

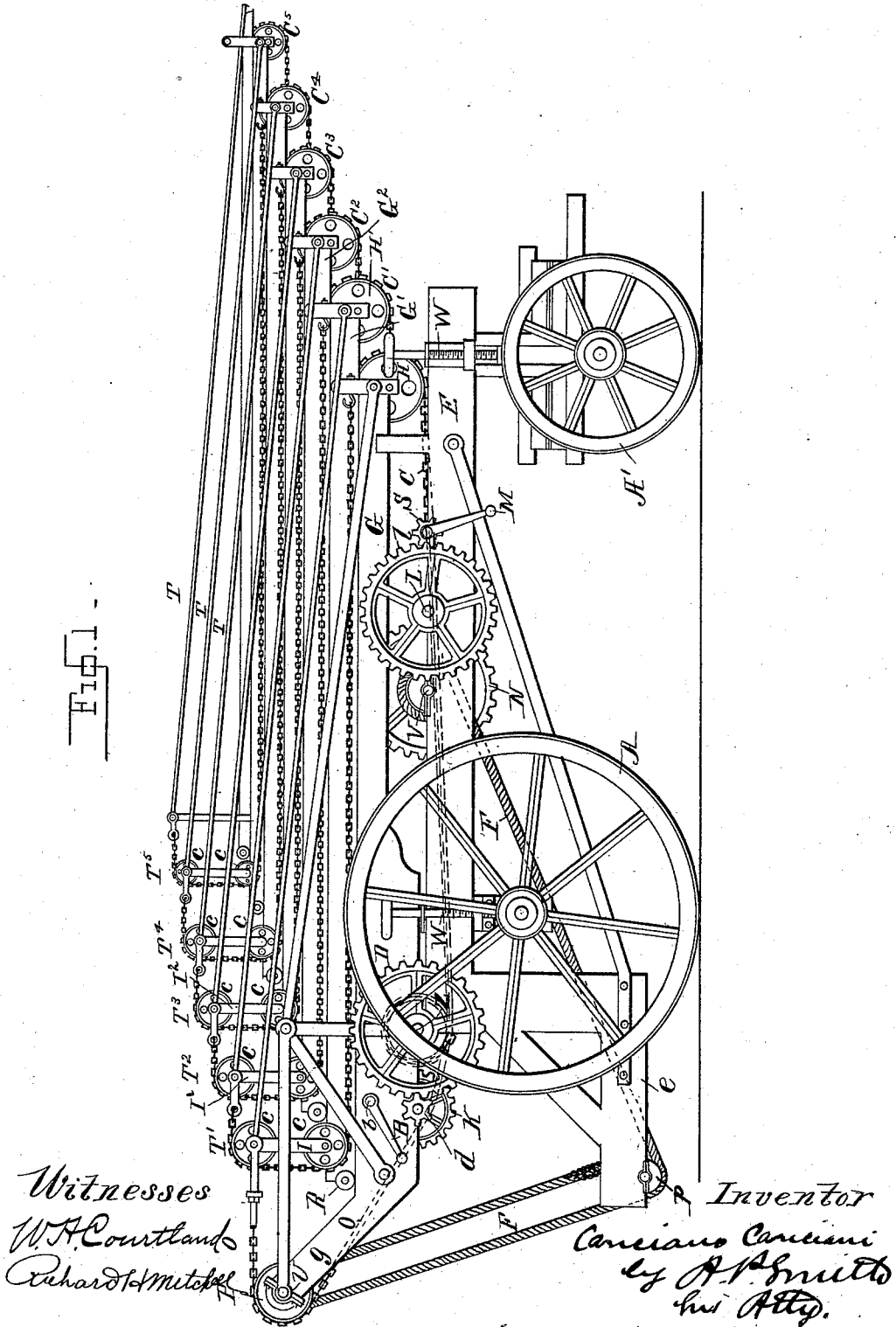
(No Model.)

2 Sheets—Sheet 1.

C. CANCIANI.
EXTENSION TRUCK LADDER.

No. 474,628.

Patented May 10, 1892.



Witnesses
W. A. Courtland
Richard Mitchell

Inventor
Canciano Canciani
by R. Smith
his Atty.

