

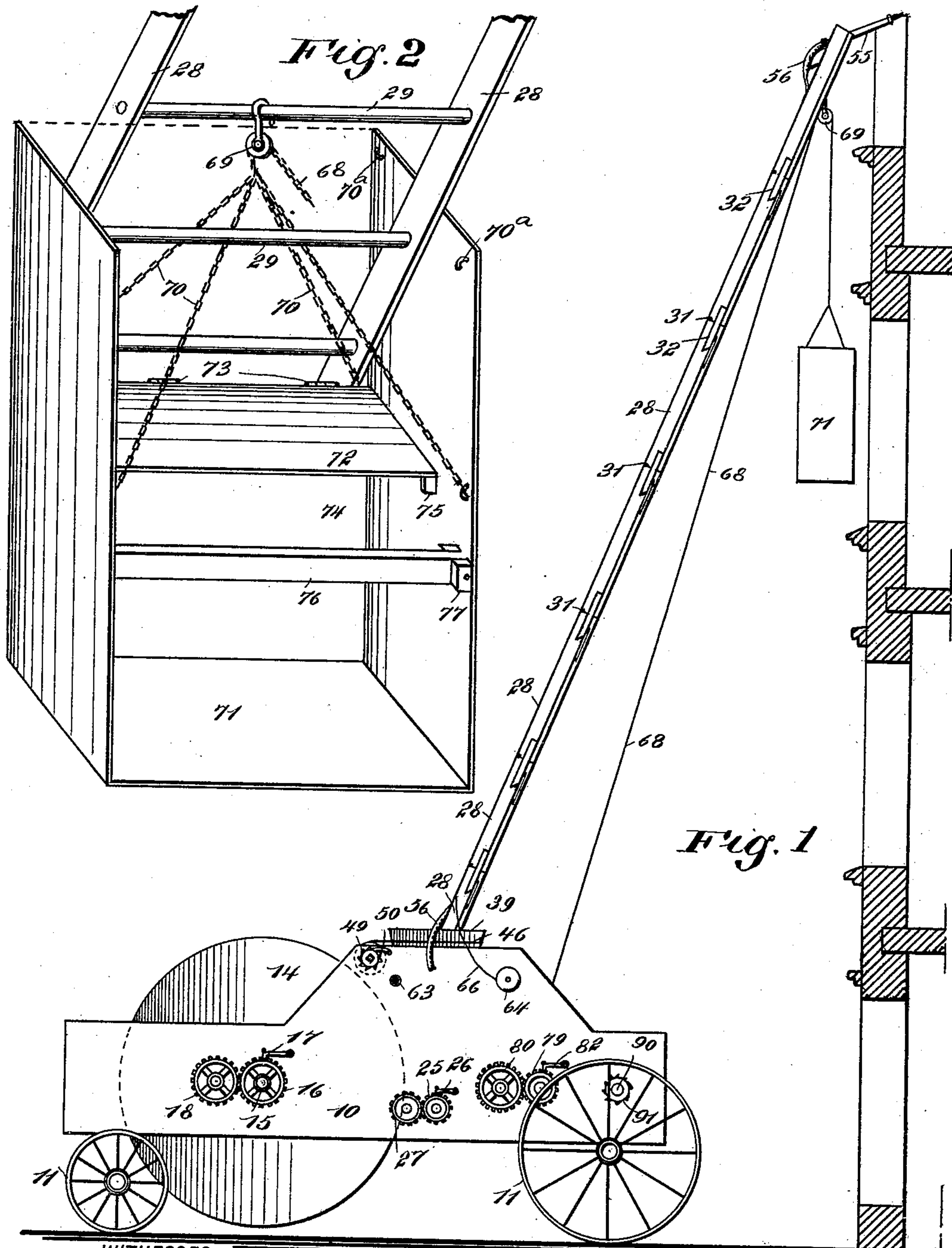
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6 Sheets—Sheet 1.

F. M. PAINTER.
HOSE TOWER AND FIRE ESCAPE.

No. 543,750.

Patented July 30, 1895.



WITNESSES:

John Bergstrom
H. B. Hutchinson

INVENTOR

F. M. Painter

BY

Munn & Co

ATTORNEYS.

(No Model.)

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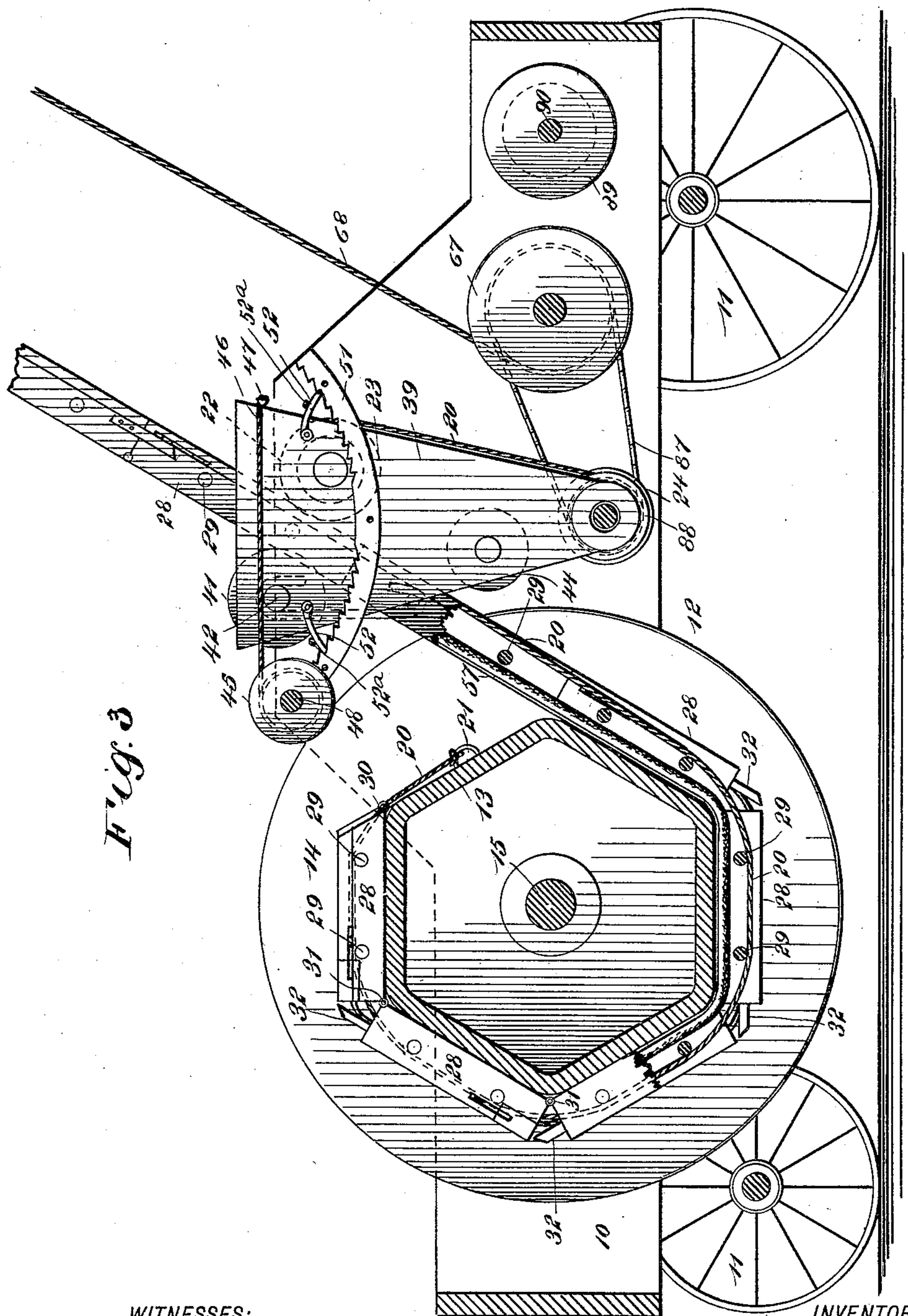


