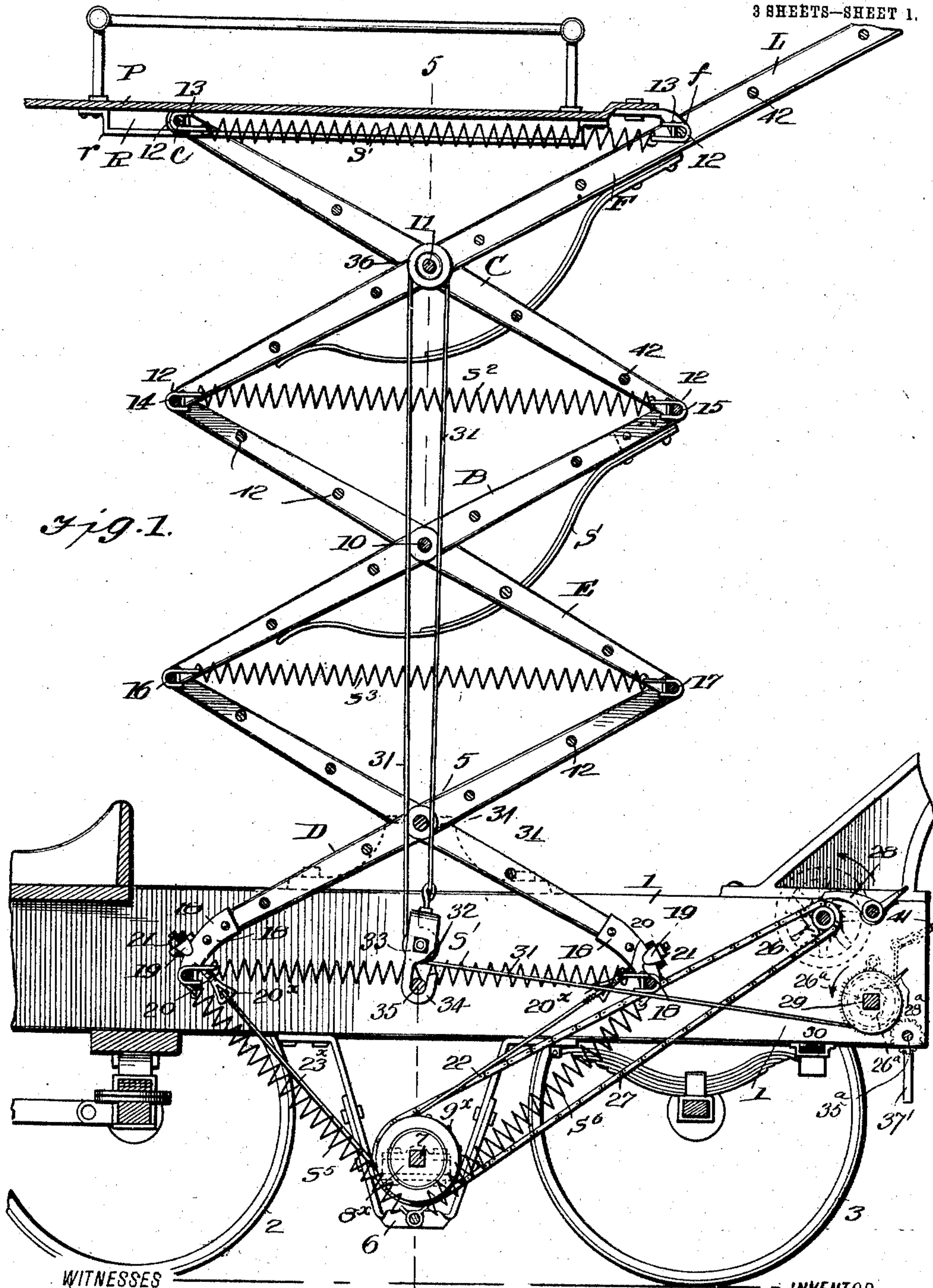


J. DUPUIS.
EXTENSION FIRE LADDER.
APPLICATION FILED FEB. 15, 1910.

967,116.

Patented Aug. 9, 1910.

