(No Model.)

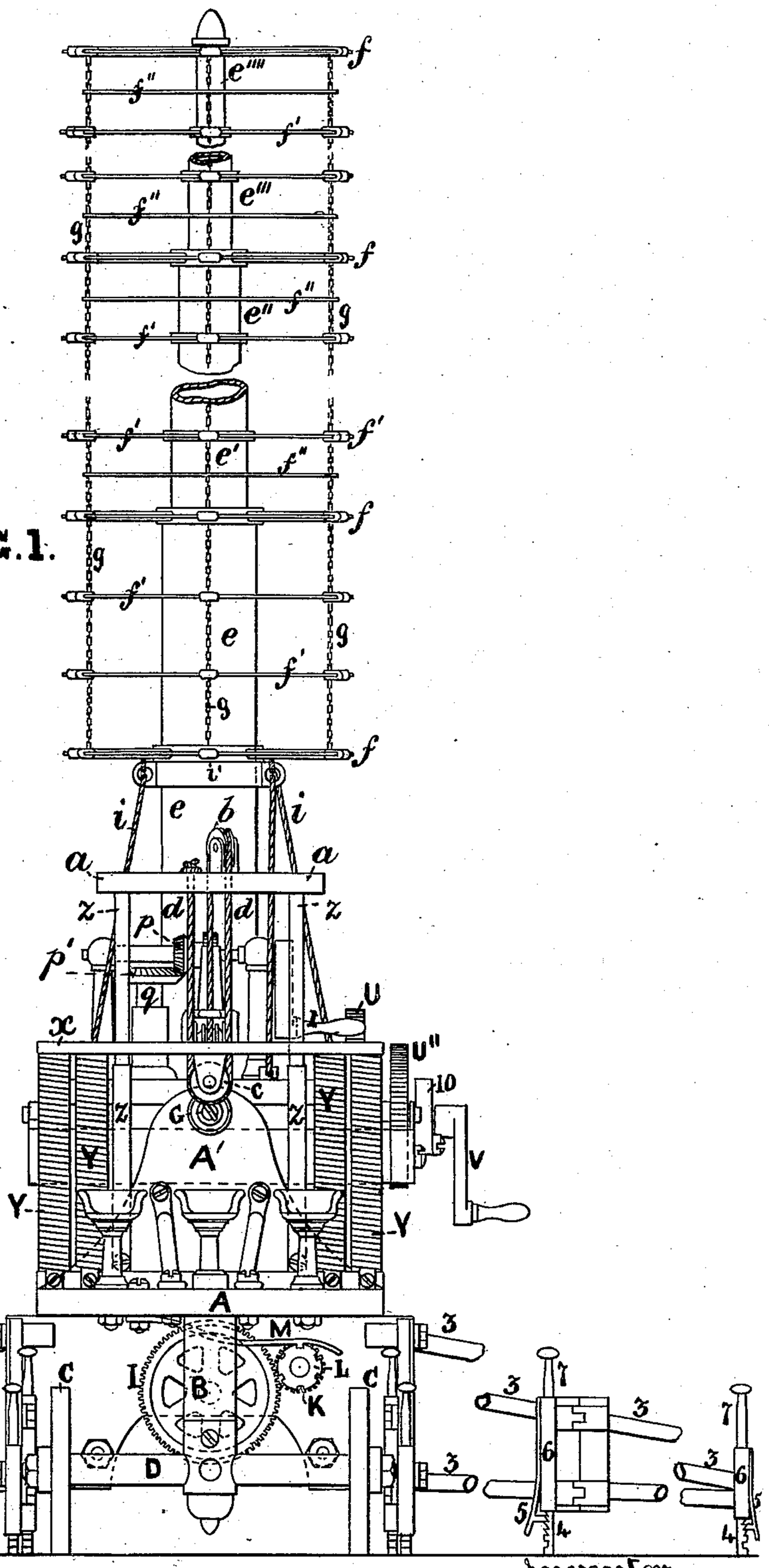
4 Sheets—Sheet 1.

L. D. B. SHAW.

FIRE ESCAPE LADDER.

No. 256,447. Patented Apr. 11, 1882.

FIG. 1.



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(No Model.)

4 Sheets—Sheet 2.

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FIRE ESCAPE LADDER.