Fig. 3

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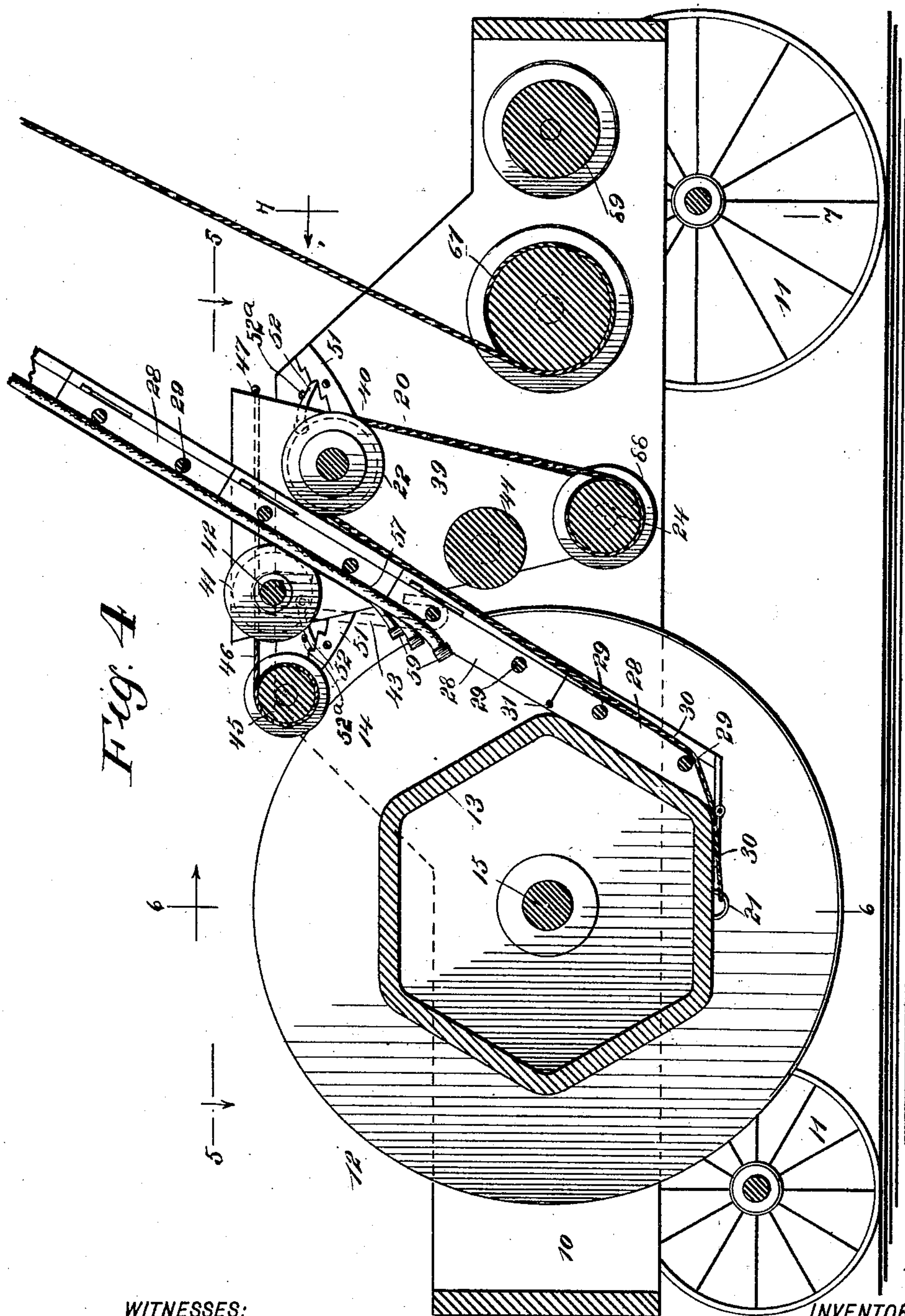


