

(No Model.)

2 Sheets—Sheet 1.

C. F. EKMAN.
EXTENSION LADDER AND HOSE TOWER.

No. 575,222.

Patented Jan. 12, 1897.

Fig. 6.

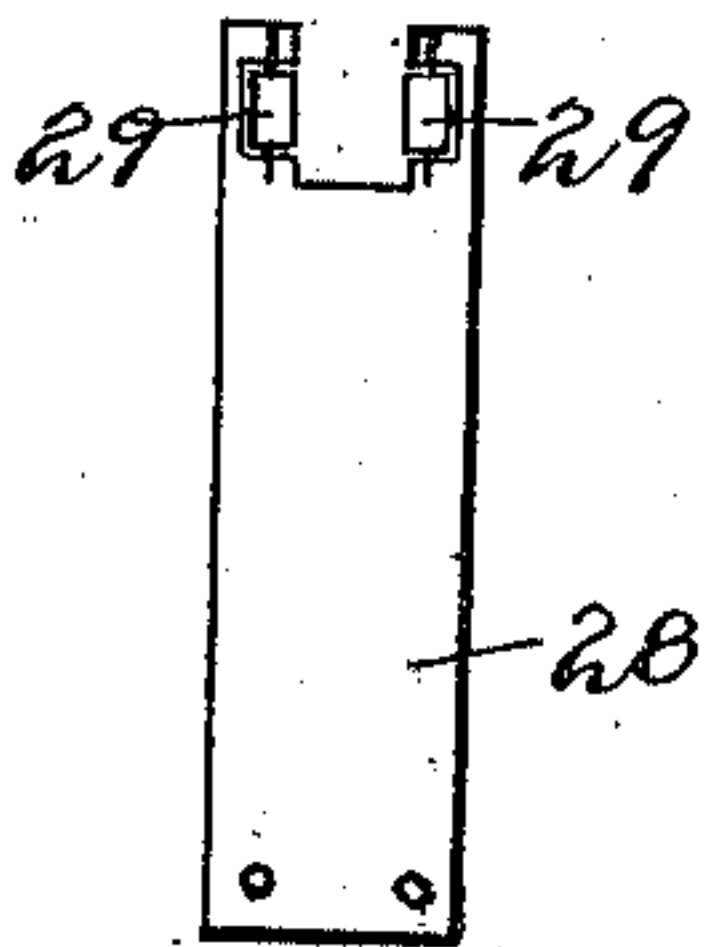
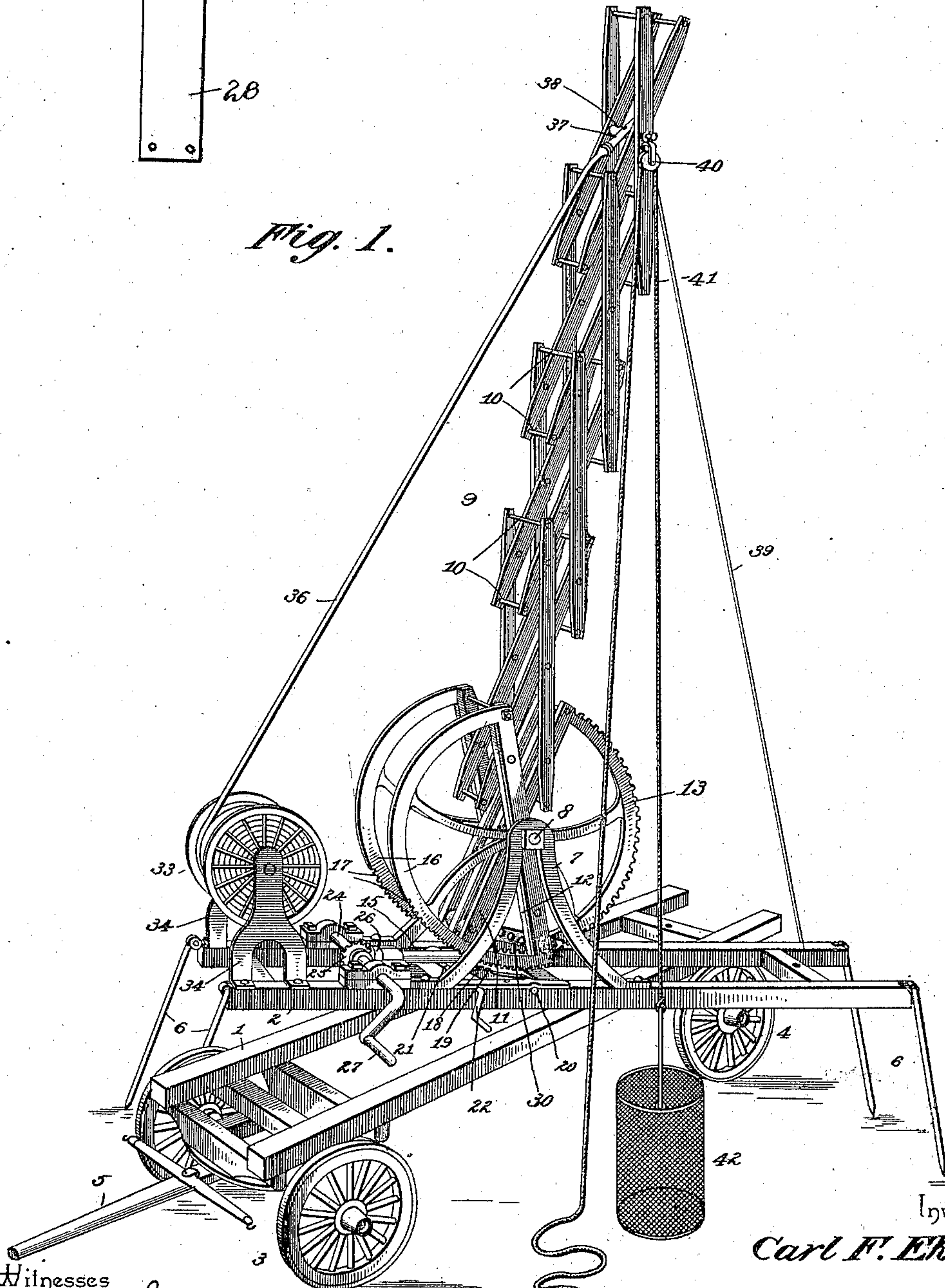


