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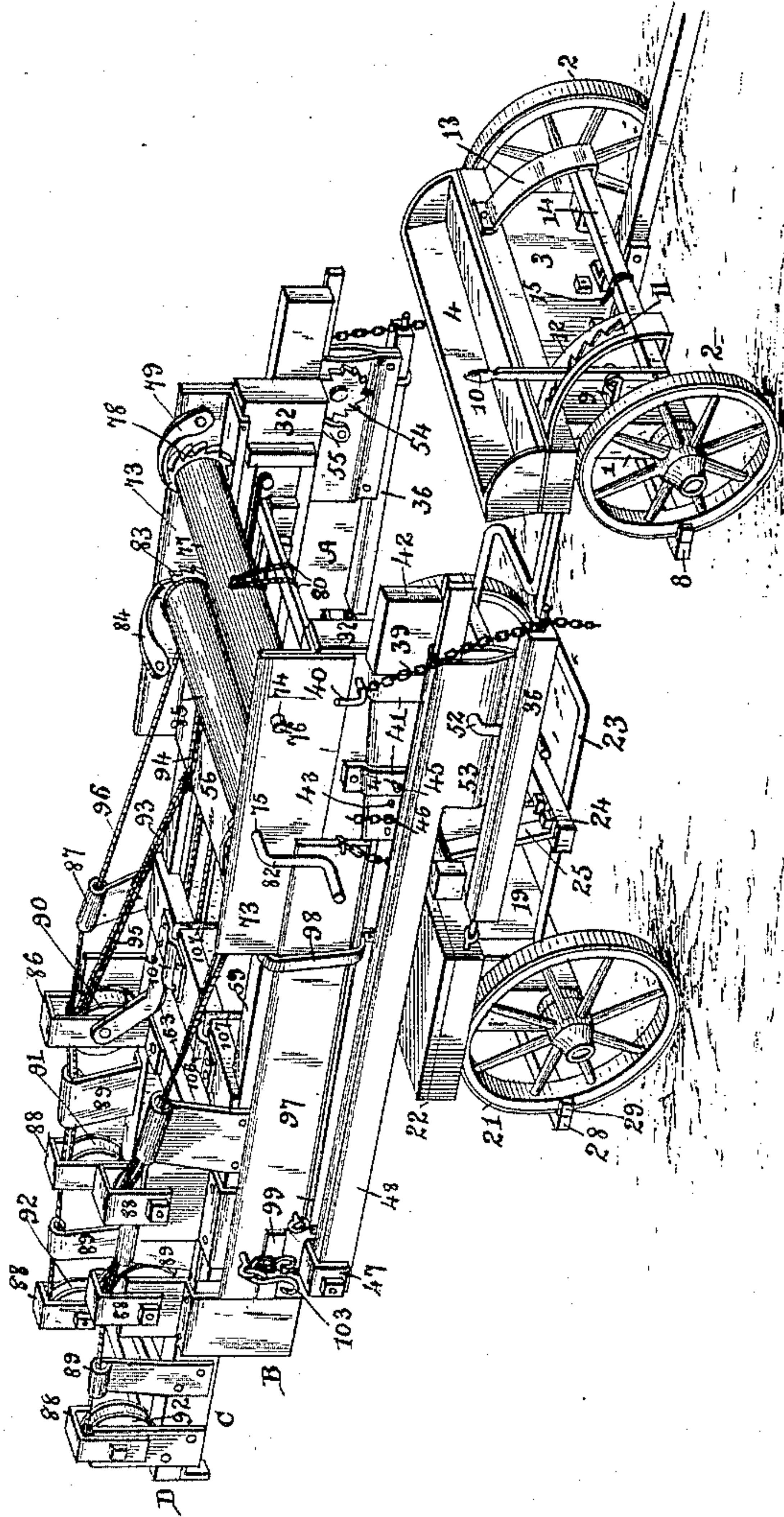
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J. McQUILLAN.
EXTENSIBLE LADDER.