Fig. 4

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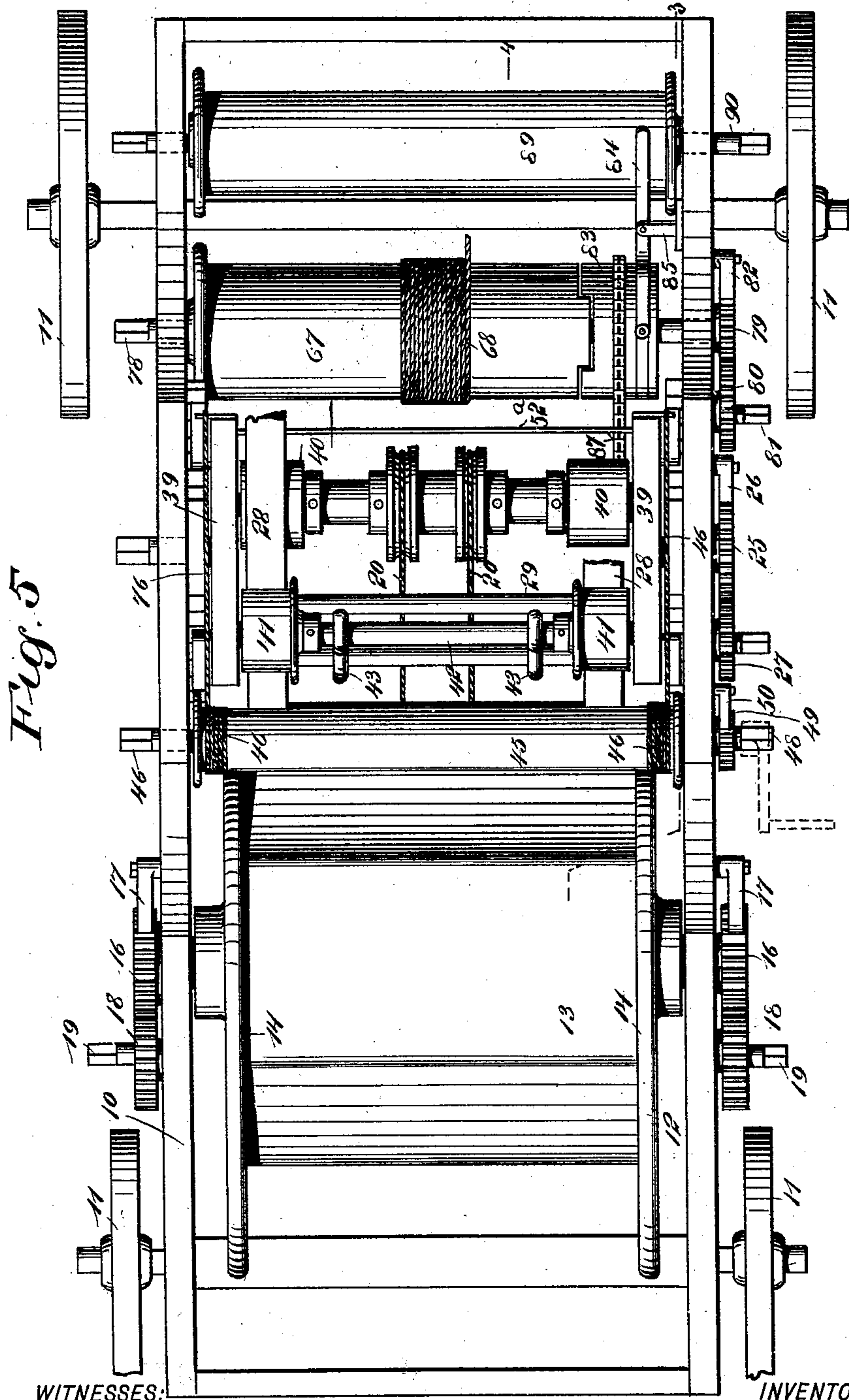
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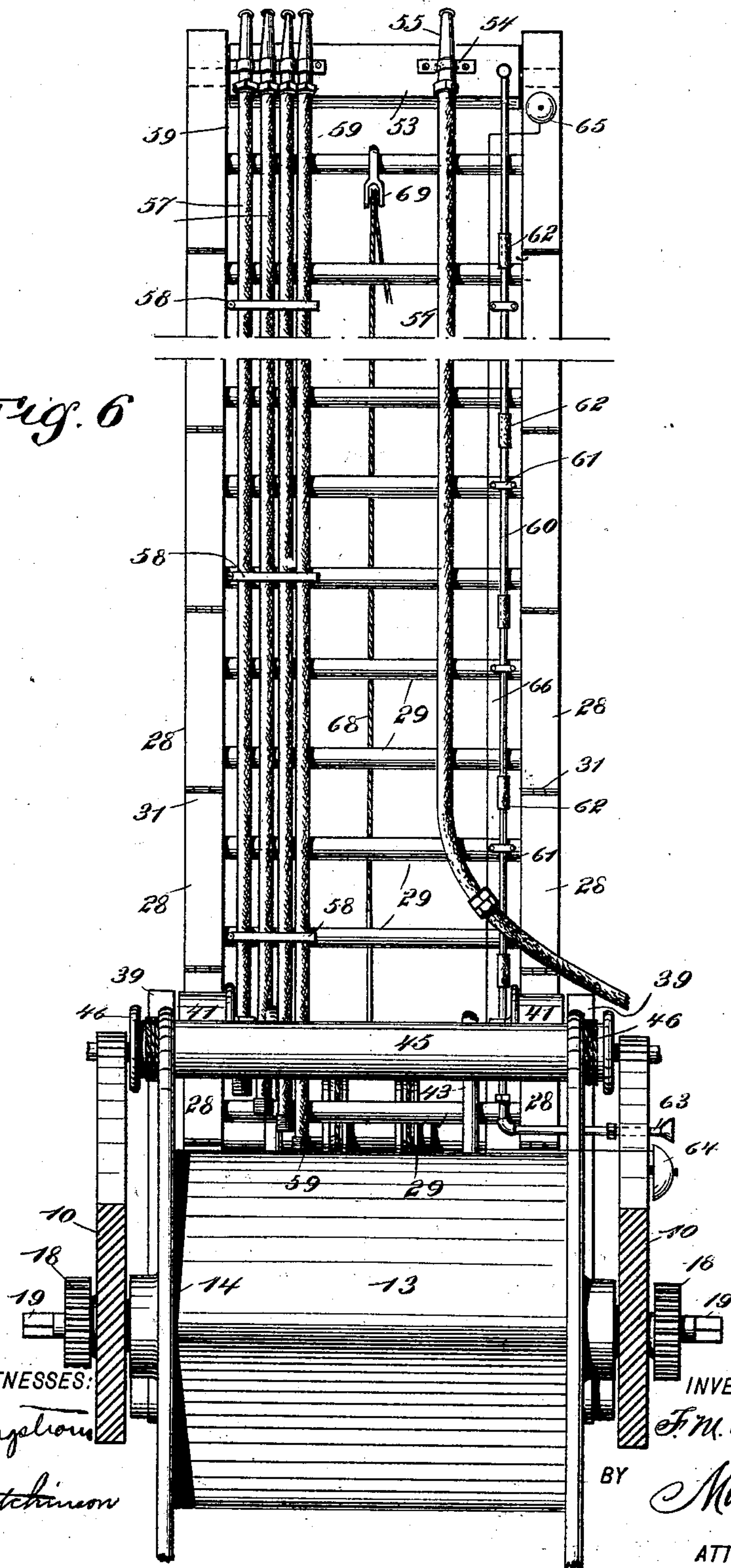
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Fig. 6