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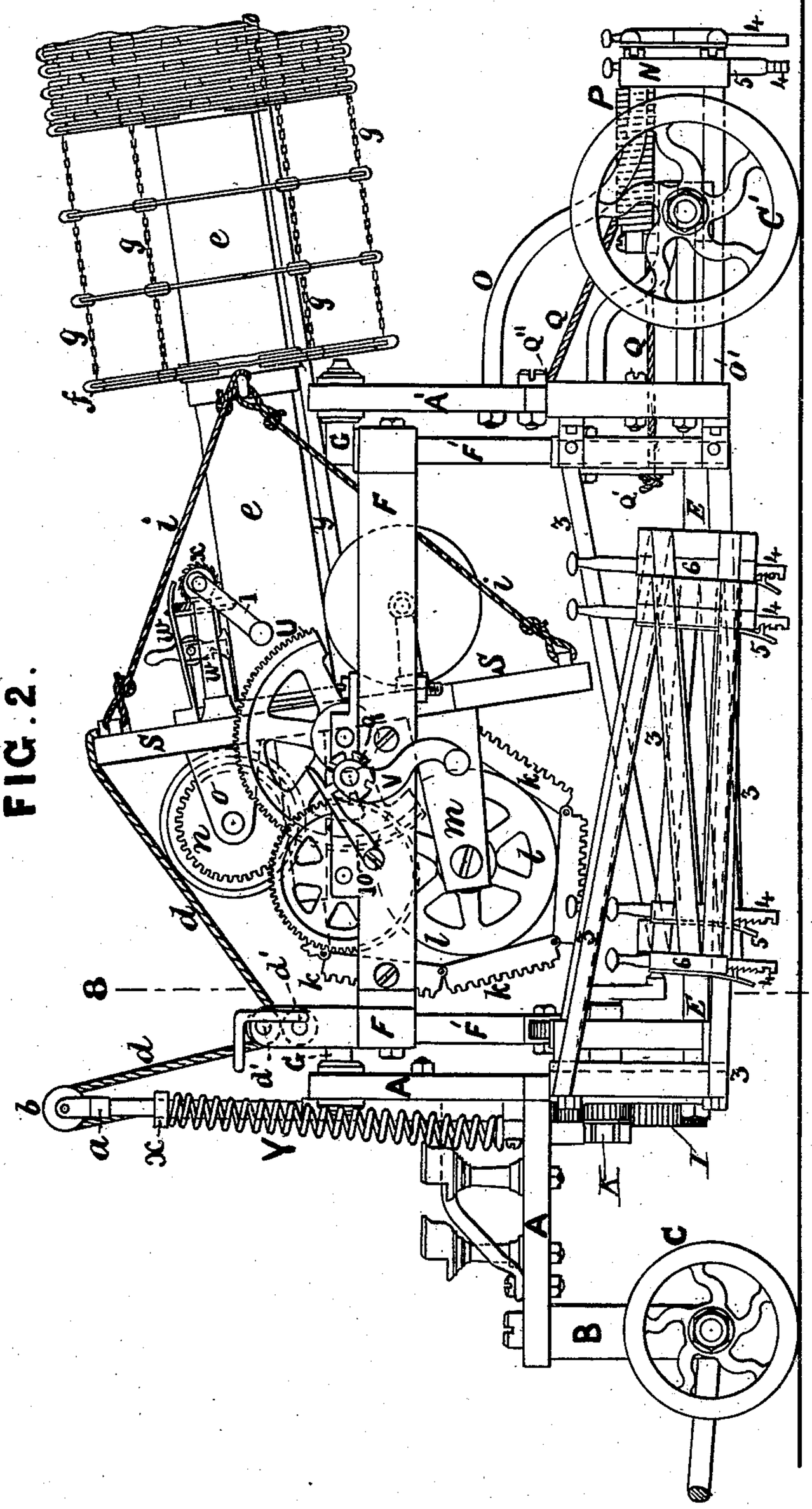
FIG. 2.



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(No Model.) 4 Sheets—Sheet 3.

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FIRE ESCAPE LADDER.