3 SHEETS—SHEET 1.



WITNESSES

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— INVENTOR

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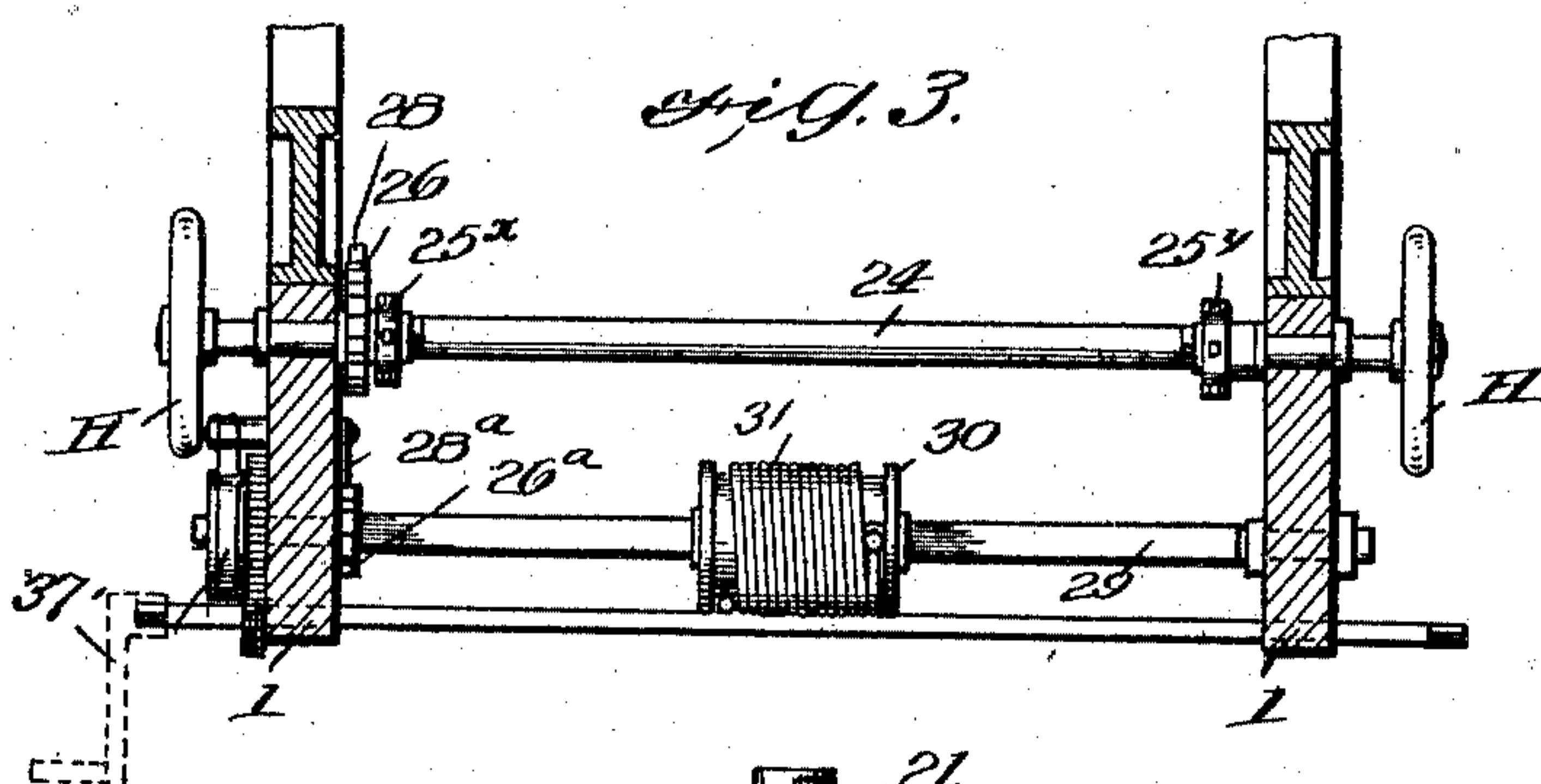
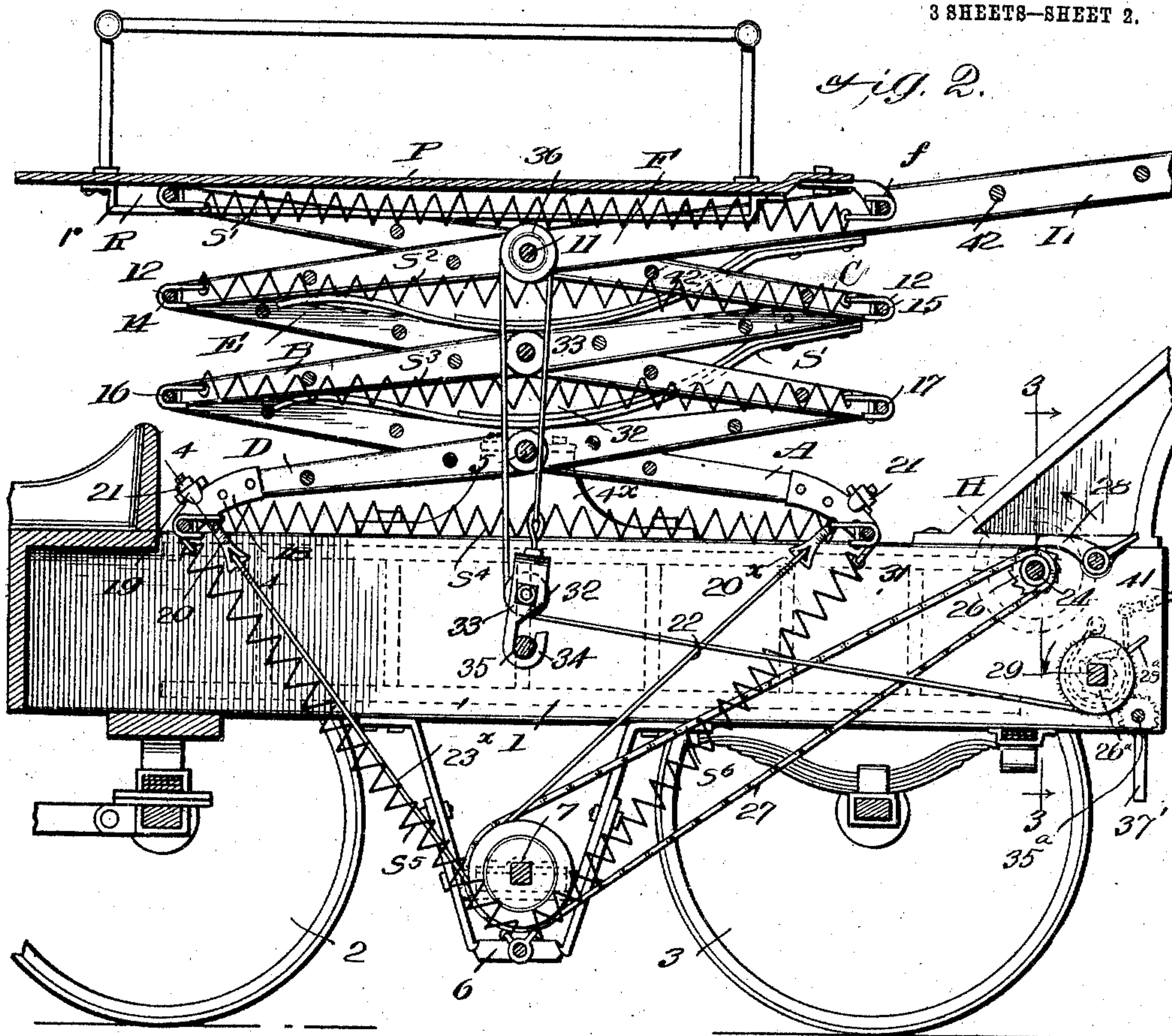
ATTORNEYS