Fig. 1.



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By his Attorneys,

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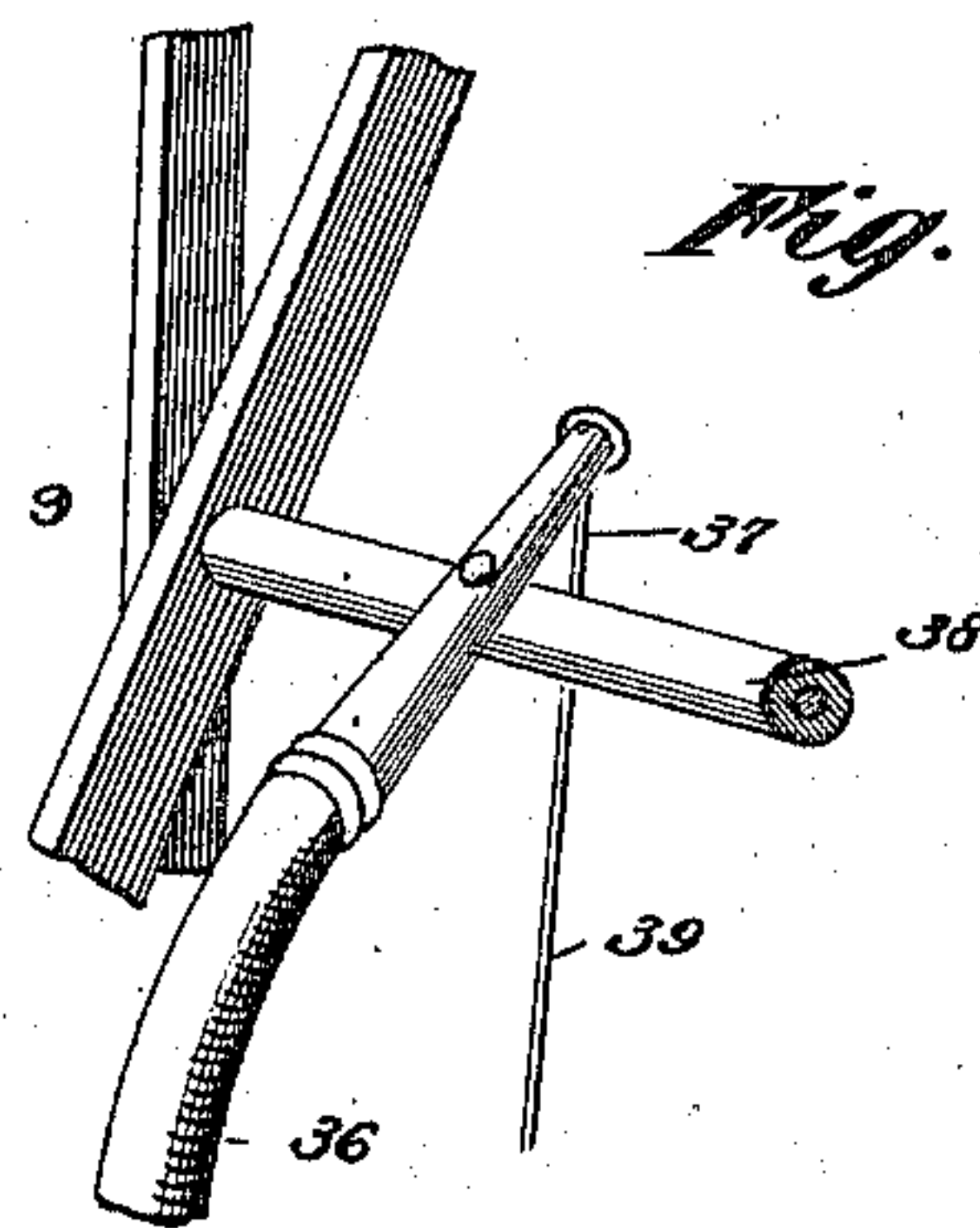
