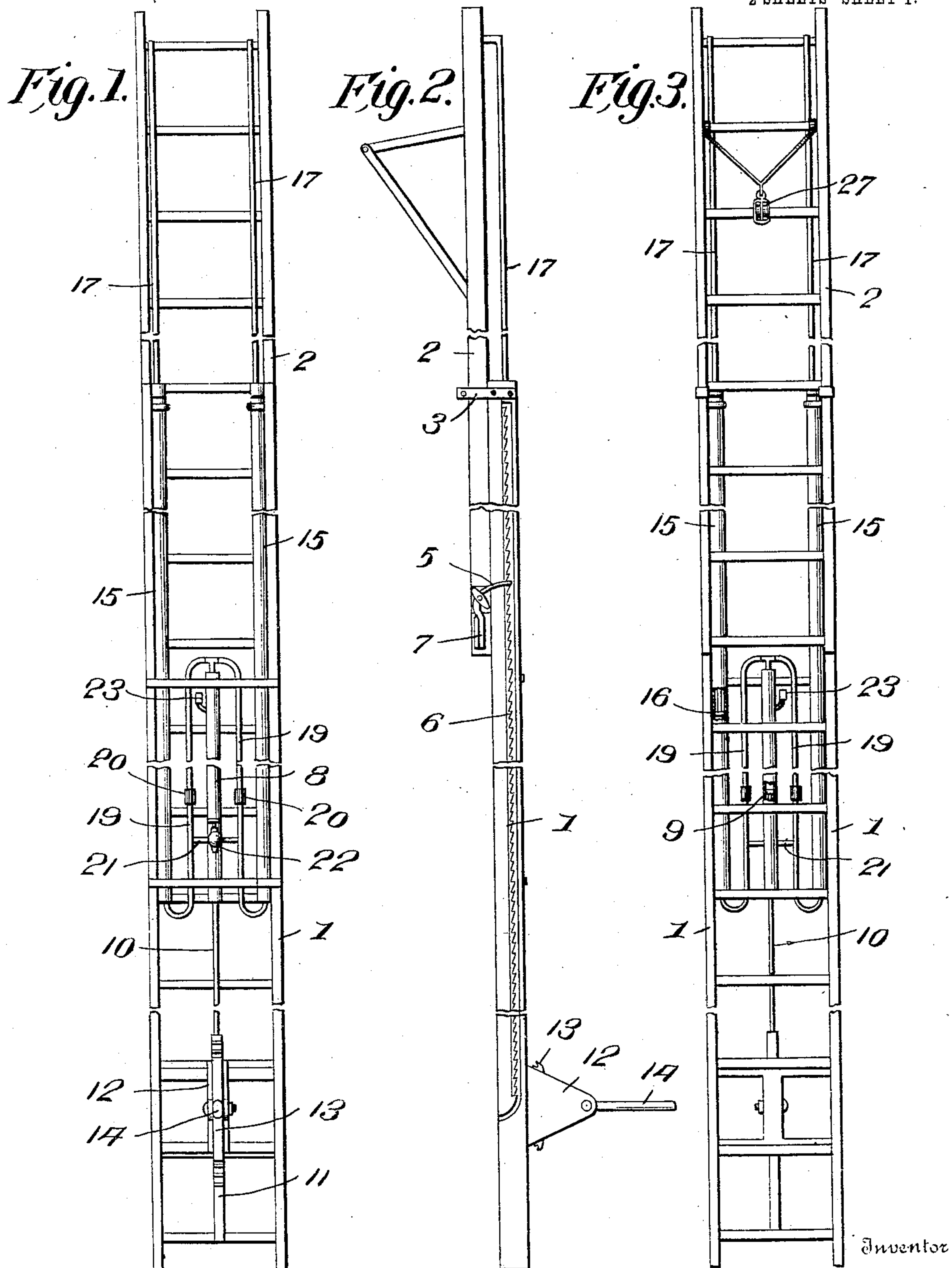


No. 862,971.

PATENTED AUG. 13, 1907.