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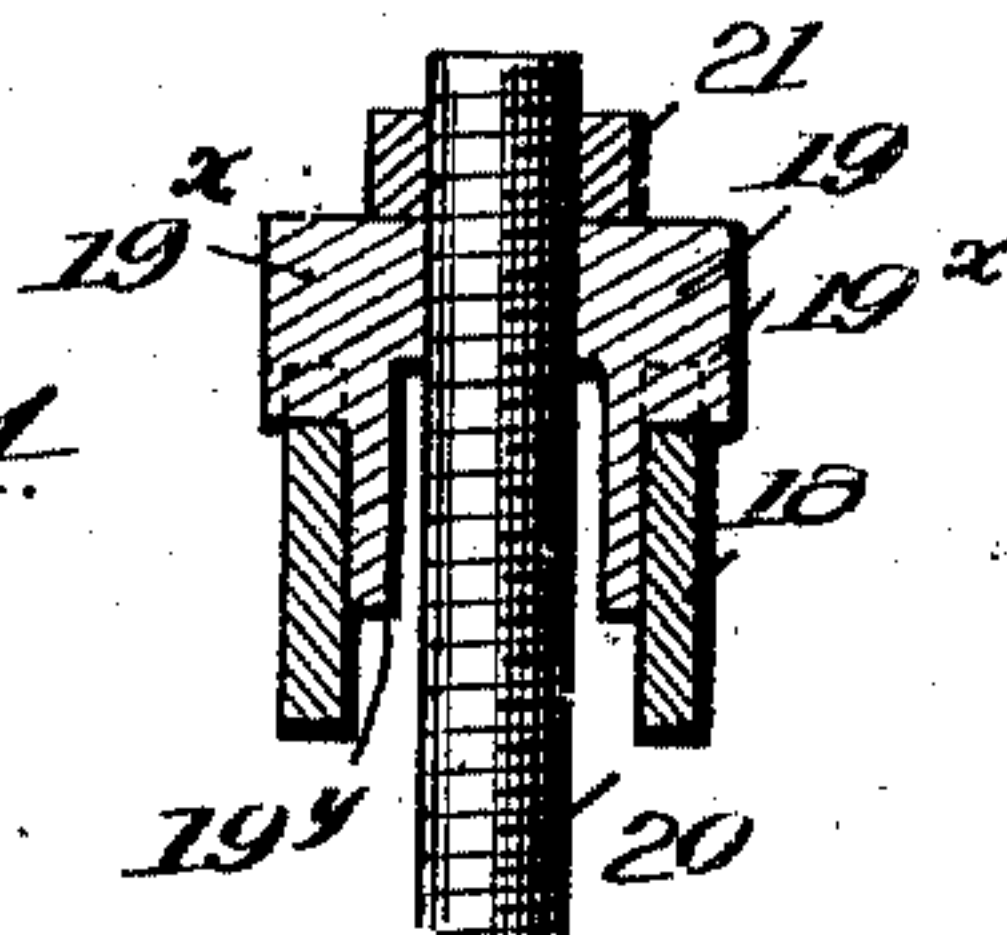
Patented Aug. 9, 1910.