No. 473,852.

Patented Apr. 26, 1892.

FIG. 1-



Witnesses:

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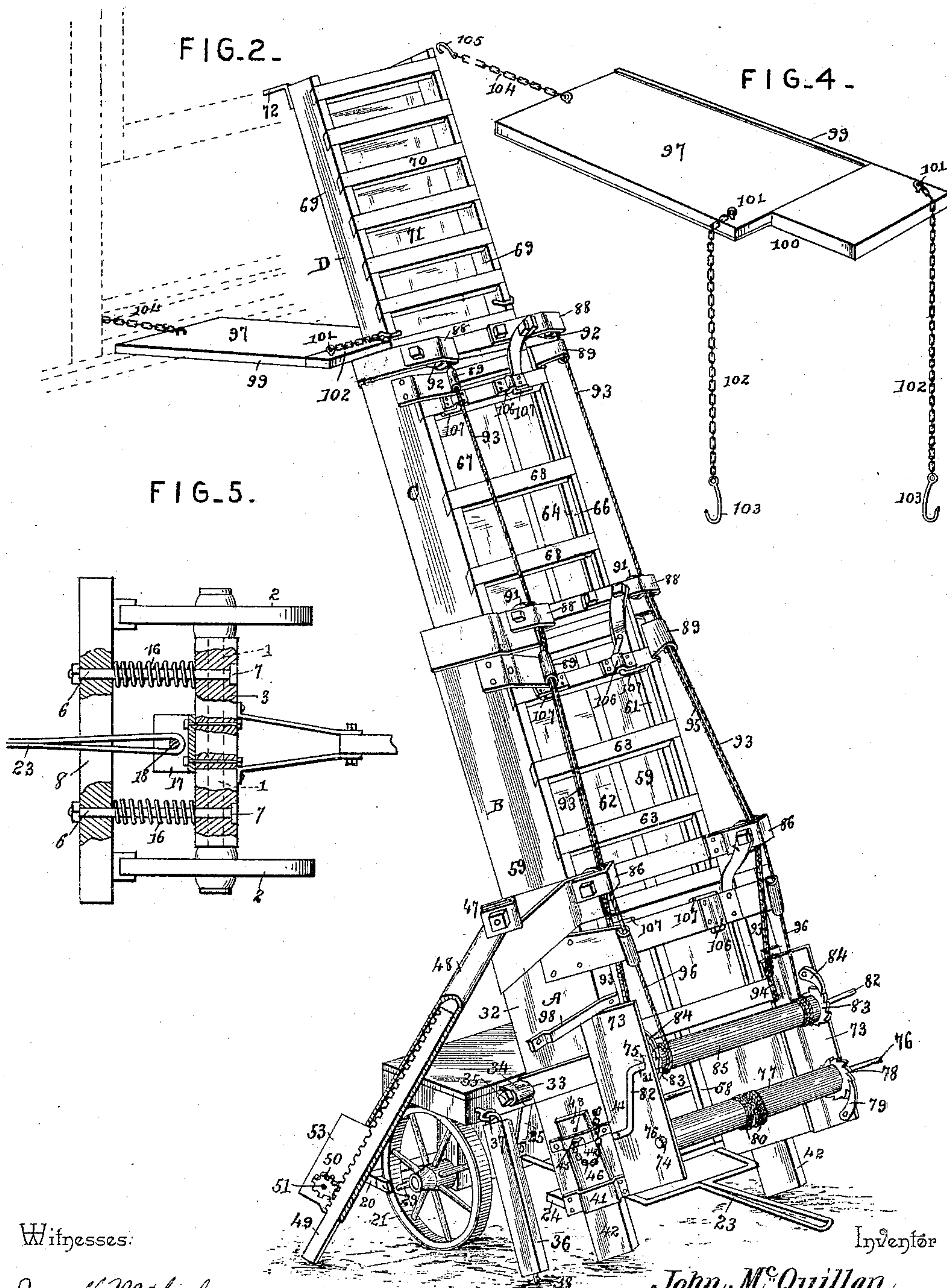