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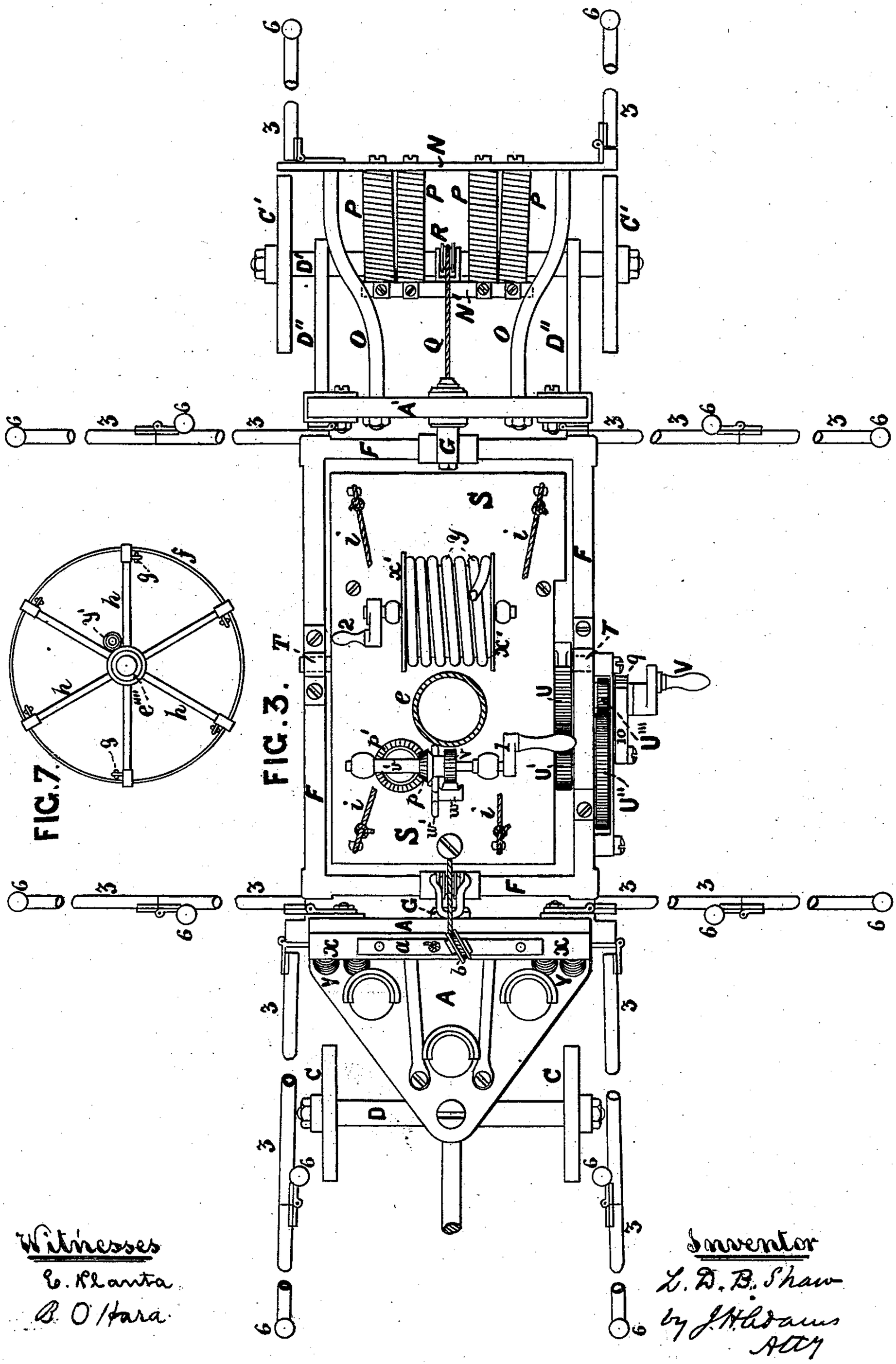

FIG. 3.

FIG. 7.

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FIRE ESCAPE LADDER.

No. 256,447. Patented Apr. 11, 1882.

FIG. 4.