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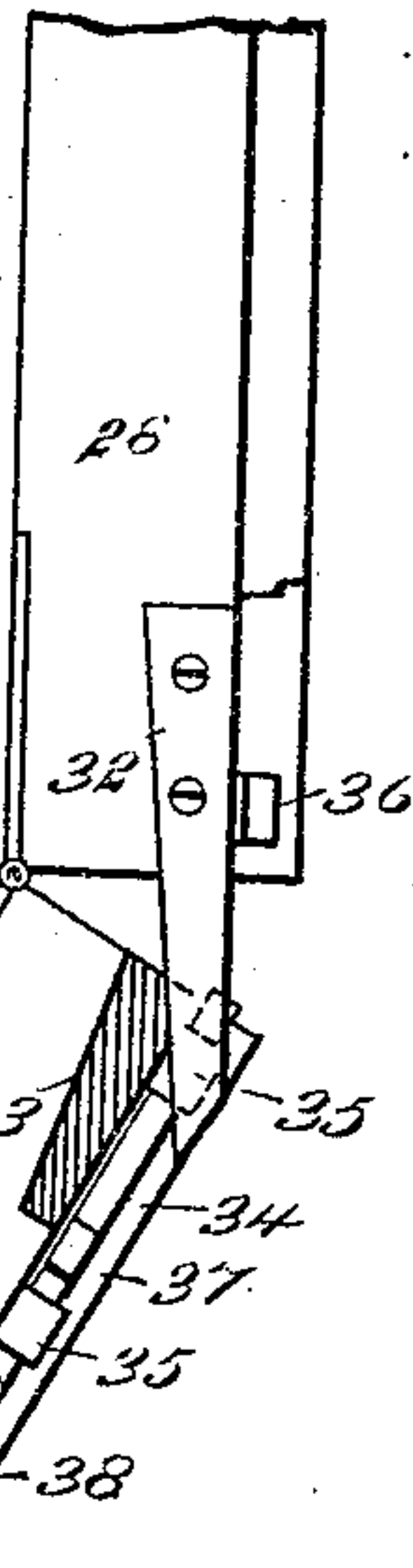
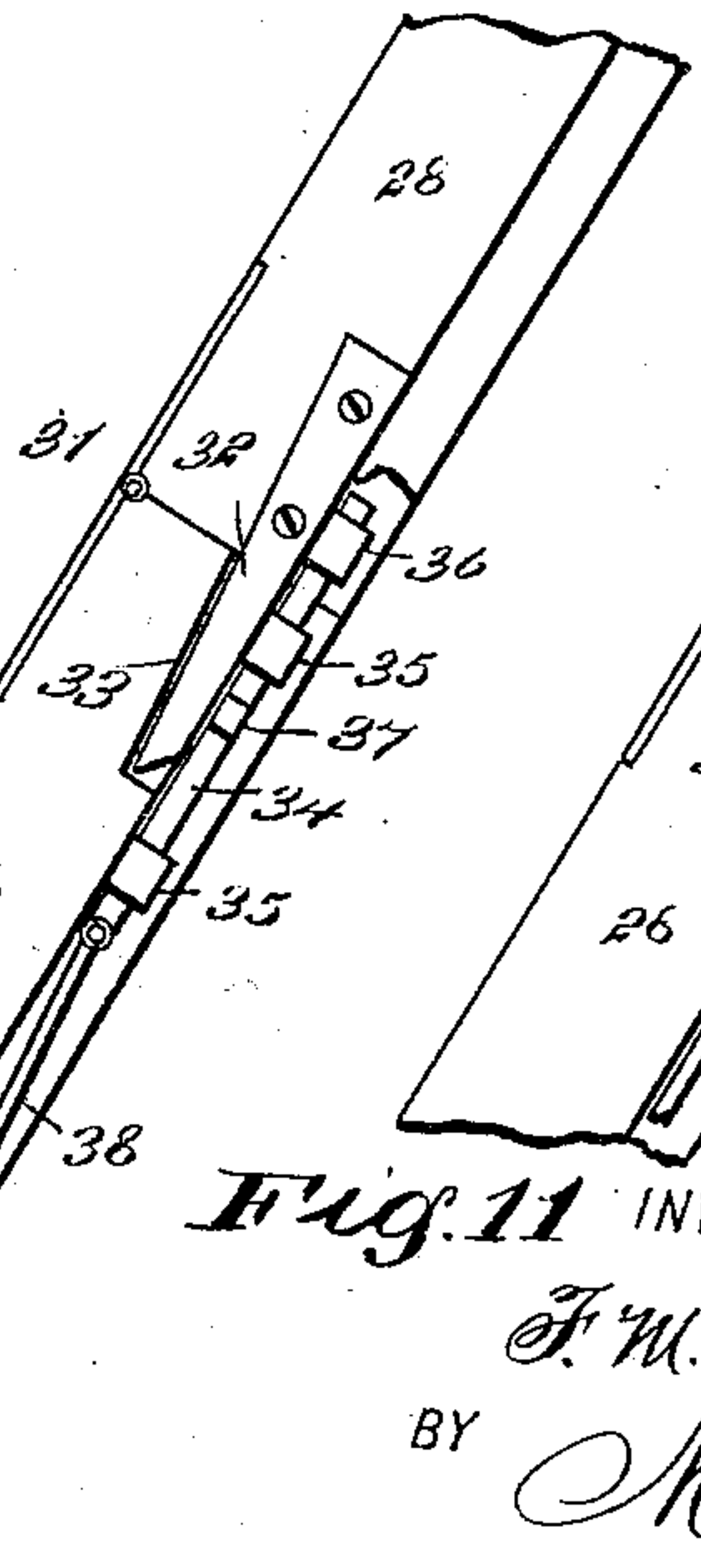
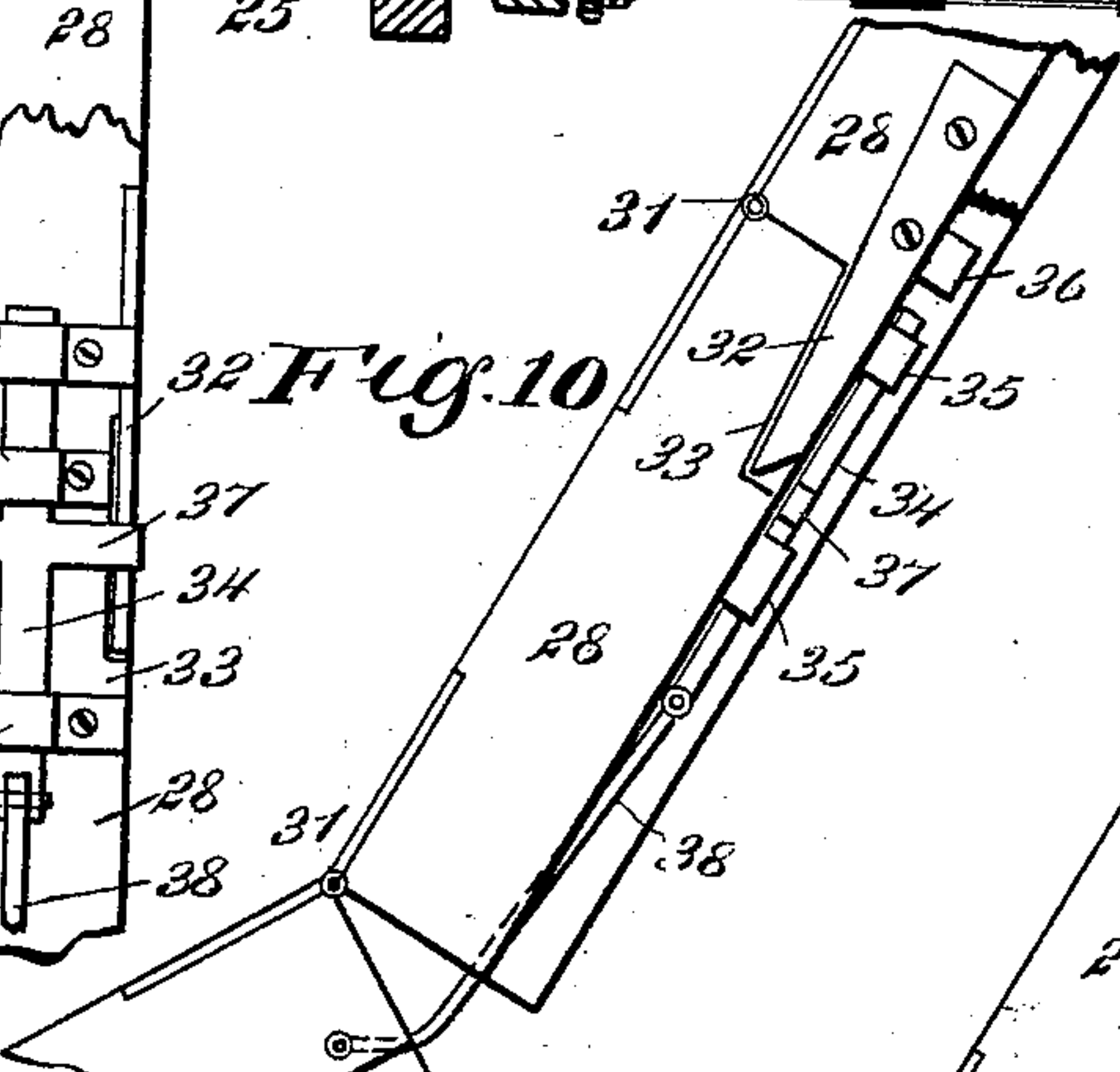
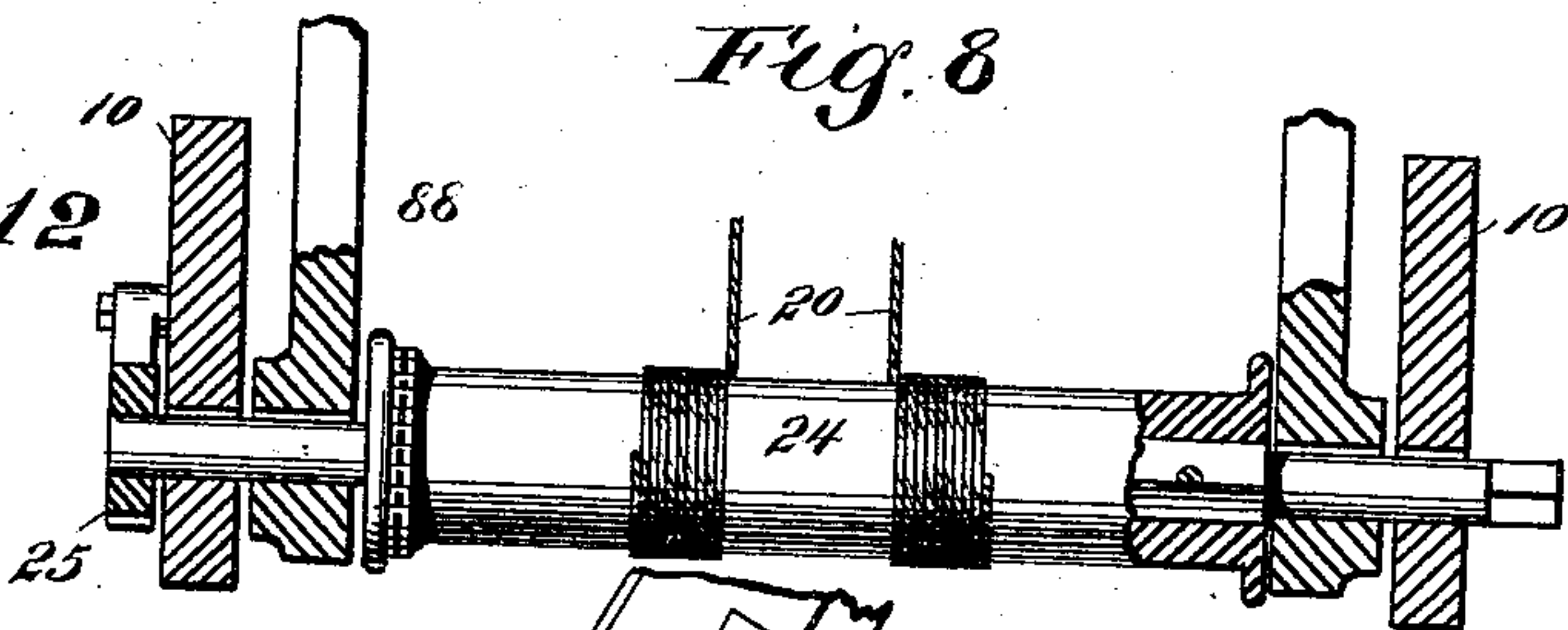