3 SHEETS—SHEET 2.



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Fig. 4.



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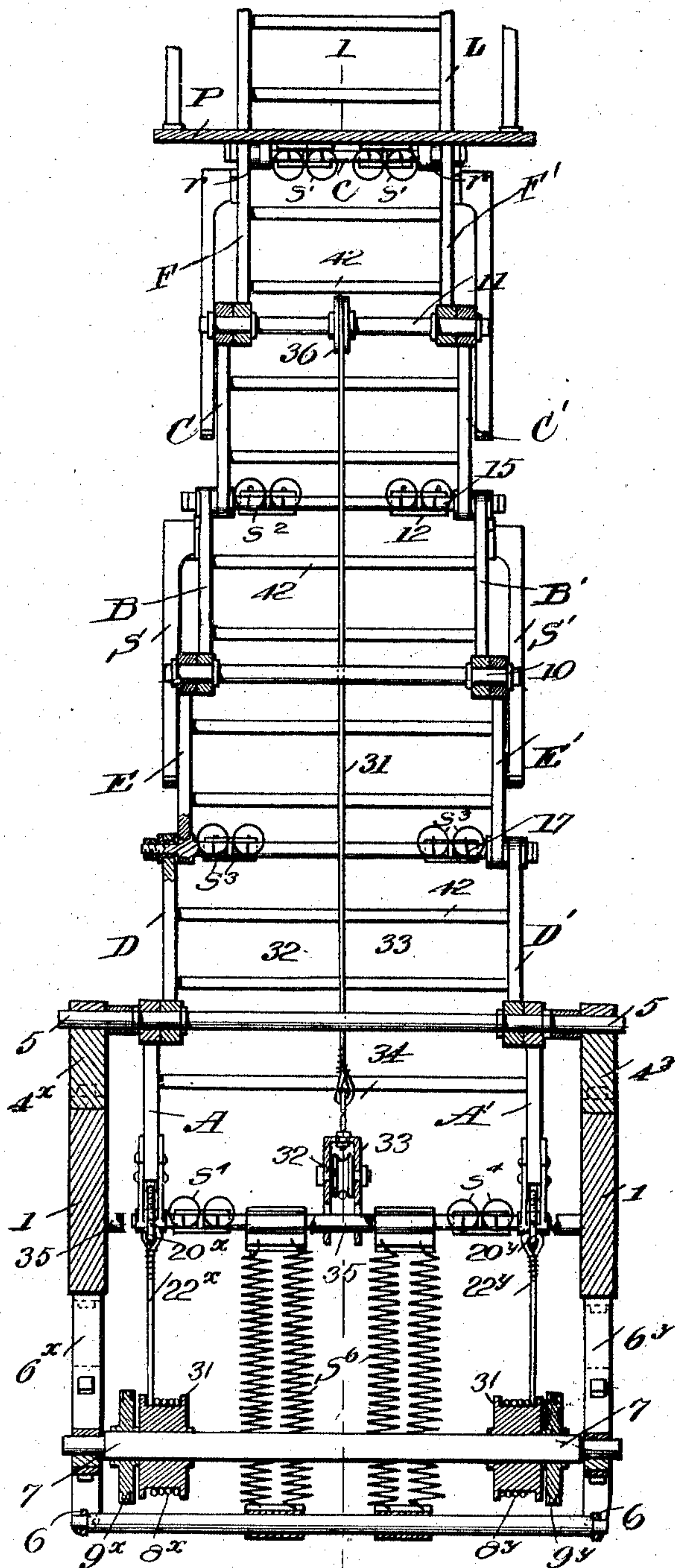
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3 SHEETS—SHEET 3.