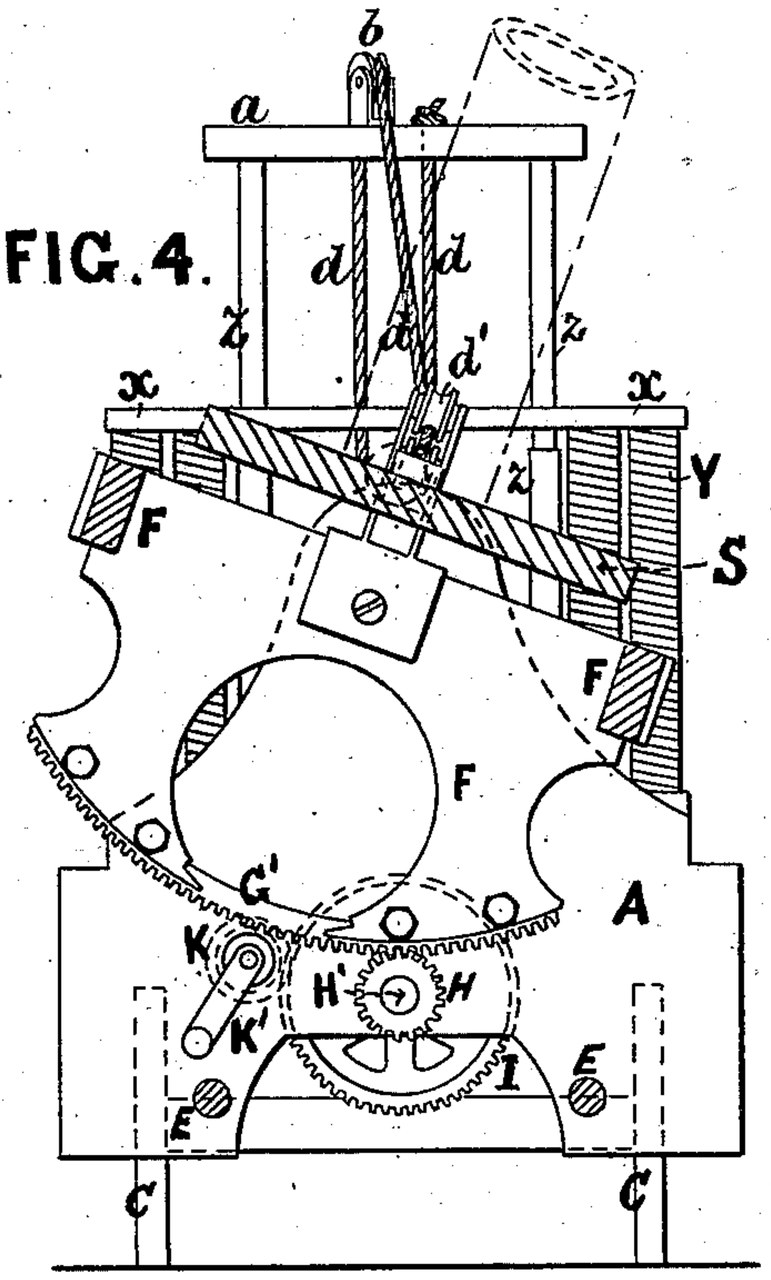


FIG. 6.