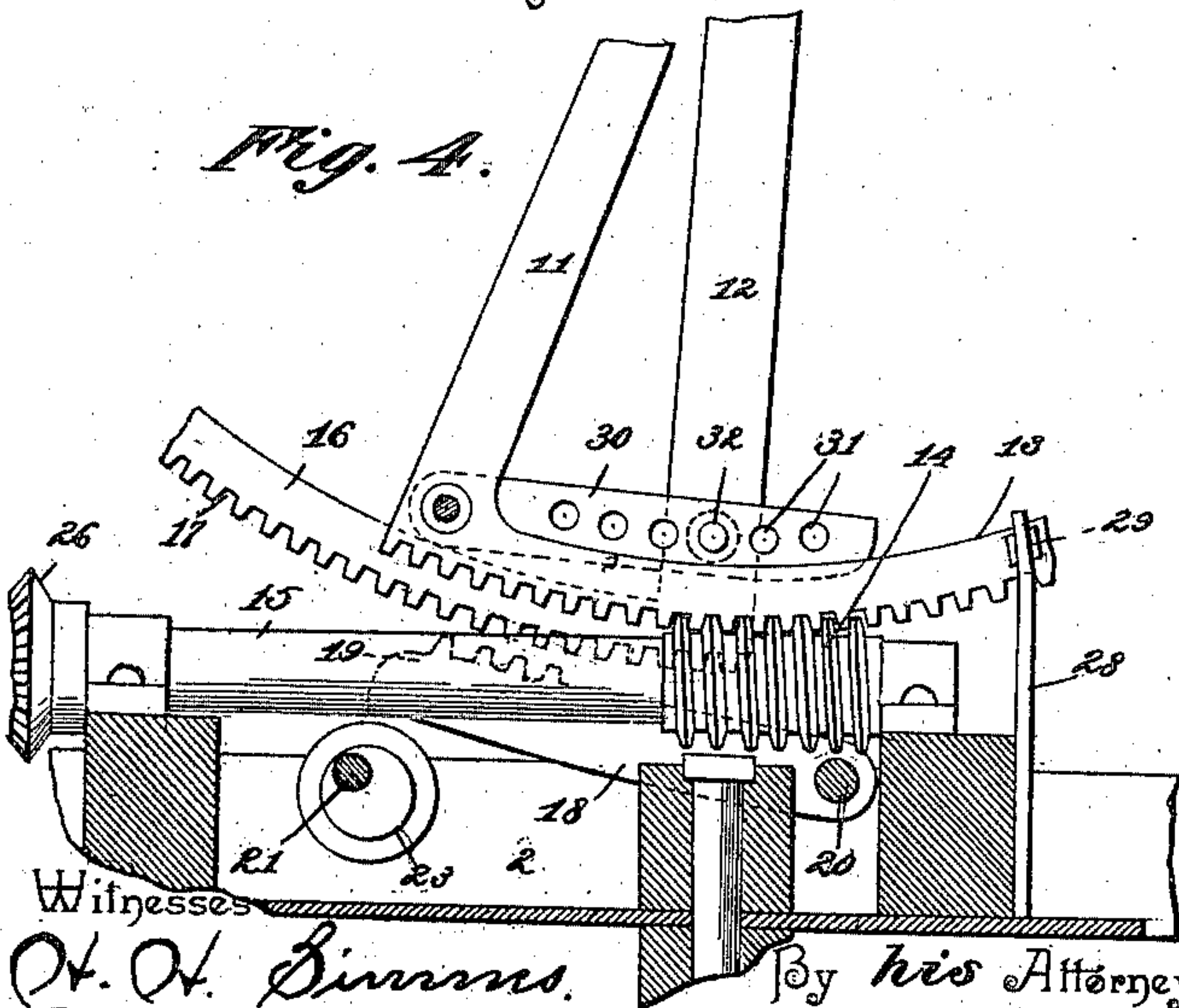
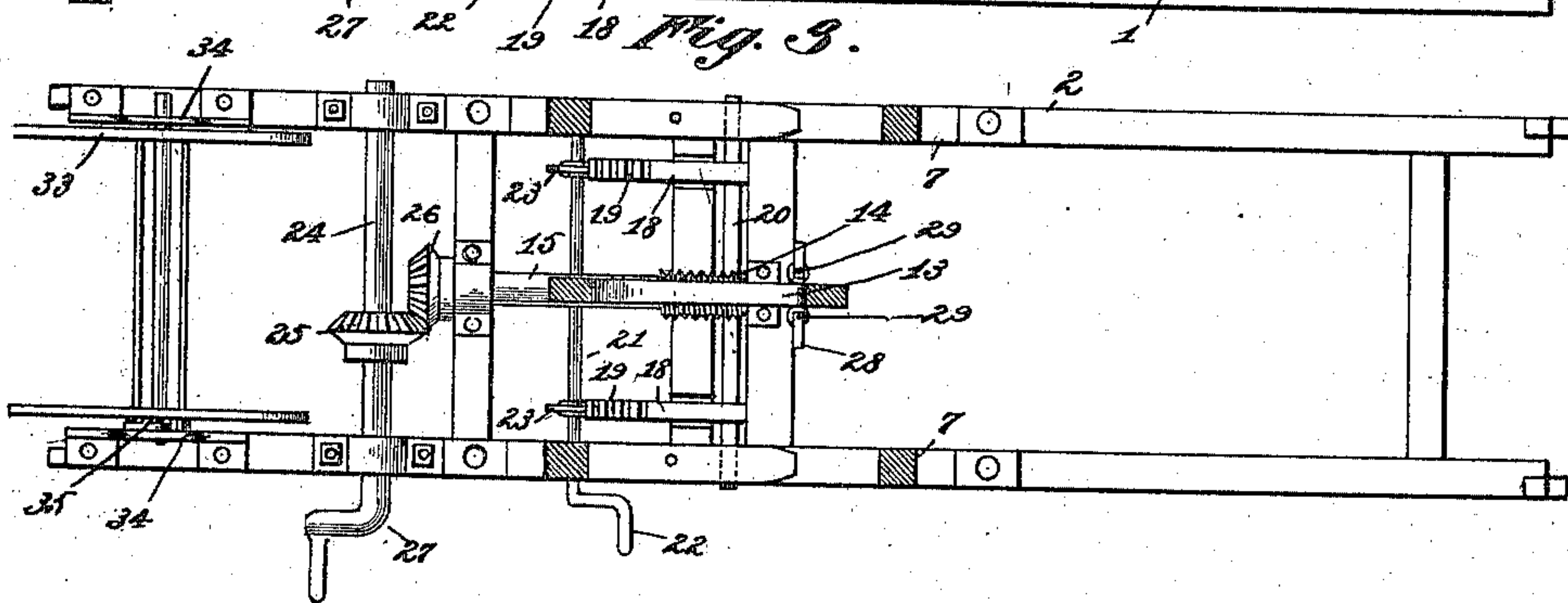
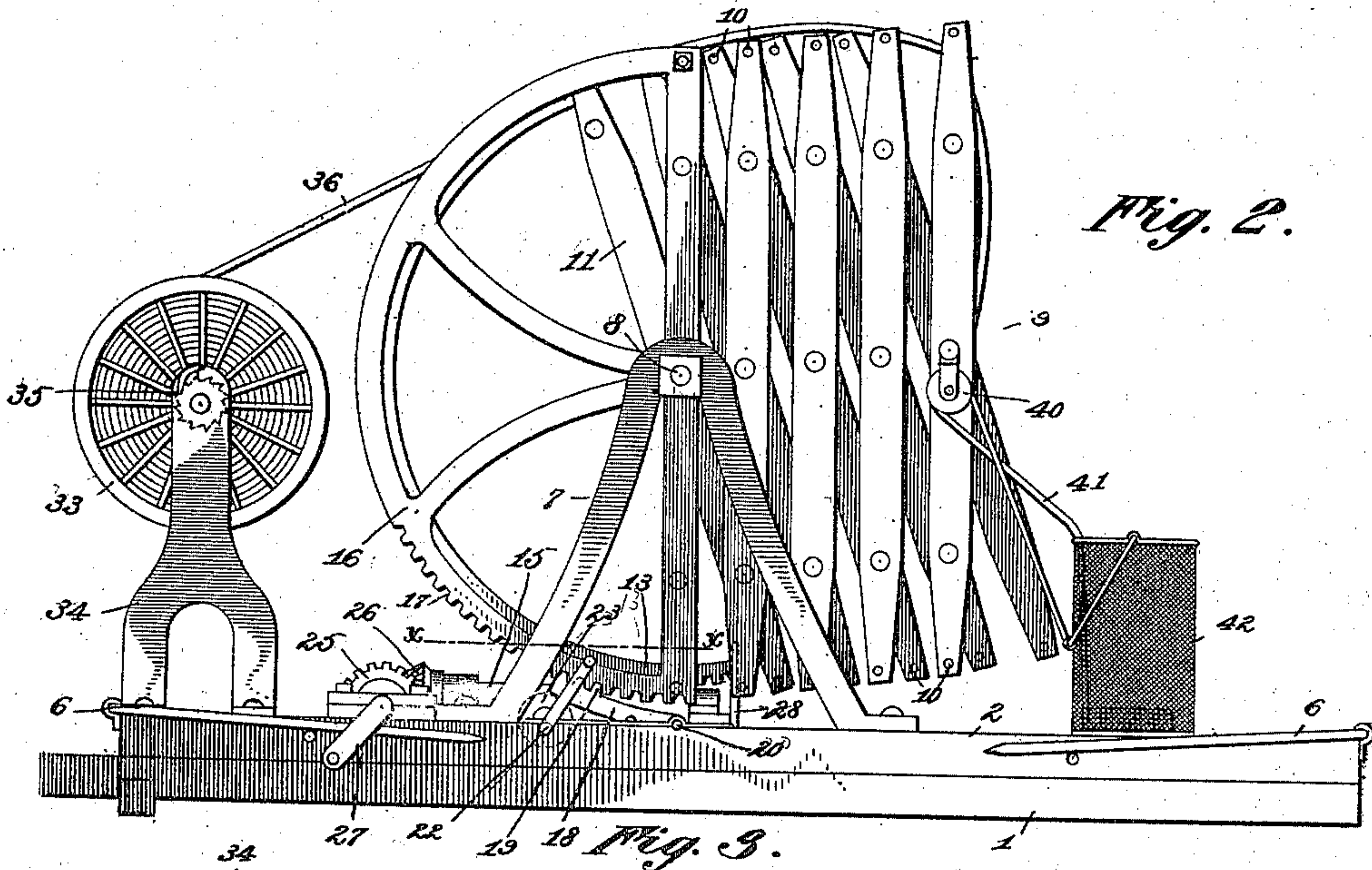
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UNITED STATES PATENT OFFICE.