S. C. JOHNSTON.  
EXTENSION LADDER.  
APPLICATION FILED SEPT. 1, 1906.

2 SHEETS—SHEET 1.



Inventor

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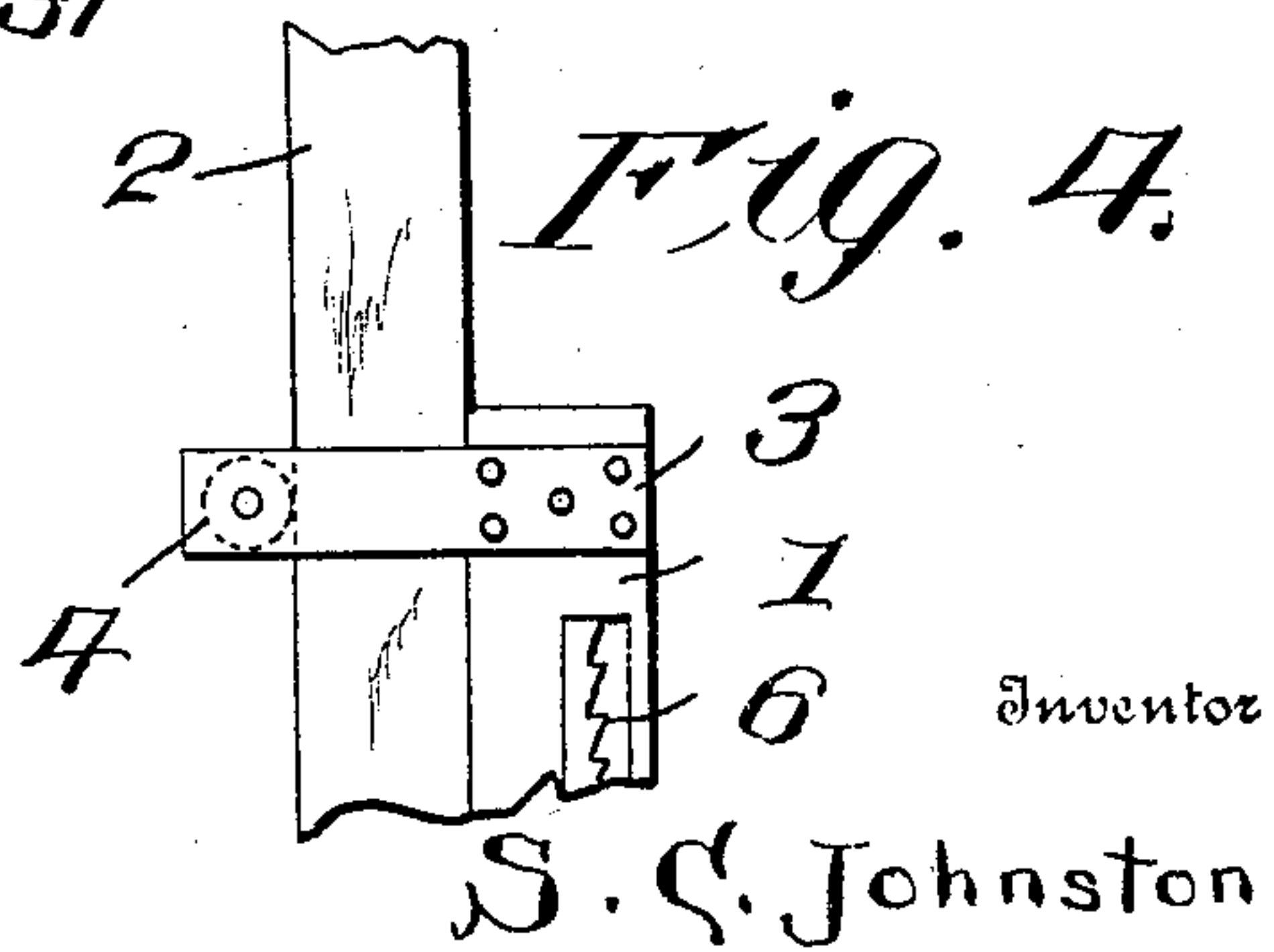