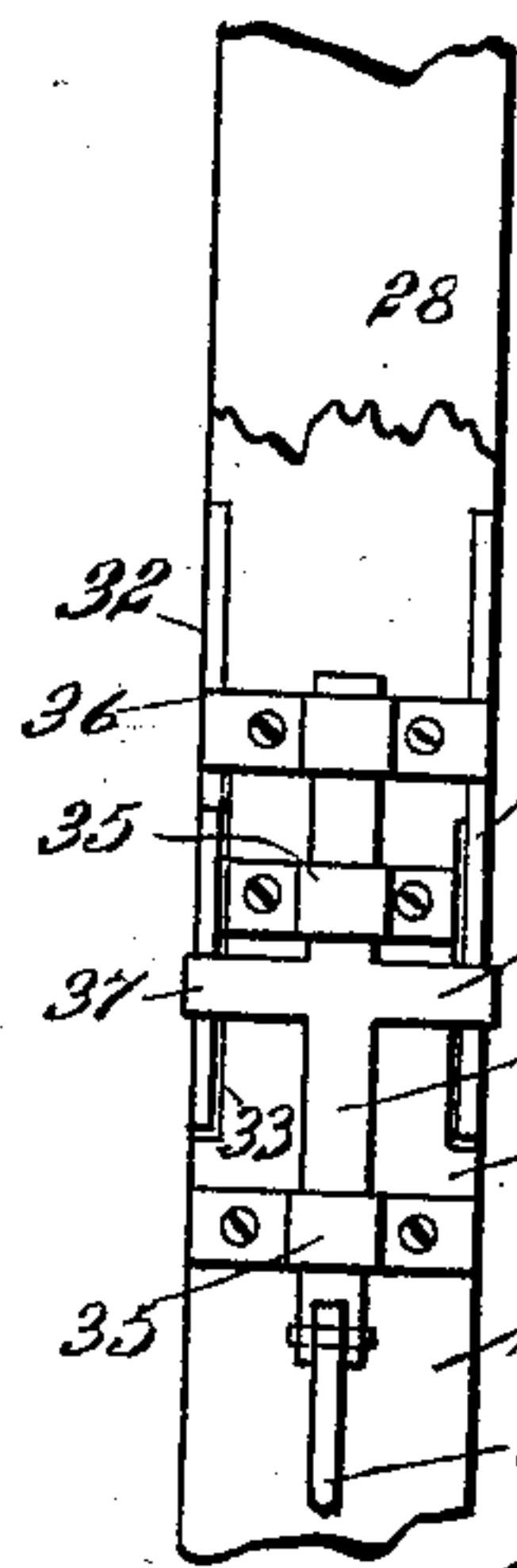
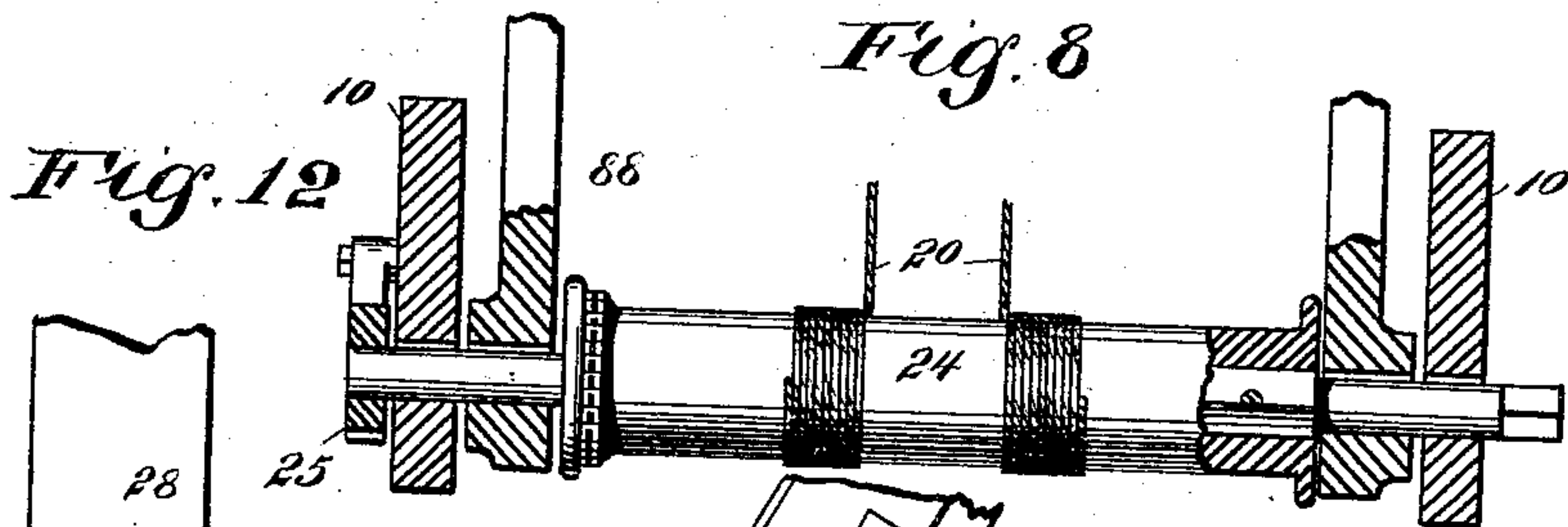
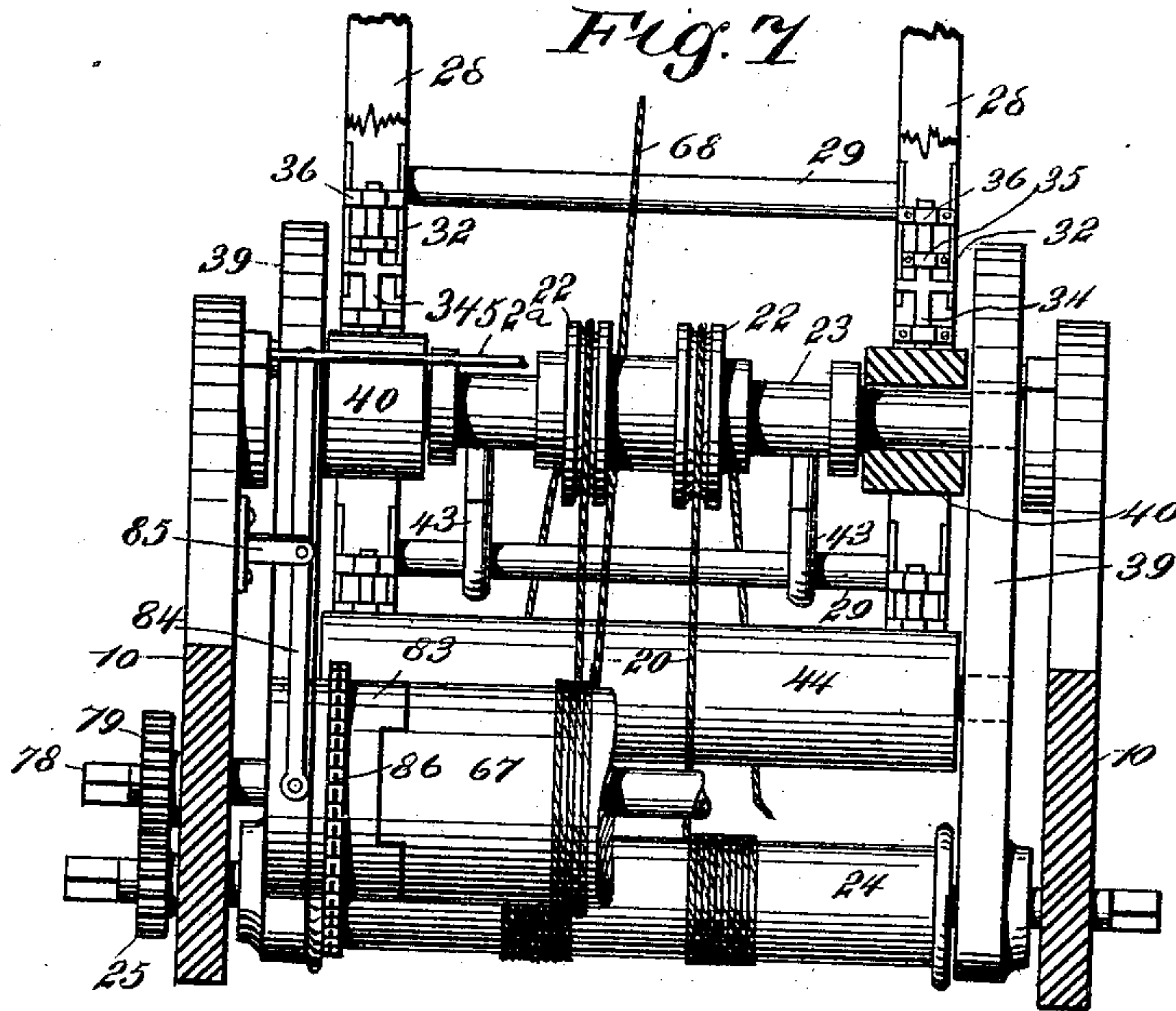
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UNITED STATES PATENT OFFICE.