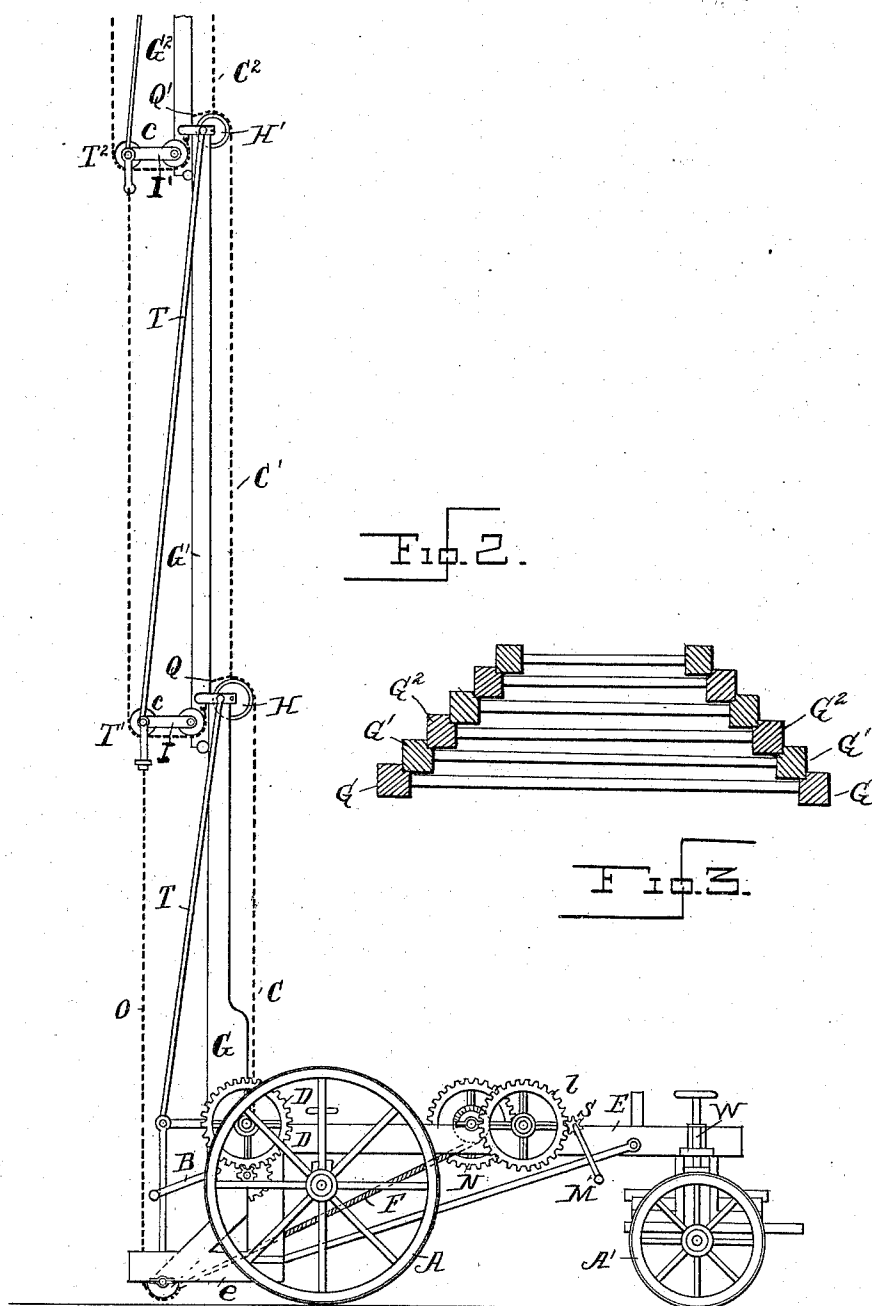
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UNITED STATES PATENT OFFICE.

CANCIANO CANCIANI, OF UDINE, ITALY.

EXTENSION TRUCK-LADDER.

SPECIFICATION forming part of Letters Patent No. 474,628, dated May 10, 1892.

Application filed December 11, 1891. Serial No. 414,665. (No model.)

To all whom it may concern:

Be it known that I, CANCIANO CANCIANI, a subject of the King of Italy, residing at Udine, in the Kingdom of Italy, have invented certain new and useful Improvements in Extension-Ladders and Trucks; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to the class of fire-escape apparatus known as "extension" or "shooting" ladders.

In the drawings, Figure 1 is a side elevation of my invention telescoped and ready for transportation. Fig. 2 is a side elevation of the same raised and extended. Fig. 3 is an enlarged cross-section of the ladders, showing the manner in which different sections slide one upon another.

Like reference-letters refer to like parts in all the figures.

The carriage E is mounted on wheels A A', the latter of which are attached to a swiveled truck. The screws W W enable the operator to adjust the carriage in a horizontal position, no matter what may be the inequalities of the surface on which the wheels A A' rest. On the carriage is supported a series of telescoping ladder-sections G G' G², &c., which slide one upon the other by means of proper grooves (not shown) and the rollers R. The first ladder-section G is preferably hinged to the carriage, so that it can be tilted at any angle to the horizontal plane from zero, as shown in Fig. 1, to ninety degrees, as shown in Fig. 2. It might be possible to operate the ladder without such hinge, having it permanently fixed at the most advantageous angle of elevation; but the employment of the hinge renders the apparatus much more convenient to handle. In the construction illustrated the spindle of the windlass Z acts as such hinge. The cable F has one end fastened to the extension e on the carriage E, passes around a pulley (not shown) on the shaft U, journaled in the bracket g on the first ladder-section G, runs over the pulley p, and winds on the windlass V, which is mounted on the carriage E. This windlass V is operated by the gear N, meshing with a pinion (not shown) on the

shaft L. This in turn is driven by the gear l, meshing with the pinion S, which is turned by the crank M. Of course other kinds of winding-gear or screw-gear could be used to tilt the ladder-sections without departing from the principle of my invention.