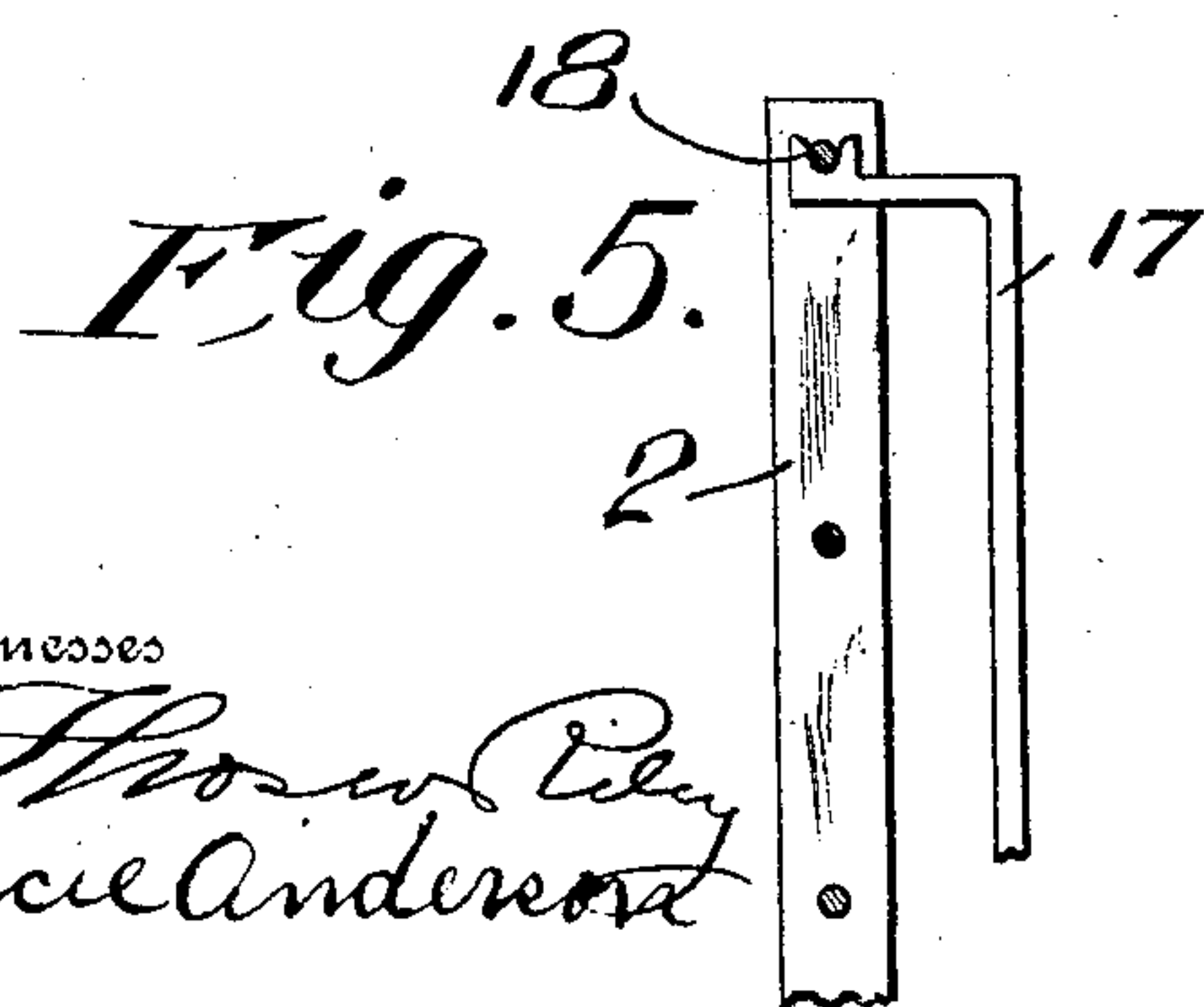
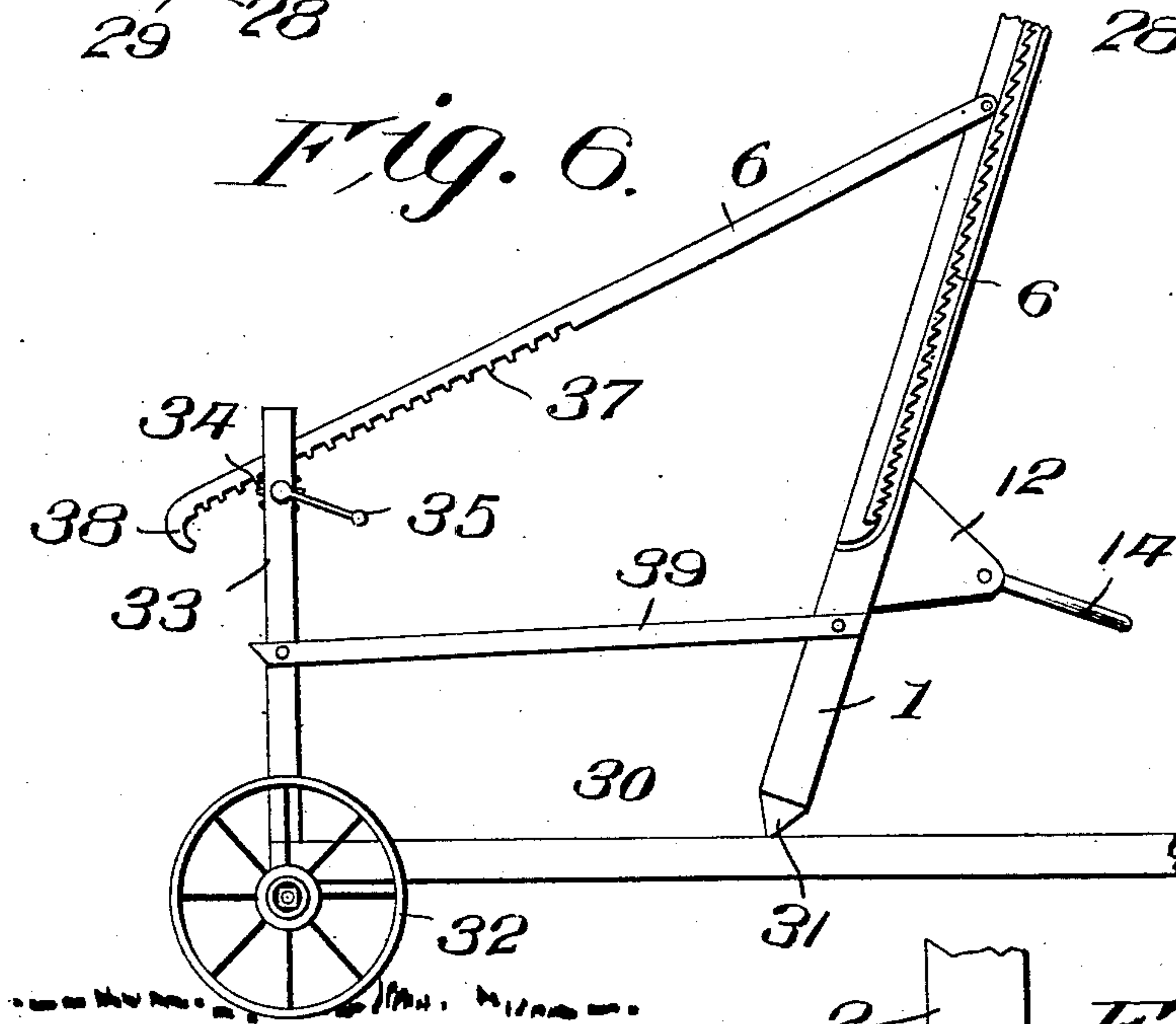