FRANCIS M. PAINTER, OF CHICAGO, ILLINOIS.

HOSE-TOWER AND FIRE-ESCAPE.

SPECIFICATION forming part of Letters Patent No. 543,750, dated July 30, 1895.

Application filed December 4, 1894. Serial No. 530,778. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS M. PAINTER, of Chicago, in the county of Cook and State of Illinois, have invented a new and Improved

5 Hose-Tower and Fire-Escape, of which the following is a full, clear, and exact description.

My invention relates to improvements in fire apparatus; and the object of my invention is to produce a comparatively simple device which may be used as a hose-tower, fire-escape, geyser, and truck, which has a collapsible ladder adapted to be coiled up on the truck when not in use or to be extended to any necessary length, which has the ladder

10 constructed in such a way that when extended it is as strong as if made in a single piece, which has a convenient means of extending and winding up the ladder, which is provided with a guide by which the pitch of the ladder

20 may be easily regulated, which has means for adjusting and raising a hose or a series of hose on the ladder, which is provided with a convenient system of signals by which communication may be carried on between a person

25 on the ladder top and one at its base, which is provided with a convenient means of raising and lowering firemen or other persons, which may be conveniently arranged to flood any desired story of a building, and

30 which in general is adapted to take the place of practically all the mechanism carried by a hook-and-ladder truck, besides subserving the ends above mentioned.

To these ends my invention consists of certain features of construction and combinations of parts, which will be hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures of reference indicate

40 corresponding parts in all the views.