The shooting or extension gear consists, primarily, of the series of chains C C' C², &c. The chain C is fastened to the lower end of the second section G' of the ladder at Q, as clearly shown in Fig. 2, runs over the pulley H, which is journaled at the upper end of the first ladder-section G, and winds on the barrel of the windlass Z. A series of similar chains C' C² C³, &c., each have one end fastened to the lower end of a ladder-section, as at Q', pass over the pulley journaled at the end of the next lower section, as H', and have the other end fastened to the upper portion of the second lower section, as G.

At the base of each ladder-section is a bracket I I' I², &c., on the upper side of said section. Each bracket has pulley-wheels c c journaled at the top and base thereof. If desirable, each bracket may be supported by a brace T. The chain O runs from the bracket I around the pulley P and winds on the windlass Z, but in a direction opposite from that of the chain C. A series of similar chains T' T² T³, &c., are each attached to a bracket upon a particular section, as G², and run over the pulleys on the bracket at the base of the next lower section, as G'. Each chain has its other end fastened to the upper part of the second lower ladder-section, as G.

The windlass Z is driven by the gear D, which meshes with the pinion d. This pinion d is on the same shaft with gear K, which meshes with the pinion (not shown) on the shaft b, which is turned by the crank B.

The mode of operating my invention is the following: The apparatus is dragged to the fire by a team of horses or by other power. The carriage E is adjusted to a horizontal position by the screws W. The crank M is then turned, winding up the cable F and tilting the ladder up into a position as near to the perpendicular as may be desired. Simultaneously or subsequently the crank B is rotated in such direction as to wind up the chain C and unwind the chain O. The effect of this

is, of course, to shoot out the second section G' of the telescoping ladder. If this section has been shot out a foot, it has obviously caused a foot of the chain C' to pass over the pulley H' and has given the chain T' a foot of slack, so that the third section G² must also have been moved over the first section G a distance of one foot. In the same way each section will have been shot out over its next lower neighbor a foot. This may be continued until the ladder is extended to its limit, as shown in Fig. 2. A reverse revolution of the windlass will shut the ladder up or telescope it. The principal advantage of this construction is the action of the brackets II', &c., and the chains O T' T², &c., to form a continuous truss for the support of the ladders when extended. Other advantages arise from convenience of manipulation, rapidity of action, &c. Of course the extension and telescoping of the ladder could be accomplished by running the chains T' T², &c., over the lower pulley of each pair c c and dispensing with the brackets II', &c.; but the valuable feature of the truss-bracing would then be sacrificed.

Having therefore described my invention, what I claim as new, and desire to protect by Letters Patent, is—

1. In a shooting-ladder, the combination of a carriage, a plurality of telescoping ladder-sections mounted thereon, a pulley-wheel journaled on the upper end of each section, a bracket mounted on the lower end of each ladder-section and upon the upper side thereof, pulley-wheels mounted on each of said brackets, a windlass upon the first section, a chain which is fastened to the lower end of the second ladder-section, runs over the pulley journaled on the upper end of the first section, and winds upon the windlass, a second chain which runs from the upper end of the bracket on the second section of ladder, around the pulley on the bracket at the base of the first section, and also winds onto the windlass, but in the opposite direction from that of the first-mentioned chain, and means for winding up said windlass, substantially as described.

2. In a shooting-ladder, the combination of a carriage, a plurality of telescoping ladder-sections mounted thereon, a pulley-wheel journaled on the upper end of each section, a bracket mounted on the lower end of each ladder-section and upon the upper side thereof, pulley-wheels mounted on each of said

brackets, a windlass upon the first ladder-section, a chain which is fastened to the lower end of the second ladder-section, runs over the pulley journaled on the upper end of the first section, and winds upon the windlass, a second chain which runs from the upper end of the bracket on the second section of the ladder, around the pulley on the bracket at the base of the first section, and also winds on the windlass, but in the opposite direction from that of the first-mentioned chain, and means for winding up said windlass, with a hinged connection between the carriage and the first ladder-section, and mechanism for tilting said first section at any angle to the horizontal plane from zero to ninety degrees, substantially as described.

3. In a shooting-ladder, the combination of a carriage, a plurality of telescoping ladder-sections mounted thereon, a pulley-wheel journaled on the upper end of each section, a bracket mounted on the lower end of each ladder-section and upon the upper side thereof, the braces which support said brackets, pulley-wheels mounted at the top and base of each bracket, a windlass upon the first ladder-section, a chain which is fastened to the lower end of the second ladder-section, runs over the pulley journaled on the upper end of the first section, and winds onto said windlass, a series of similar chains, each of which is fastened to a particular ladder-section near its lower end, runs over the pulley at the upper end of the next lower section, and is fastened to the upper end of the second lower section, a second chain which runs from the upper end of the bracket on the second section of the ladder, around the pulley on the bracket at the base of the first section, and also winds on the windlass, but in a direction opposite from that of the first-mentioned chain, and a series of similar chains, each of which is fastened to the bracket on one ladder-section, runs around the pulleys on the bracket at the base of the next lower section, and is fastened to the upper end of the second lower ladder-section, all substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

CANCIANO CANCIANI.

Witnesses:

CUDUTHI VITTORIO,
LONGO GIVONNI.