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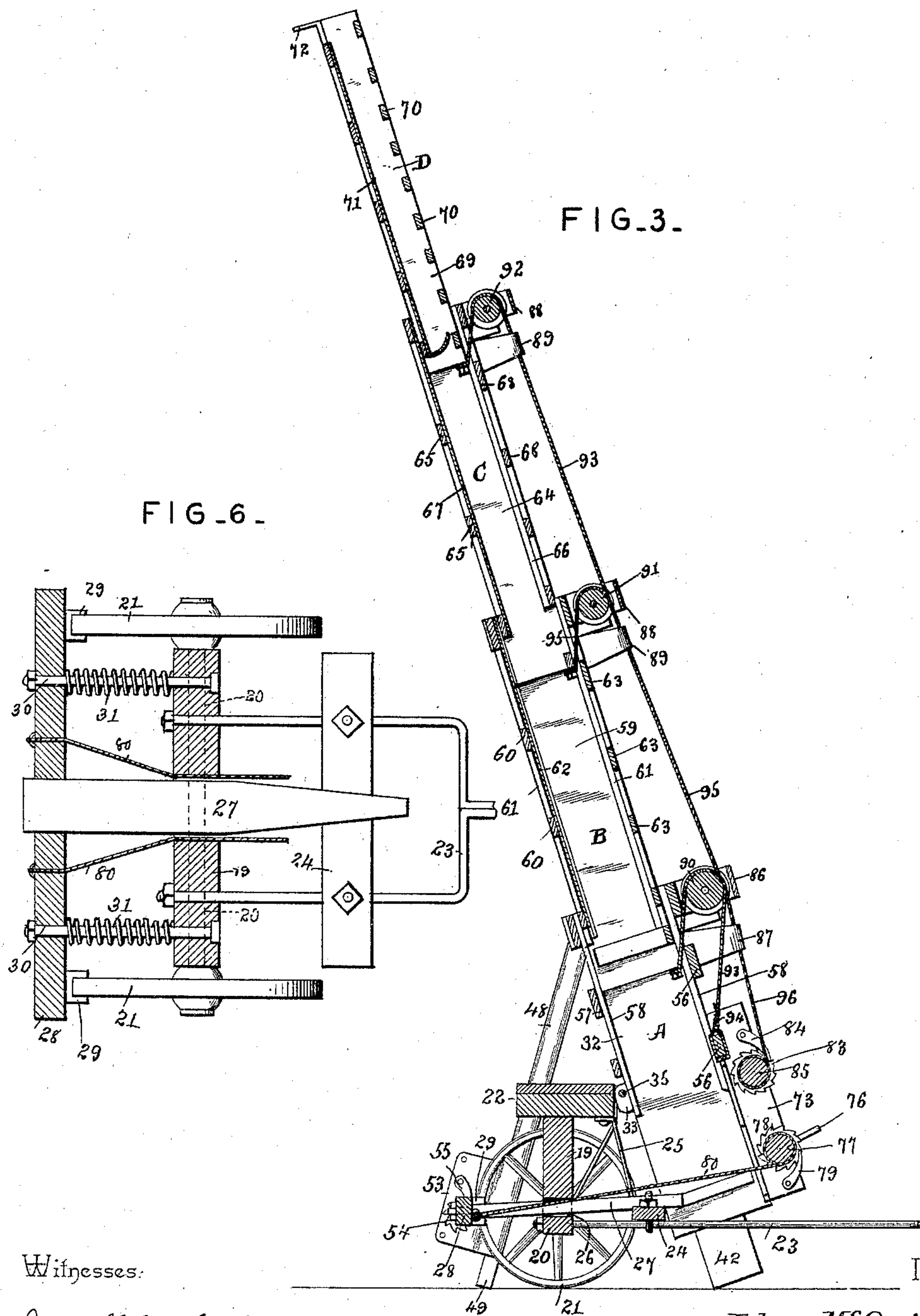
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UNITED STATES PATENT OFFICE.