CARL F. EKMAN, OF MARSHALLTOWN, IOWA.

EXTENSION-LADDER AND HOSE-TOWER.

SPECIFICATION forming part of Letters Patent No. 575,222, dated January 12, 1897.

Application filed February 14, 1896. Serial No. 579,285. (No model.)

To all whom it may concern:

Be it known that I, CARL F. EKMAN, a citizen of the United States, residing at Marshalltown, in the county of Marshall and State of Iowa, have invented a new and useful Extension-Ladder and Hose-Tower, of which the following is a specification.

The present invention relates to certain new and useful improvements in a combined extension-ladder and hose-tower which is capable of use as a fire-escape, truck-ladder for firemen, and for elevating one or more lines of hose-pipe which can be operated from the ground by means of guide-ropes or from the tower by a person mounted thereon, and has for its object to provide means for simultaneously extending and elevating the structure, whereby the device can be erected and placed in position for use in the shortest space of time possible; to provide means for leaning the structure in any direction, the initial power being derived from the same devices utilized for extending the ladder; to provide a novel clutch mechanism whereby one set of levers of the lazy-tongs is held relatively fixed, while the other set is movable and in positive connection with the actuating mechanism whereby the structure is extended and contracted, and to combine with the ladder one or more hose-reels and life-saving baskets which are suspended from and operated by ropes passing over pulleys carried by the upper end of the structure.

The improvement consists, essentially, of the novel features and the peculiar construction and combination of the parts, which hereinafter will be more fully set forth and claimed, and which are shown in the accompanying drawings, in which—

Figure 1 is a perspective view showing the invention mounted upon a truck and extended as it will appear when in service. Fig. 2 is a side elevation showing the ladder or tower folded, the truck being dispensed with. Fig. 3 is a detail plan view on the line X X of Fig. 2. Fig. 4 is a detail view showing the two sets of lazy-tongs levers in locked relation and the actuating mechanism in position for leaning the ladder or tower in either direction. Fig. 5 is detail view of the hose-nozzle and its mountings. Fig. 6 is a detail view in elevation of the guide for directing a toothed

segment attached to a set of levers of the lazy-tongs structure.