Figure 1 is a side elevation of the apparatus, showing the ladder extended opposite a building and illustrating also the use of the

45 conveying basket or car. Fig. 2 is an enlarged detail view of the car as supported from the ladder. Fig. 3 is a vertical longitudinal section of the apparatus on the line 33 of Fig. 5. Fig. 4 is a longitudinal section on the line 44

50 of Fig. 5. Fig. 5 is a broken plan view of the apparatus. Fig. 6 is a cross-section on the

line 66 of Fig. 4 and with the ladder extended.

Fig. 7 is a cross-section on the line 77 of Fig. 4. Fig. 8 is a detail sectional view of the winding-drum by which the ladder is raised. 55 Fig. 9 is an enlarged detail side elevation of a few of the ladder-sections, showing particularly the way in which the said sections are connected. Fig. 10 is a similar view, but with the sections partially opened. Fig. 11 60 is a broken side elevation of two adjacent ladder-sections in the position which they assume as they are wound upon the main drum, and Fig. 12 is an inverted plan showing the connection between the ladder-sections. 65

The apparatus is preferably mounted on a truck having a suitable body 10, this being mounted on wheels 11 in the usual way. On this truck is mounted transversely a drum 12, having a body portion 13, which is faceted, so 70 that the ladder-sections may be conveniently folded on it, as hereinafter specified, and end flanges 14, which prevent the displacement of the ladder. The drum 12 is secured to a shaft 15, which is journaled in the body 10, and the 75 shaft has at its ends cog-wheels 16, which are engaged by pawls 17 to prevent the shaft and drum from turning back and which engage cog-wheels 18, which are journaled on the 80 sides of the truck and have squared shafts 19, to which a wrench may be applied to turn them and the drum, with which they are connected, as described. The drum is turned by means of the gear mechanism just described 85 to wind up the ladder; but to raise the ladder and unwind it from the drum cables 20 are used, which are secured to the drum by means of staples 21 or equivalent fastenings and which are adapted to be wound upon the drum 90 with the ladder and unwound as the ladder is raised. These cables 20 extend over guide-pulleys 22 on the cross-shaft 23 of the guide, which will be described below, and the cables are secured to a drum 24, which is journaled transversely in the truck 10 in front of 95 the drum 12, and the shaft of the drum 24 is connected by a gear-wheel 25 with a gear-wheel 27, which is journaled on the drum-body and has a squared shaft to receive a winding-crank, so that by turning it the motion may be transmitted to the gear-wheel 25 100 and drum 24, and the gear-wheel 25 is pro-

vided with a pawl 26, which prevents it from turning back and permitting the ladder to drop.

The ladder is made up in a series of sections 5 adapted to fold upon the drum 12, and each section is made up of side rails 28 connected by ordinary cross rungs or rounds 29. The lower end of the ladder is hinged to the drum at one edge of one of its facets, as shown at 10 30, and the several ladder-sections are hinged together on the inner side, as shown at 31, to enable them to fold compactly upon the drum 12. (See Fig. 3.) Each ladder-section is provided at one end and on each rail with an arm 15 32, which overlaps the rail of the adjacent section and fits in a side socket 33 therein, (see Figs. 9 to 12,) and on the side of one of the rails opposite the said arm is a bolt 34, which slides in keepers 35 and is adapted to 20 enter a keeper 36 on the abutting rail when the rails are placed end to end, thus firmly fastening the rails together.

The bolt 34 is provided with side arms 37, which overlap the arms 33 when the bolt is 25 slipped forward, and thus the side arms 32 brace the rails against lateral movement, while the bolts 34 lock them together, so as to prevent them from turning on the hinges 31. To enable the bolts to be automatically moved 30 when the ladder is raised or lowered, each bolt is connected by a rod 38 to the next ladder-section below that on which the bolt is held, (see Fig. 9,) and so when the ladder is wound upon the drum the bending of one 35 section, as shown in Fig. 10, will cause the joint to open and the rod 38 to be pulled, which, acting on the bolt 34, pulls it from the keeper 36 and pulls the arms 37 off the arms 32, thus permitting the next sections to open 40 at the joint. When, however, the ladder is raised, the opposite effect takes place, the rails 28 as they are straightened out being brought end to end, and this brings the arms 32 into the sockets 33, while the rods 38 are 45 straightened out and pushed forward, thus pushing the bolts 34 into the keepers 36 and locking the rails, as specified.

The ladder as it is raised is straightened and adjusted by a guide comprising the opposite end frames 39 and auxiliary mechanism 50 to be presently described. The guide has rollers 40, which are journaled on the cross-shaft 23, and on which the rails of the ladder run, and the upper or inner portions of the 55 rails run on guide-rollers 41, which are journaled on a shaft 42 in the upper front portion of the guide, and this cross-shaft 42 also serves as a support for the hooks 43, which, when the ladder is raised, may be placed in 60 engagement with one of the ladder-arms and the shaft 42 to assist in sustaining the weight of the ladder. The guide is also provided with a roller 44 beneath the ladder, which is journaled in the frames 39, and on which the 65 rails may run when the guide is tilted, so as to hold the ladder at a comparatively slight angle to the truck. The guide is moved back-

ward to raise the ladder by means of a drum 45 and cables 46, which are secured to the upper front portions of the frames 39, and 70 the ladder is moved forward at a lesser angle by permitting the frames to swing forward under the weight of the ladder. The drum 45 is carried by a shaft 48, which is journaled on the truck-frame 10 and is squared to receive a crank, the shaft having also a ratchet-wheel 49 thereon, which is engaged by a 75 pawl 50, and the pawl and ratchet-wheel prevent the drum from turning back and the ladder from swinging down. The guide is 80 held in a desired position after being adjusted by means of the curved rack-bars 51 on the truck-frame and the pawls 52 on opposite sides of the frames 39, which pawls engage the rack-bars, as shown in Fig. 3. The pawls 85 52 are connected by a cross-rod 52^a, so that both pawls may be lifted in unison from either side of the truck.

At the top of the ladder is an adjustable cross-bar 53 carrying the several nozzles 55 90 and hose 57, these nozzles being held in place on the cross-bar by keepers 54 or equivalent fastenings. The hose 57 are held to the ladder by keepers 58, and they extend the full 95 length of the ladder, being at frequent intervals provided with the ordinary couplings 59, and when the ladder is raised the cross-bar 53 may be adjusted, so that the nozzles 55 will point in the desired direction. If it is desired 100 to play but one stream from the ladder one hose 57 is disconnected and connected with a supply-pipe from a steam fire-engine, the others being left idle; but if the other hose are 105 to be used they may be connected up in a similar way, and thus any desired quantity of water within the limits of the capacity of the apparatus may be poured into a building. The ladder is also provided with a speaking-tube 110 60, which is fastened in keepers 61, and the speaking-tube is made up in sections corresponding in length to the ladder-sections, and at points opposite the joints of the ladder-sections the sections of the speaking-tube are 115 connected by flexible couplings 62, which permit the tube to flex. The tube may be disengaged at any of these points and connected with a hose-piece 63 on the truck. Near the 120 mouthpiece 63 is a gong 64, and a similar gong 65 is arranged near the top of the tube, the two gongs being connected by a cord 66, which is adapted to operate the hammers of the gongs in the usual way, and therefore the details of this construction are not shown.