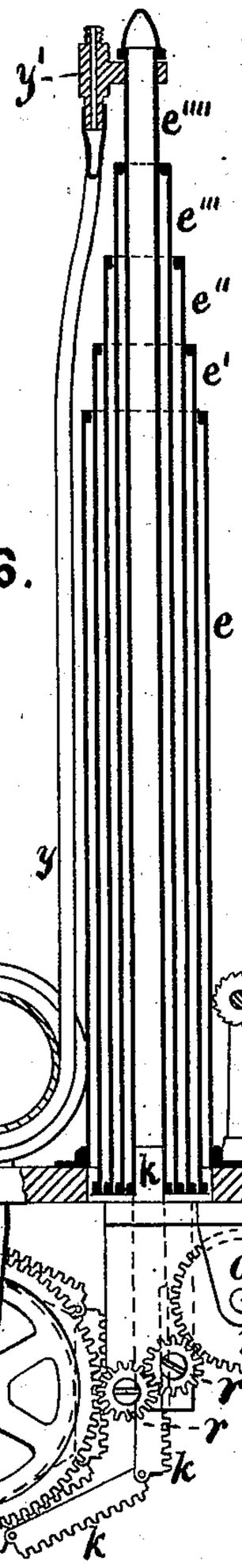
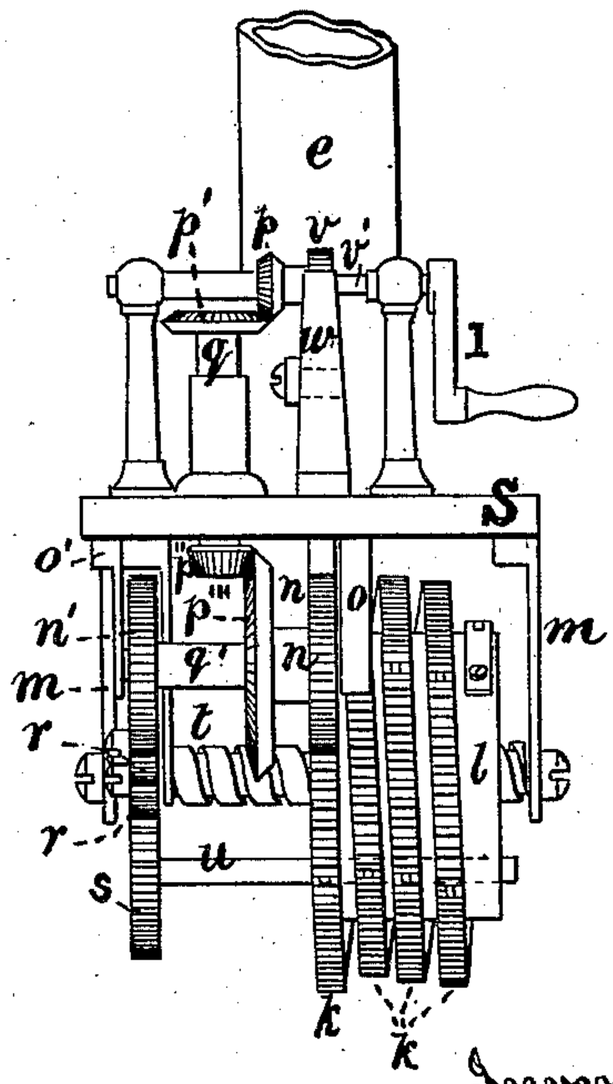


FIG. 5.



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UNITED STATES PATENT OFFICE.

LORENZO D. B. SHAW, OF REVERE, MASSACHUSETTS.

FIRE-ESCAPE LADDER.

SPECIFICATION forming part of Letters Patent No. 256,447, dated April 11, 1882.

Application filed August 29, 1881. (No model.)

To all whom it may concern:

Be it known that I, LORENZO D. B. SHAW, of Revere, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Fire-Escapes, of which the following is a specification.

My invention relates to an improvement in that class of fire-escapes in which a telescopic column is employed in elevating a ladder to any required height, and is designed as an improvement upon a fire-escape for which a patent was granted to me July 12, 1881, No. 244,323.

My present improvement consists in the combination, with the elevating-column, of a hose wound upon a reel at the base of the column and rendered capable of being elevated with the ladder, and by means of which a stream of water can be thrown into or upon a burning building at any required height.

The invention further consists in a means of counterbalancing the superincumbent weight of the telescopic tubing and ladder, and of steadying the motion of the same while being inclined in their elevated position.

Referring to the drawings, Figure 1 is a front elevation of an apparatus embodying my invention. Fig. 2 is a side elevation of the same, showing the telescopic column and ladder closed and in position when not in use. Fig. 3 is a plan view of the apparatus. Fig. 4 is a section of the apparatus on the line *s s* of Fig. 2. Fig. 5 is a view of the sectional rack and accompanying operating mechanism. Fig. 6 is a sectional view of the telescopic column and its elevating mechanism. Fig. 7 is a transverse section of the circular ladder.

Similar letters indicate like parts in the several figures.

A A′ represent the two ends of the frame of the apparatus, connected together at the lower portion by the bars E E. At the front end of the frame is a standard, B, Fig. 2, by which the frame is supported on the axle D and the wheels C C. The rear end of the apparatus is supported by bars D″ D″ on the axle D′ and wheels C′ C′. F is a frame journaled at each end in bearings G G in the upright portions of the frame A, so as to admit of said frame being tilted from side to side of the main frame A.

On the under side of the front part of the tilting frame F is a toothed sector, G′, Fig. 4, the teeth of which engage with the pinion H on a shaft, H′, to which latter is also attached the toothed wheel I, engaging with a pinion, K, operated by the crank K′, by turning which latter the frame F, which supports the telescopic column, may be inclined to either side of the apparatus, as desired.

