claim as my invention is—

1. In an aerial ladder, elevator or lift, the combination with the base, of an expansible standard composed of sides formed by a series of crossed bars pivotally connected together at their point of intersection, rectangular blocks interposed between the adjacent sides to the outer faces of which the ends of the cross-bars are pivoted, springs connected to the crossed bars and to the blocks, means for controlling the height of the standard and a platform located at the top of the standard as and for the purpose specified.

2. In an aerial ladder, elevator or lift the combination with the expansible standard composed of the pivotally-connected cross-bars and connecting-blocks, of a hollow base, diagonally-arranged guideways located on the top of the base into which the lowermost connecting-blocks are designed to extend and operate and endless chains connected to the block and extending through the guideways, guide-wheels for supporting said chains and means for imparting a uniform movement to the chains as and for the purpose specified.

3. In an aerial ladder, elevator or lift the combination with the expansible standard composed of the pivotally-connected cross-bars and connecting-blocks, of a base, a series of counter-shafts secured beneath the base, guideways secured to the top of the base in which the lowermost blocks are designed to extend, endless chains connected to the blocks, supporting-wheels for the chains journaled at the ends of the guideways, sprocket-wheels mounted on the said counter-shafts around which the said chains pass, a beveled gear connection between the ends of the counter-shafts, an operating main shaft connected by beveled gears to one of the counter-shafts as and for the purpose specified.

4. In an aerial ladder, elevator or lift, the combination with the expansible standard and means for raising and lowering the same, of the base, a centrally-arranged supporting arched platform for the base, spring-supports between the side of the base and the side of the arched platform, a toothed quadrant, and a coacting lever and plunger secured to the platform and a link connecting the lever with the base for changing the inclination of the base as and for the purpose specified.

5. In an aerial ladder, elevator or lift, the combination with the expansible standard and means for raising and lowering the same, of the base, a supporting arched platform for the base, a suitable turn-table on which the platform rests, spring-supports between the sides of the base and the side of the platform, a toothed quadrant and a coacting lever and plunger secured to the platform and a link connecting the lever with the base for changing the inclination of the base as and for the purpose specified.

6. In an aerial ladder, elevator or lift, the combination with the expansible standard having corner-blocks at the upper end thereof, the base and means for raising and lowering the standard, of a top platform provided with diagonal guideways secured beneath the same in which the upper corner-blocks of the standard are designed to extend and operate, guy-wires secured to the platform, arms extending from the base, pulleys journaled in the

ends thereof, and winding-drums around which the guy-wires are wound as and for the purpose specified.

7. In an aerial ladder, elevator or lift the combination with the base, of an expansible standard composed of sides formed by a series of crossed bars, a central pivot-pin connecting said bars at their centers, connecting corner-blocks to which the ends of the bars are pivotally connected, and designed to connect the sides together, a V-shaped spring coiled centrally around the central pivot-pin connecting the crossed bars and having its ends attached to an opposite pair of connecting corner-blocks and means for regulating the height of the standard as and for the purpose specified.

ANGUS WILLIAM SHAW.

Witnesses:
M. McLAREN,
E. B. MATTHEWS.