JOHN McQUILLAN, OF HECKER, ILLINOIS.

EXTENSIBLE LADDER.

SPECIFICATION forming part of Letters Patent No. 473,852, dated April 26, 1892.

Application filed June 24, 1891. Serial No. 397,347. (No model.)

To all whom it may concern:

Be it known that I, JOHN McQUILLAN, a citizen of the United States, residing at Hecker, in the county of Monroe and State of Illinois, have invented a new and useful Extensible Ladder, of which the following is a specification.

This invention relates to improvements in extensible ladders for use at fires.

The objects of my invention are to provide a cheap and simple construction of extensible ladder that may be operated—that is, raised and lowered—from the ground to any desired degree within its capacity, so as to effect entrances in buildings to protect the same and its users from heat and flame, to provide means for steadying the ladder when raised, to provide means for tilting or inclining the same previous to its elevation, and, furthermore, to provide means for locking the wheels of the truck at the time of elevation or inclination of the ladder.

Various other objects and advantages of the invention will appear in the following description, and the novel features thereof will be particularly pointed out in the claims.

Referring to the drawings, Figure 1 is a perspective of a ladder constructed in accordance with my invention, the same being in its folded position. Fig. 2 is a similar view, the ladder being extended. Fig. 3 is a vertical longitudinal section of Fig. 2. Fig. 4 is a detail in perspective of one of the removable platforms. Fig. 5 is a horizontal section of the front truck. Fig. 6 is a horizontal section of the rear truck.

Like numerals and letters of reference indicate like parts in all the figures of the drawings.

In practicing my invention I provide a front and rear truck, the former consisting of an axle 1, having ground-wheels 2, said axle being suitably secured in a bolster 3, upon which is mounted the seat 4 for the driver and necessary assistant. Upon the rear face of the bolster, near the opposite ends of the same, is a pair of rearwardly-disposed rods 6, terminating at their outer ends in heads 7, said rods having mounted thereon and adapted to reciprocate a brake-bar 8, terminating at its ends in brake-shoes adapted to operate upon the ground-wheels 2. In a bracket 9, secured

to the front face of the bolster, there is fulcrumed a brake-lever 10, the upper end of which is designed for movement in the slot 11 of a locking-bar 12, the inner edge of the slot being toothed, as shown, for the purpose of engaging and locking the brake-lever. At the opposite end of the bolster a triangular-shaped keeper-bracket 13 is secured, and in the swing is pivoted a lever 14, the free end of which is connected to the brake-lever 10. A cable 15 is secured to the lever 14, passes through the bolster, and is connected to the brake-bar 8, so that, as will be evident, through the medium of the levers 10 and 14 and the cable the brake-bar 8 may be drawn inwardly, so that its brake-shoes are applied to the wheels 2. Normally, however, the brake-shoes are thrown off or out of contact with the wheels through the medium of coiled springs 16, mounted upon the rods 6 and interposed between the brake-bar 8 and the bolster. At its rear side and center the bolster is provided with a clevis 17, through which passes a linchpin 18.

The rear truck consists of the bolster 19, in which is mounted an axle 20, carrying ground-wheels 21. Upon the bolster is mounted a platform 22. From the front face of the bolster extends forwardly a reach 23, the front end of which enters the clevis 17 and is removably coupled to the front truck by means of the pin 18. At its rear end the reach diverges and is connected to a cross-bar 24, the ends of which are bolted inclined braces 25, the upper ends of which are secured to the front edge of the platform 22. Through an opening 26, formed in the bolster near its lower edge, passes a loose bar 27, the rear end of which is tenoned in and rigidly connected with a transverse brake-bar 28, which bar terminates in brake-shoes 29, adapted for contact with and to lock against movement the wheels 21 of the rear truck. A pair of rods extends rearwardly from the bolster and passes through openings formed in the brake-bar, in rear of which the rods are headed, and upon said rods coiled springs 31 are mounted, which serve to normally throw the brake-shoes out of contact with the wheel.