To the pinion K is attached a notched wheel or disk, L, Fig. 1, which is held in any desired position by a spring-pawl, M, so as to hold the toothed wheel I in position as the column and ladder are inclined to either side, and whereby the latter are maintained in their inclined or upright position, as required.

In order to counterbalance the superincumbent weight of the telescopic tubing and ladder, and to steady the motion of the same while being inclined in their elevated position, I connect the tilting frame with a series of strong coiled springs, arranged and operating as follows: To the lower end of the rear portion, F′, of the tilting frame F is attached, at Q′, a wire rope or chain, Q, which passes between two horizontal pulleys in the frame A, and extending to the rear passes around a pulley, R, (see Fig. 3,) attached to a bar, N′, and then inclining upward is secured to the rear of the main frame A at Q″. The bar N′, not being fixed, is allowed an up-and-down motion, and it has secured to it the ends of a series of stout coiled springs, P P, arranged horizontally and attached at their opposite ends to a plate, N, which is connected to the main frame by means of the rods or bars *o o′*, or in any other suitable manner. As the frame F is tilted the rope or chain Q will be drawn through the frame A, causing the springs P to yield to the pressure exerted by the inclining tube and ladder, thus serving as a yielding counterbalance and steadying the movement of the tube and ladder.

S represents a table or platform journaled at its sides in bearings T T on the frame F, so as to tilt horizontally or in the opposite direction from frame F. To the journal of the table S, at one side, is attached a toothed sector, U, which gears with a pinion, U′, the shaft of which latter passes through or is journaled in the frame F, and has upon its outer end a

toothed wheel, U″, engaging with a pinion, U‴, operated by a crank, V. To the crank V, on the same shaft with pinion U‴, is attached a notched disk, 9, to which is fitted a spring-pawl, 10, to hold the pinion in position, and by means of which the table S is held at any desired inclination. A similar appliance of springs to that used in connection with the frame F is also employed in connection with the tilting table S as follows:

To the front end of the table S is attached a wire rope or chain, *d*, which passes between two pulleys, *d′ d′*, one above the other, in a standard, *d″*, on the front end of frame F. From thence the chain *d* passes up over a pulley, *b*, attached to a bar, *a*, supported upon two upright bars or standards, Z Z, attached to the frame A. (See Figs. 1 and 4.) From the pulley *b* the chain passes down under a pulley, *c*, and then passing upward is secured to the cross-bar *a*, Figs. 1 and 4. The uprights Z Z pass through holes in the cross-bar X, which allows the latter to move up and down on the said uprights.

To the under side of the bar X are attached four coiled springs, Y Y, the lower ends of which are firmly secured to the frame A. As the table S is tilted to the front or rear the springs Y will act as a counterbalance, through the rope or chain *d* and the several pulleys, to steady the movement of the table S and the extended tube and ladder.

In Fig. 1 the telescopic tube and ladder are shown in an upright position, the springs Y being retracted and in their normal position. In Fig. 4 the tubing and ladder are shown in a position inclined to the rear, the springs Y being distended, which is effected by the drawing up of the bar X by the action of the rope or chain *d*, attached to the end of the table S. The springs Y Y in front and P P at the rear of the apparatus act conjointly in counterbalancing and steadying the movement of the elevated ladder in its several inclinations from front to rear and from side to side.

To the upper side of the table or platform S is firmly secured a section of thin metal tubing, *e*, composed of drawn brass. Ropes or chains *i i*, extending from the ends of the table S to eyes on the band *i′*, attached to the tubing *e*, serve as stays to hold the tubing in position on the table S. Within the stationary tubing *e* are arranged a series of telescopic tubes, *e′ e″ e‴ e⁗*, of sufficient length, respectively, to enable the column, when extended, to reach to any desired height.

The sections of tubing are elevated in the following manner: To the lower end of the upper section of tubing, *e⁗*, is firmly attached a rack, *k*, which is made in sections hinged together, as shown in Fig. 6. These sections, when straightened out, constitute a column of sufficient rigidity to sustain the several sections when extended to their entire height. The sectional rack is wound upon a drum, *l*, which is mounted upon a screw-shaft, *t*, having its bearings in hangers *m m*, attached to the table S, as shown in Fig. 5.