Journaled transversely in the truck-frame 10 forward of the guide is a drum 67 carrying 125 a cable 68, which is adapted to extend upward over a guide-pulley 69, hooked to one of the upper ladder-rungs, and the upper end of the cable is secured to the branch chains or cables 70, which support the car 71. By turning 130 the drum 67 and winding or unwinding the cable 68 the car may be raised or lowered, and it will be seen that by raising the ladder to a sufficient height the car may be lowered

to a point opposite any desired window or part of a building, so that the fireman may work on the car or the occupants of the building may escape into it and be safely lowered to the ground. The car is open in front and has the upper portion 72 of its back hinged, as shown at 73, (see Fig. 2,) to the lower part 74 of the back, so that when necessary the part 72 may be folded inward and permitted to rest on the stops 75, thus forming a platform on which the fireman may conveniently stand. When the car is used for rescuing people from a building the part 72 is turned up, so that a person may readily step into the car, and a cross-bar 76 is used to prevent people from falling from the car, this cross-bar being hinged at one end to suitable supports 77, so that it may be turned up out of the way when necessary. The car 71 has an extra set of hooks 70^a near its upper corners, so that when it is used for rescuing people the chains 70 may be connected with these hooks and the car may then be more conveniently used.

The drum 67 has a squared shaft 78, to which a crank may be applied to turn it when necessary; but it is usually turned by means of a gear-wheel 79, which is secured to the shaft and meshes with a gear-wheel 80 secured to a squared shaft 81, to which a crank may be applied, which shaft is journaled on the truck-frame 10. The pawl 82 prevents the gear-wheel 79 from turning back.

Loose on the shaft 78 of the drum 67 is a clutch 83, which is adapted to be thrown into engagement with the drum by a lever 84, which is fulcrumed on a bracket 85, and the clutch is provided with a sprocket-wheel 86 connecting by means of a chain 87 with a sprocket-wheel 88 on the drum 24, so that when the drum 24 is raised to lift the ladder the clutch may be thrown into engagement with the drum 67 and the latter will be turned in a direction to permit the unwinding of the cable 68, so that the car 71 may retain its position in relation to the ladder-top; but after the ladder has been raised the clutch may be disengaged and the drum 67 turned to raise or lower the car, as described.

In the front part of the truck-frame 10 is a hose-reel 89, on which extra hose may be wound, and the shaft 90 of this reel is provided with an ordinary ratchet-wheel and pawl 91. (See Fig. 1.)

From the foregoing description it will be seen that the ladder may be easily raised to its full height by winding the cables 20 and drums 24, that as it is raised its several sections are fastened together, so as to make the ladder exceptionally strong, that the ladder is guided and supported by the guide-frames 39 and connecting parts in such a way as to bring it under perfect control, that when it is raised the hose-pipes, speaking-tubes, and auxiliary devices are raised for use, and that when it is to be folded it is only necessary to release the ladder and wind it up on the drum 12. It will also be observed that the ordinary

extension-ladders or folding ladders may be made in the manner in which the truck-ladder is made and used independently of a truck. 70

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In an apparatus of the kind described, the ladder comprising a series of sections hinged together, arms secured to the side rails of certain sections and adapted to engage recesses in the adjacent sections, slide bolts movable on a portion of the sections and adapted to engage the adjacent sections, and a device for operating the slide bolts by the opening and closing of the sections, substantially as described. 75

2. An apparatus of the kind described, comprising a supporting frame, a revoluble drum journaled on the frame, a folding ladder secured to the drum, means for raising the ladder and unwinding the drum, an oscillating guide frame mounted on the head frame and provided with supports and guides for the ladder, a drum and cable mechanism for shifting the position of the guide, and means, as the rack bars on the main frame and the pawls on the guide frame, for locking the guide, substantially as described. 80 90 95

3. The combination, of the revoluble drum, the folding ladder secured to the drum, the oscillating guide comprising opposite end frames and connecting shafts, the guide rollers on the guide to engage the ladder, the winding drum at the foot of the guide, the cable extending from the winding drum over suitable guide pulleys to the ladder drum, and a locking device to fix the position of the guide, substantially as described. 100 105

4. The combination, with the ladder, the winding drum for lifting it, the second winding drum and the car and cable connected with the second winding drum, of a clutch for the second winding drum, and a driving connection between the clutch and the first winding drum, substantially as described. 110

5. The combination, with the ladder and the car hoisting device, of the car having a back adapted to fold inward and make a platform, substantially as described. 115

6. In an apparatus of the kind described, a car having a back to fold inward to make a platform, and a hinged cross bar in the front of the car, substantially as described. 120

7. In an apparatus of the character described, a ladder consisting of a series of sections connected and adapted to fold together, and sliding bolts on the several sections, said bolts being provided with actuating devices constructed and arranged to be actuated by the flexure or straightening of the next adjacent sections of the ladder to unlock and lock the sections together, substantially as set forth. 125 130

8. In an apparatus of the character described, a ladder consisting of a series of sections pivotally connected on one face at their adjacent ends, a bolt secured to one section,

an eye on an adjacent section adapted to receive the said bolt, and a connection between said bolt and the other adjacent section, whereby when the latter is moved, the bolt will be actuated, substantially as set forth.

9. In an apparatus of the character described, a ladder consisting of a series of sections pivotally connected at one side at adjacent ends and provided on opposite sides with overlapping arms, and interlocking bolts and eyes on the sections, said bolts having lugs to engage the overlapping arms, substantially as set forth.

10. In an apparatus of the character described, the combination of a frame, a revoluble drum, a folding ladder secured to the drum and adapted to wind thereon, means for unwinding the ladder, a guide-frame pivotally mounted at its lower end in the frame with its upper end adapted to be moved toward and from the drum, a drum revolvably mounted in the frame, a cable secured at one end thereto and at its other end to the upper end of the guide-frame, whereby the same may be adjusted to impart the desired inclination to the ladder, and means for locking said guide-frame in position when adjusted, substantially as set forth.

11. In an apparatus of the character described, the combination of a frame, a revoluble drum, a folding ladder secured to the drum and adapted to wind thereon, a cable secured

to the drum and adapted to wind outside the ladder, a cross-shaft in the frame, a drum on said cross-shaft, the cable being secured to and adapted to wind on said drum, on the cross-shaft a guide-frame comprising end bars pivotally mounted at their lower ends on the said cross-shaft of the frame, and means for locking said guide-frame in position when set at the desired inclination, substantially as set forth.

12. In an apparatus of the character described, the combination of a frame, a revoluble drum, a folding ladder secured to the drum and adapted to wind thereon, a cable secured to the drum and adapted to wind outside the ladder, a cross-shaft in the frame, a drum on said shaft, the cable being secured to and adapted to wind on said drum on the cross-shaft, a guide-frame comprising end bars pivotally mounted at their lower ends on the said cross-shaft, a shaft in the upper ends of said end bars, and means for locking said guide-frame in position when the same is set at the desired inclination, a sheave on said shaft in the end bars adapted to receive and guide the cable, and rollers on said shaft to receive and guide the side rails of the ladder, substantially as set forth.

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