The ladder comprises in this instance four sections, which for the purpose of convenience I will designate as A, B, C, and D; but it will

be readily understood that a greater or lesser number of sections may be employed, as the length of the ladder desired and the locality in which it is used in a city or town may dictate. The lower or main ladder-section comprises opposite side bars 32, which are provided at their central lower edge with bearings 33, said bearings being located between a pair of bearings 34, projecting from the front edge of the platform 22 of the rear truck. Through the two sets of bearings is passed a bolt or shaft 35, whereby the lower main section A is hinged to the rear truck, and by the location of its joint it will be obvious that said section may lie flat upon the upper side of the rear truck or be tilted by mechanism hereinafter described, so that its lower end may rest upon the ground.

36 designates a pair of oppositely-inclined truck-braces, the same being coupled, as at 37, at their upper ends to the front edge of the platform at its ends and terminating, as shown, at their lower ends in spikes 38, adapted to enter the pavement or ground, and thus prevent the truck from moving forwardly or laterally. When not in use, the section A rests in a horizontal position upon the platform 22, and its front end supports suspension-chains 39, depending from hooks 40, which hooks are adapted to engage in a removable manner the free or lower ends of the braces 36.

The opposite side rails of the section A at their lower ends and upon their outer sides are provided with pairs of keepers 41, in each pair of which is located an extensible leg 42, the lower end of which extends beyond the side rails of the section. Each leg is also provided near its upper end with a series of adjusting-holes 43, any one of which may be thrown into alignment with a hole 44, formed in the upper keeper 41, and locked in a desired adjusted position by means of a pin 45, attached to the chain 46. By manipulating or properly adjusting these extensible legs the ladder may be given a stable support regardless of its degree of inclination.

To the rear or upper ends of the side rails of the section A there is pivoted in brackets, as at 47, a pair of tubular brace-sections 48, in each of which is mounted telescopically an extensible section 49, the upper edge of which is toothed, as shown, and is engaged by a gear-wheel 50, mounted upon a shaft 51, terminating in a crank 52 and journaled in a housing 53, located upon the lower end of the tubular brace-section 48. The shafts 51 also carry ratchet-wheels 54, which are locked against moving in one direction through the medium of pivoted gravity-pawls 55. By operating the cranks 52 it will be obvious that the two extensible sections 49 will be run out from their tubular sections, so as to be elongated or extended to agree with the degree of inclination at which the ladder may be disposed, and thus constitute efficient braces for the same. When not in use, the

braces are collapsed or telescoped, swung to the front, and supported by the platform 22.

The section A comprises opposite side rails 32, as before mentioned, and has its upper edges connected by rungs 56. The lower edges are connected by cross-bars 57 and are provided with longitudinally-disposed ways 58. Mounted for sliding in the ways 58 are the opposite side bars 59 of the second ladder-section B, provided with connecting cross-bars 60, longitudinal ways 61, and a sheet-metal lining 62 between the rails. The side rails are further provided with the rungs 63. In the ways 61 are mounted for sliding the side rails 64 of the third ladder-section C, the lower edges of which are connected by the cross-bars 65 and provided with the ways 66 and the sheet-metal lining 67. The side rails are further connected upon their upper edges by rungs 68. The ways 66 receive the side rails 69 of the topmost section D, which latter is provided with rungs 70 and the metal lining 71. It will be understood that the side bars of the several sections are graduated in width, so that they may be telescoped one within the other and the entire number of sections thus contained within the lower or main section A. The upper ends of the side bars 69 of the section D are provided with grappling-hooks 72.