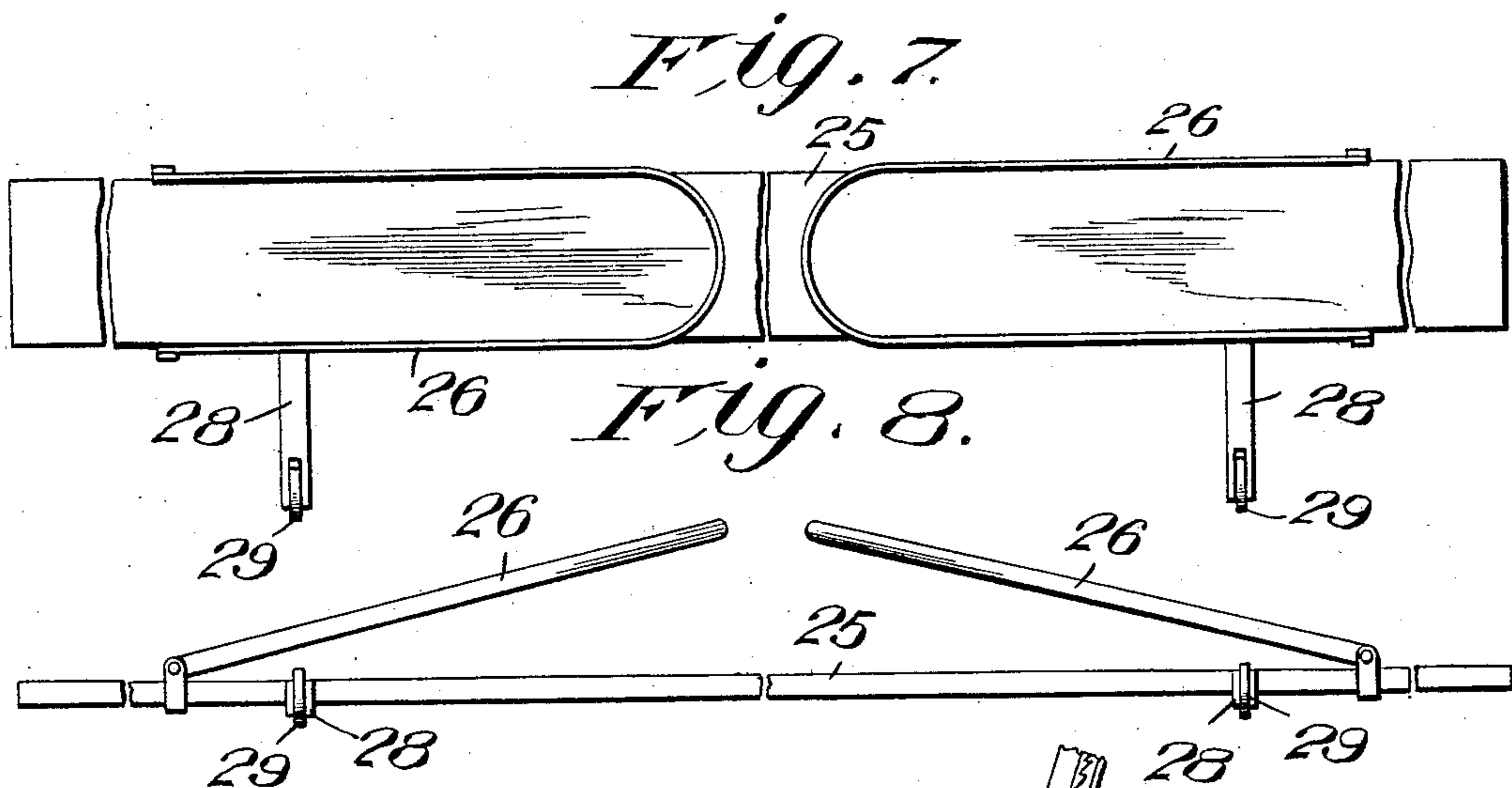
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2 SHEETS—SHEET 2.