The invention is adapted for fixed structures as well as to be portable, and will be shown and described in the latter character. For general application it will be mounted upon a truck, as shown in Fig. 1, but when made light and of comparatively small proportions it may be transported or moved from place to place by hand, after the fashion of moving the ordinary hand-barrow.

The numeral 1 represents a base comprising side and end cross-beams which are connected together in any convenient manner, and 2 a platform of similar construction to the base and secured to the latter at a middle point by the ordinary king-bolt connection, whereby the platform can be turned in a horizontal plane to bring the ladder or tower in the required position, so that it may be leaned to or from the building or other elevated point desired to be reached thereby.

As shown in Fig. 1, the base 1 is mounted upon front and rear trucks 3 and 4 in any approved manner, the front truck 3 having the usual fifth-wheel connection to enable the turning of the truck in the proper steering of the device, said truck having a pole or tongue 5, to which the team or draft is applied when moving the device from place to place. Brace-sections 6 have pivotal or hinge connection with the ends of the platform 2 to brace and strengthen the latter when turned crosswise of the base to any required angle. The free ends of the brace-sections 6 are pointed to enter the ground and secure a firm footing to prevent accidental slipping. Similar side standards 7 are secured at their lower ends to the platform 2, and are connected at their upper ends by a transverse bar or rod 8, upon which the extension ladder or tower 9 is mounted and turns in its various adjustments.

This extension ladder or tower comprises side lazy-tongs which are connected together by means of cross-bars 10 and form the rungs of the ladder. The lower levers 11 of the ladder have a semicircular toothed segment 13 rigidly connected therewith and meshing with a worm 14 on the inner end of a longitudinal shaft 15, mounted in suitable bearings provided on the platform 2. The corresponding lower levers 12 have semicircular segments

16 firmly attached thereto and of like construction to the segment 13, and these segments 16 have toothed portions 17, which are adapted to be engaged by pawls 18 when it is required to hold the levers 12 locked when the levers 11 have been moved to extend or fold the ladder. The pawls 18 have a series of teeth 19 to engage with a corresponding number of teeth 17, thereby distributing the strain and decreasing the liability of the structure giving way, which would be the case if the pawls 18 had only one point in engagement with the toothed segments 16, and these pawls are secured at their inner ends to a transverse bar or rod 20, so as to operate in unison. A shaft 21, having a crank 22 at one end, is provided with eccentrics 23, which are adapted to engage with the pawls 18 and throw the latter in engagement with the toothed segments 16 when it is required to hold the levers 12 locked. An operating-shaft 24, journaled transversely of the platform 2, is provided with a bevel gear-wheel 25, which meshes with a corresponding bevel gear-wheel 26 on the longitudinal shaft 15, thereby transmitting motion from the shaft 24 to the said shaft 15. The operating-shaft 24 is rotated in its bearings in any convenient manner, and is provided with a crank 27 for this purpose.

The toothed segment 13 is braced against lateral movement by a vertically-extending guide 28, secured at its lower end to the platform 2 and having its upper end notched and embracing the sides of the said segment 13, and to relieve friction between the sides of the segment 13 and the vertical extensions of the guide 28 antifriction-rollers 29 are journaled to the vertical extensions of the said guide and are adapted to bear laterally against the sides of the toothed segment 13.

When the ladder or tower is extended to the required distance, the two sets of levers 11 and 12 are locked together, so that they will move as a unit when leaning the ladder to or from the object to be reached, and for this purpose bars 30 are provided and secured at one end to one set of levers, as 11, and have a series of openings 31 in their length to engage with lateral extensions 32 on the opposite set of levers, as 12. Any equivalent mechanism for effecting the same result, namely, securing the two sets of levers 11 and 12 together, may be substituted for the provisions herein set forth.