The side bars 32 of the section A are provided with a vertical bearing-standard 73, one being located upon each of the same and opposite each other. These bearing-standards have pairs of bearing-openings 74 and 75, in the lower pair 74 of which is located a crank-shaft 76, the crank of which is outside of the standard. The shaft 76 carries a roll or drum 77 between its bearings, and also a ratchet-wheel 78, the latter being locked against movement in one direction by a pawl 79. A cable 80 is secured at its center to the drum 77, passes downwardly from the same and rearwardly through the opening 26 of the bolster, and connects with the brake-bar 28 of the rear truck. By operating the shaft 74 the cable first draws the brake-bar snugly to the locking position, in which its brake-shoes have contact with the rear wheels of the apparatus. When the inward movement of the brake-bar is arrested, the further winding up of the cable 80 draws upon the front end of the lower ladder-section, thus tilting the same to a desired inclination, which inclination may be preserved by the engagement of the pawl 79 with the ratchet 78 in that a retrograde movement of the crank-shaft and its drum, which would tend to permit the ladder-section to resume its former position, is prevented. When the position is thus secured, the front and rear braces are adjusted, as heretofore described, as are also the legs 42, so that the latter will rest upon the ground and form a continuation of and add stability to the ladder. In the bearings 75 a shaft 81 is journaled, the same terminating at opposite ends beyond the bearings in a pair of contrarily-disposed cranks 82.

Near its bearings the shaft is provided with ratchet-wheels 83, the teeth of which are engaged and the shaft prevented from retrograding by means of a pair of gravity-pawls 84.

5 Between the ratchet-wheels there is mounted fast upon the shaft a drum or roll 85. Upon the upper ends of the side bars a pair of standards 86 is secured, and in rear of them cable-guides 87. Similar standards and guides 88
10 and 89 are located at the upper ends of the sections B and C, and in the standards are mounted grooved pulleys 90, 91, and 92, the same being located in the standards of the sections A, B, and C, respectively.

15 A pair of cables 93 are secured at their upper ends to the lower ends of the side bars of the upper section D, pass rearwardly along the same, upwardly over the pulleys 92, through the guides 89, and connect to one of the rungs
20 of the main or lower section A, as at 94. A second pair of cables 95 are connected at their upper ends to the lower ends of the side bars of the ladder-section C, pass rearwardly over the same, over the pulleys 91 thereof, through
25 the guides 89, and are likewise secured to the rung of the main section.

A third pair of cables 96 are made fast to the lower ends of the side bars of the section B, are passed rearwardly and upwardly over
30 the pulleys 90, through the guides 87, and are connected to the drum 85.

97 designates platforms, which are normally carried when out of operation in keepers 98, secured to the side rails of the main section
35 A. Each platform is lined upon its under side with metal, as indicated at 99, and is provided at one end with an L-shaped recess 100. Eyes 101 are located two at the rear end and one at the front end, and in those at the rear
40 end a pair of chains 102, terminating in hooks 103, are located. These chains embrace the opposite side rails of the ladder-sections, and the hooks engage with the front edges thereof. A chain 104 is located in the rear eye of the
45 platform and terminates in a hook 105. When in position upon a ladder-section, the platform is designed to rest at its rear end upon a doorway or window-sill, whereby exit from the building at points below the upper end
50 of the ladder may be secured. When in operative position, the chain 104, together with its hook 105, is passed through the window and anchored to a bureau, bedstead, window-sill, or other convenient device.

55 In keepers 106, a pair of which is located upon one rung of each of the ladder-sections, with the exception of the uppermost, are mounted rotatably U-shaped locking-pins 107. When the ladder is distended, these pins are
60 rotated so as to engage the rungs of the adjacent section, and hence the severe strain is not entirely borne by the cable 93, but is supported by said pins, and should the cable part the ladder will not collapse.