Witnesses

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# UNITED STATES PATENT OFFICE.

SAMUEL C. JOHNSTON, OF SALEM, OHIO.

## EXTENSION-LADDER.

No. 862,971.

Specification of Letters Patent.

Patented Aug. 13, 1907.

Application filed September 1, 1906. Serial No. 332,931.

*To all whom it may concern:*

Be it known that I, SAMUEL C. JOHNSTON, a citizen of the United States, residing at Salem, in the county of Columbiana and State of Ohio, have invented certain new and useful Improvements in Extension-Ladders; 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.

10 My invention relates to new and useful improvements in extension ladders and more particularly to that class adapted to be used by painters, carpenters or in the fire department and my object is to provide means for extending the ladder by air pressure.

15 A further object is to provide means for releasing the pressure of air whereby the extended portion of the ladder will descend.

A further object is to provide means for holding the ladder in its extended position to prevent the same from accidentally descending.

20 A still further object is to provide suitable swings or scaffolding for the ladder whereby the same may be used for painting buildings or for use in any place where a scaffold is required.

25 Other objects and advantages will be hereinafter referred to and more particularly pointed out in the claims.

In the accompanying drawings which are made a part of this application, Figure 1 is an elevation of my improved ladder showing the same partially extended. Fig. 2 is a side elevation thereof. Fig. 3 is an elevation of the opposite side of the ladder from that shown in Fig. 1 of the drawings. Fig. 4 is a detail elevation of the upper end of the stationary ladder showing the manner of telescopically securing the movable ladder thereto. Fig. 5 is a detail sectional view of the upper end of the movable ladder. Fig. 6 is a detail view of the lower end of the stationary ladder showing the manner of mounting the same upon a truck. Fig. 7 is a top plan view of a swing of that class principally used by painters, and Fig. 8 is an edge elevation thereof.

Referring to the drawings in which similar reference numerals designate corresponding parts throughout the several views, 1 indicates the stationary ladder, and 2 the movable ladder which is adapted to be telescopically mounted upon the stationary ladder.

30 Secured to the upper ends of the side rails of the stationary ladder 1 are clips 3 in each of which is rotatably mounted rollers 4, the side rails of the movable ladder 2 being disposed between one edge of the side rails of the stationary ladder 1 and the rollers 4 thereby securely holding the movable ladder in position upon the stationary ladder and it will be seen that by providing the rollers that the movable ladder will be prevented from binding and will freely move upwardly or downwardly when desired.

The lower end of the movable ladder 2 is held into operative relation with the stationary ladder 1 by means of a latch 5, said latch being pivotally secured to the lower end of the movable ladder and having one of its ends disposed into engagement with a suitable rack 6 in the outer face of the side rails of the stationary ladder 1, while the opposite end thereof is provided with a weight 7 so that the latch will be normally held into engagement with the rack 6. The rack is so constructed that the movable ladder can be readily extended but as the weight normally holds the latch into engagement with the rack the movable ladder is prevented from casually descending by the latch engaging the rack.

70 The ladder 2 is adapted to be elevated through the medium of a compression pump 8 which is mounted in any suitable manner upon the stationary ladder and is provided with a piston 9 which is operatively secured to a piston rod 10 which extends downwardly from the compression pump 8 and is provided at its lower end with a rack 11. Mounted between ears 12 secured to the ladder 1 is a segmental pinion 13 which is adapted to mesh with the teeth upon the rack 11 so that when the pinion 13 is operated the piston 9 will direct air into the compression pump 8. The pinion 13 is operated through the medium of a handle 14 and by oscillating the handle the piston 9 is moved back and forth in the compression pump 8.

85 Secured to the inner face of each of the side rails of the stationary ladder 1 is a compression chamber 15 which is provided with a suitable piston 16 carried by the lower end of a rod 17, said rod having its upper end directed inwardly and provided with a seat 18 in which is adapted to take one of the rungs of the movable ladder 2 and by this construction it will be seen that when air is directed into compression chambers 15 that the pistons 16 will be directed to the upper end thereof thereby elevating the ladder through the medium of the rods 17, the compression chambers 15 being connected to the compression pump 8 through suitable tubes 19, each of said tubes being provided with a check valve 20 so that after the air has been forced into the compression chamber it cannot escape therefrom.

100 The tubes 19 are connected together at a point below the check valves 20 through the medium of an auxiliary tube 21 which is in turn provided with a cock 22 so that when it is desired to lower the movable ladder said cock may be opened and the air allowed to escape from the compression chambers 15.

The compression pump 8 is provided near its upper end with an inlet valve 23 through which the air enters the compression pump.

110 In operation when it is desired to elevate the movable ladder the handle 14 is moved upwardly and downwardly thereby forcing air into the compression



chambers 15 through the medium of the compression pump 8, the force of the air directing the pistons 16 toward the upper end of the compression chambers 15 thereby elevating the movable ladder through the medium of the rods 17, the handle 14 being operated until the movable ladder has been extended the proper distance where it will be held in its elevated position by means of the latch 5 engaging the rack 6, it being understood that the latch will pass from notch to notch on the rack as the movable ladder ascends so that it is always in readiness to engage the rack to prevent the movable ladder from casually descending. As soon as it is desired to lower the movable ladder the cock 22 is opened thereby allowing the air to escape from the compression chambers 15 and by swinging the weighted end 7 of the latch 5 upwardly the latch proper will be disengaged from the rack 6 whereupon the ladder will descend.