A hose-reel 33 is located on one end of the platform 2 and is journaled in suitable uprights 34 and will be provided with a ratchet-and-pawl mechanism 35 of ordinary construction to prevent the unwinding of the hose-pipe 36 when the latter is wound upon the reel. While only one reel is shown, it is obvious that any required number may be provided and located upon the same shaft as the reel illustrated, so that each line of hose-pipe may be separately reeled without interference with any other line of hose-piping. The hose-

pipe nozzle 37 has pivotal connection with a transverse bar or shaft 38, so as to swing laterally, and said bar or shaft 38 is constructed to turn, thereby admitting of the said hose-pipe nozzle having a vertical and lateral movement, whereby it has a wide range within certain limits, so that a stream of water can be directed to any required point either by a person mounted upon the ladder or by means of a guide-line 39, which can be operated from the ground, as will be readily understood. This bar or shaft 38 occupies substantially the highest position of the ladder and is mounted in the side lazy-tongs and has its end portions projected and fitted with pulleys 40, which support safety-lines 41, to one end of which is attached a basket or cage 42, which is to be used for rescuing persons from burning buildings or for raising and lowering articles to the person or persons mounted upon the ladder for any required purpose.

When the ladder or tower is folded, the levers comprising the side lazy-tongs are in substantially a vertical position and in a compact form. To extend the ladder or tower, the levers 12 are first locked substantially in the manner described and the shaft 24 is rotated, and through the instrumentalities hereinbefore disclosed the levers 11 will be moved, thereby attaining the desired result. As the structure is extended it will at the same time turn upon the transverse bar or rod 8, so as to lift or elevate the outer end, this operation being due to the turning of the levers 11 upon the bar or rod 8, while the levers 12 are held relatively stationary. After the ladder has been sufficiently extended the levers 11 and 12 are locked, by means of the bars 30, in the manner specified, and the toothed segments 16 are released, and by operating the shaft 24 in either direction the ladder or tower can be leaned in the required direction, as it will turn upon the bar or rod 8, as will be readily understood.

The actuating mechanism may be differently related and yet attain the same result. Therefore in adapting the invention to the various makes of extension-ladders and hose-towers it is to be understood that changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed as new is—

1. In an extension-ladder or hose-pipe tower, the combination of two opposite series of jointed levers, the two series being connected so as to form a lazy-tongs, locking means applied directly to one set of levers, actuating mechanism having direct and positive connection with the other set of levers for extending and folding the lazy-tongs, a locking device for connecting the two sets of levers after the lazy-tongs have been extended to the proper distance, and means for releasing the lazy-tongs, whereby the actuating

mechanism used for extending and folding the structure can be employed for leaning the ladder or tower in the required direction, substantially as set forth.

5 2. In an extension-ladder or hose-tower the combination of two opposite series of jointed levers, the two series being connected so as to form a lazy-tongs, a toothed segment firmly attached to one set of levers, a locking device
10 to engage with the said toothed segment to secure it in a fixed position, a second toothed segment firmly attached to the opposite set of levers, actuating mechanism for moving the second toothed segment for extending and
15 folding the lazy-tongs, and a locking means for securing the two sets of levers after the lazy-tongs have been extended to the required distance, whereby the two sets of levers are secured in locked relation and the ladder, or
20 tower, capable of being leaned in either direction by the same mechanism employed for extending and folding the same, substantially as set forth.

3. In combination, a lazy-tongs structure mounted upon a bar, or shaft, toothed segments firmly attached to one set of levers, locking-pawls adapted to engage with the said toothed segments, a shaft having eccentrics to engage with the pawls and operate the same, a second toothed segment attached
25 to the opposite levers, locking-bars for connecting the two sets of levers after the structure has been properly extended, a shaft having a worm-gear to engage with the said second toothed segment, and actuating mechanism therefor, the parts being combined so that
30 the same mechanism employed for extending and folding the structure is used for leaning the same, substantially as described.

In testimony that I claim the foregoing as
40 my own I have hereto affixed my signature in the presence of two witnesses.

CARL F. EKMAN.

Witnesses:

JOH. W. LINDEROTE,
M. ERICKSON.