The drum *l* is so arranged and connected with the screw-shaft *t* as to move horizontally on the latter when it is rotated and cause the toothed rack to pass up centrally through the tubing as it is being elevated. The rack *k* engages with a toothed wheel, *n*, mounted on the same shaft with the beveled gear *p‴* and the gear-wheel *n′*. The gear-wheel *p‴* engages with the gear *p″* on the shaft *q*, to which the bevel-gear *p′* is attached, and, engaging with the bevel-gear *p*, is rotated by means of the shaft to which the crank 1 is attached, as shown in Fig. 5, the said shaft being mounted in standards on the surface of the table S.

The lateral movement of the drum *l* on the screw-shaft *t* is effected by means of the gears *n′ r r s* and the bar *u*. The shaft carrying the bevel-gear *p*, and to which the crank 1 is attached, is prevented from turning by means of a ratchet-wheel, *v*, on the shaft *v′* and a spring-pawl, *w*, secured to the table S. The pawl *w* is thrown out of connection with the ratchet-wheel *v* by means of a lever, *w′*, pivoted to the pawl and having a cam-shaped end which is made to bear against the tube *e* to push back pawl *w* when the lever *w′* is depressed.

To the upper end of each section of the telescopic tubing *e e′*, &c., is firmly secured, by means of a collar and the radial arms *h h*, a circular frame or metal ring, *f*, and between each fixed ring are a series of rings, *f′*, connected together and to the fixed rings *f* by means of chains *g* or other suitable flexible and fire-proof material. Between each metal ring I propose to surround the chains *g* with rubber bands *f″*, which will allow the chains to assume a perpendicular position when the column is extended as shown in Fig. 1, but which, when the column is lowered, will serve to draw the chains inward to admit of the rings being more readily folded together and prevent entanglement of the chains.

A plan view of the fixed rings and arms is shown in Fig. 7. These rings *f f* and *f′ f′* serve as rings in a ladder and admit of persons descending and climbing up on the inside or outside, as desired. Descent on the inside may be effected with almost perfect safety with moderate care.

At the rear of the telescopic column on the table S is mounted in suitable bearings a reel, *x′*, upon which is wound a hose, *y*, of rubber or other suitable material, one end of which is attached to the upper end of the uppermost section, *e⁗*, of the telescopic column, and is provided at the upper end with a coupling device, *y′*, Fig. 6, for the attachment of a pipe or other hose, if required. As the telescopic column is elevated the hose will be carried up at the same time and be ready for immediate use. When the telescopic column is lowered the hose is wound upon the reel by means of the crank-handle 2.

In order to prevent the apparatus, when ex-

tended for use, from overcoming the center of gravity, and to insure a firm support to the carriage, I employ a series of doubly-hinged folding braces, 3 3, &c., attached to each corner of the frame, and also to the rear end, so that the same can be extended outward on both sides of the frame, and also at the front and rear, as shown in Fig. 3.

In Fig. 2 the braces are shown as folded together when not in use. At the outer end of each double brace is attached a hollow standard, 6, as shown in Figs. 1 and 2, within which is arranged a bar, 7, to slide up and down. The lower part of the bar 7 is provided with ratchet-teeth, as shown at 4, and to the side of each standard 6 is attached a spring, 5, provided with a tooth or projection, which engages with the rack 4 to hold the bar 7 when drawn up within the standard 6. When the folding braces 3 3 are extended for use the bars 7 are let down upon the ground, and are designed to hold the braces firmly in position, and when the braces are to be folded up the bars 7 are drawn up and held by the toothed springs 5.

What I claim as my invention is—

1. The combination, with an extensible cylindrical ladder, of a hose adapted to be elevated and lowered simultaneously with said ladder, substantially as set forth.

2. The combination, with a tilting table, S, of a series of springs, Y, attached to the frame A, and operating in connection with a chain, *d*, substantially as and for the purpose set forth.

3. The combination, with the tilting frame F, of springs P, connected to a bar, N, at the rear of the apparatus, and operating in connection with a chain, Q, attached to the lower portion of frame F, as and for the purpose specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

L. D. B. SHAW.

Witnesses:
JOS. H. ADAMS,
B. O'HARA.