In Fig. 2 of the drawings I have shown the ladder 2 as provided with a suitable bracket 24 upon which is adapted to be placed suitable scaffolding when desired, while in Figs. 7 and 8 I have shown a swing 25 which is adapted more particularly to be used by painters and in using the same two ladders are employed and the bails 26 are secured to a suitable block 27 carried by the movable ladder 2 through the medium of any preferred form of cable (not shown), the ladders in this instance being employed to support the swing instead of attaching the blocks to the gable or other preferred point upon the building. The swing 25 is provided upon one edge with arms 28 to the outer ends of which are secured rollers 29 which are adapted to contact with the side of the building and hold the swing steady and a proper distance therefrom.

In Fig. 6 of the drawings I have shown the ladder mounted upon a frame 30, the lower ends of the side rails of the ladder 1 being preferably pointed as at 31 and adapted to rest upon the frame. The frame 30 is provided with suitable supporting wheels 32 and disposed upon the frame 30 are standards 33 between the upper ends of which is secured a pinion 34 which is operated through the medium of a crank 35.

Pivotaly secured at one end to the stationary ladder 1 is a lever 36 which is provided on a portion of its lower edge with a plurality of teeth 37 which is adapted to engage the pinion 34 so that when the pinion is rotated the pitch of the ladder may be readily changed or regulated, the free end of the lever 36 being directed downwardly to form a stop 38 so that the lever 36 cannot be casually moved entirely out of engagement with the pinion 34.

A brace 39 is pivotaly secured to the lower end of the ladder 1, while the opposite end thereof is pivotaly secured to the standards 33 so that the base of the lad-

der will be held against slipping when the pitch of the ladder is being regulated. The brace also serves to hold the ladder permanently in position upon the frame.

By this construction it will be seen that the ladder may be readily transported from place to place and that the same may be quickly placed into operation, the form of ladder shown in Fig. 6 being adapted more particularly to be used in connection with fire apparatus, while the ladder shown in the other views is adapted more particularly to be employed for general use.

What I claim is:

1. A ladder of the class described comprising a stationary ladder, a movable ladder telescopically mounted thereon, a compression pump mounted upon the stationary ladder, a piston therefor, means on the stationary ladder for operating said piston, compression chambers on the stationary ladder, pistons therefor having lateral portions engaged beneath a rung of the movable ladder, and tubes connecting said pump and compression chambers.

2. A ladder of the class described comprising a stationary ladder, a movable ladder telescopically mounted thereon, a compression pump mounted upon the stationary ladder, a piston therefor, means on the stationary ladder for operating said piston, compression chambers on the stationary ladder, pistons therefor having lateral portions engaged beneath a rung of the movable ladder, tubes connecting said pump and compression chambers, a check valve in each of said tubes, an auxiliary tube connecting said tubes below the valves, and a cock in said auxiliary tube.

3. The combination with a stationary ladder, and a movable ladder mounted thereon, of a compression air pump on the stationary ladder, a piston therefor, means for operating said piston, compression chambers on the inner faces of the side rails of the stationary ladder, tubes connecting said pump and chambers, check valves in said tube, and pistons working in said chambers and having rods the upper ends of which are directed inwardly and provided with seats engaging one of the rungs of the movable ladder.

4. The combination with a stationary ladder, and a movable ladder mounted thereon, of a compression air pump on the stationary ladder, a piston therefor, means for operating said piston, compression chambers on the inner faces of the side rails of the stationary ladder, tubes connecting said pump and chambers, check valves in said tube, pistons working in said chambers and having rods the upper ends of which are directed inwardly and provided with seats engaging one of the rungs of the movable ladder, clips at the upper end of the stationary ladder embracing the movable ladder, rollers in said clips and bearing against the movable ladder, and means on the lower end of the movable ladder for engagement with means on the stationary ladder for holding the same together and preventing accidental lowering of the movable ladder.

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

SAMUEL C. JOHNSTON.

Witnesses:

C. A. WHITE,  
JABEZ WIDDUP.