65 The above being the construction, the operation of the apparatus is as follows: The apparatus being run to the place of conflagra-

tion, the coupling-pin 19 is withdrawn, so that the rear truck is disconnected from the front truck, after which the crank-shaft 76 is oper- 70
ated to incline the ladder and lock the rear wheels, as before described. The legs 42 are adjusted, the supports or braces 36 and 48 swung out to the front and rear of the truck, and the latter adjusted to the inclination of 75
the ladder. It now simply remains to operate the shaft 81 so as to distend the ladders, engaging the grappling-hooks at the upper ends of the same with a convenient window, cornice, or other object jutting from the face of 80
the building. The locking-pins are then thrown into a locking position and the platforms 97 employed or not, as the occasion may require. It will be noted that the sheet-metal linings of the ladder-sections preserve 85
the same, together with the occupants of the ladders, from scorching or burning and also from the excessive heat. After the conflagration it is simply necessary to raise the locking-pawls out of engagement with the ratchet- 90
wheels and permit the shaft 81 to relax the cables 93, 95, and 96, whereby the weight of the ladder-sections will cause the same to descend and the ladder collapse or telescope, whereby it may be readily swung to a hori- 95
zontal position and the supports swung up to their positions. The platform 22 over rear truck may be occupied by two men during the travel of the apparatus to and from the point of use. 100

It will be understood in instances where there are more than three ladder-sections the cables for operating the remaining sections will be of sufficient length to permit them to distend, and when, therefore, they are nested 105
such cables will be slack.

Having described my invention, what I claim is—

1. In an apparatus of the class described, the combination, with a rear truck and a 110
hinged main ladder-section, of a brake-bar yieldingly supported out of contact with the rear wheels of the truck, a shaft journaled in the main ladder-section, a drum mounted thereon, means for locking the same and for 115
rotating the shaft, and cables extending from the drum to the brake-bar, substantially as specified.

2. In an apparatus of the class described, the combination, with the rear truck com- 120
prising the bolster having an opening, an axle, and ground-wheels, of a bar mounted for reciprocation in the opening, a brake-bar mounted thereon and terminating in shoes for operating on the wheels, rods extending from 125
the bolster through the brake-bar, springs mounted on the rods and interposed between the brake-bar and bolster, a ladder-section hinged to the truck, a drum journaled in the ladder-section, means for operating the drum, 130
and a cable connected at its center to the drum, having its terminals passed through the opening in the bolster and connected with the brake-bar, substantially as specified.

3. In an apparatus of the class described, the combination, with the rear truck and a ladder-section hinged to the front edge of the same, of the braces 36, loosely connected to the front of the truck and terminating in anchoring-points, substantially as specified.

4. In an apparatus of the class described, the combination, with the rear truck and hinged ladder-section, of the inclined braces 36, loosely connected, as at 37, to the front of the truck and terminating in the points 38, the hooks extending from the opposite sides of the ladder-section, and the brace-supporting chains connected to the hooks, adapted to be passed around the braces, and removably connected with the hooks, substantially as specified.

5. In an apparatus of the class described, a series of ladder-sections telescopically connected, in combination with pulleys mounted upon the upper ends of the sections, a drum mounted for rotation in the lower section, cables leading from the lower end of the second

section, passing over the pulleys of the first section, and connected to the windlass, and cables connected to the lower end of each section above the second and passing over the pulleys at the upper ends of the next adjacent section below and secured fixedly to the first section, substantially as specified.

6. The combination, with the ladder, of the platform 97, having the recess 100 at one corner, adapted to receive a side rail of the ladder, the short chain at the inner end of the recess, the long chain at the inner opposite end of the platform, and the chain 104 at the outer end of the platform, the said chains terminating in hooks, substantially as specified.

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

JOHN McQUILLAN.

Witnesses:

JOHN RAPP,

LEWIS J. GREGSON.