Fig. 5.



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UNITED STATES PATENT OFFICE.

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EXTENSION FIRE-LADDER.

967,116.

Specification of Letters Patent.

Patented Aug. 9, 1910.

Application filed February 15, 1910. Serial No. 544,102.

To all whom it may concern:

Be it known that I, JOSEPH DUPUIS, a citizen of the United States, and resident of Fall River, in the county of Bristol and State of Massachusetts, have invented certain new and useful Improvements in Extension Fire-Ladders, of which the following is a specification.

My invention relates to emergency ladders for use especially as fire apparatus, and it consists in the combinations, constructions and arrangements herein described and claimed.

An object of my invention is to provide an extension ladder which may be more easily and more quickly raised to position than other ladders of a similar type, owing to the use of a series of springs, which, when the apparatus is in its normal position of disuse, are under great tension.

A further object of my invention is to provide a ladder having a receiving platform upon which a number of persons may assemble and afterward be lowered to the ground, the platform in the meanwhile remaining in a horizontal position.

A further object of my invention is to provide auxiliary means for raising the ladder in addition to the springs mentioned above, means for lowering the ladder, and means for locking the ladder both in its operative and inoperative positions.

Further objects and advantages will appear in the following specification and the novel features of the device will be particularly pointed out in the appended claim.

My invention is illustrated in the accompanying drawings, in which similar reference characters indicate like parts in the several views, and in which—

Figure 1 is a central section through the device along the line 1—1 of Fig. 5, showing the ladder in its extended position, Fig. 2 is a similar view showing the ladder in its closed position, Fig. 3 is a detail section along the line 3—3 of Fig. 2, Fig. 4 is a detail section along the line 4—4 of Fig. 2, and Fig. 5 is a central section along the line 5—5 of Fig. 1.

In carrying out my invention I make use of the box 1 of a wagon which is provided with the usual front and rear wheels 2 and 3 respectively. On the sides of the wagon, midway of the device, are mounted the supports 4^x and 4^y which carry the main sup-

porting shaft 5, as shown in Figs. 1, 2, and 5. Underneath the wagon box are secured the adjustable hangers 6^x and 6^y. Journaled in suitable bearings carried by these hangers is a shaft 7 which bears the drums 8^x and 8^y and their adjacent sprocket wheels 9^x and 9^y, respectively. The ladder proper consists of a series of pivoted arms formed in the manner of lazy tongs. There is a series of these arms on each side, and they are joined by pivot bars.

Referring now to Fig. 1 it will be seen that on one side of the wagon box is a series of pivoted arms A, B and C, the arm A being pivoted on the rod 5, the arm B on the rod 10, and the arm C on the rod 11. A second series of rods is provided to complete the lazy tongs, these rods being shown at D, E and F, which are pivoted on the rods 5, 10 and 11, respectively. It will be noticed that the arm B is on the inside of the arm A while the arm C is on the inside of the arm B. The arms E and F are similarly disposed, this having the effect of making the ladder narrow toward the top and hence more stable, as shown in Fig. 5. On the opposite side are the similarly disposed arms A', B', C', D', and F'. The arms F and F' are extended to form the ladder L. The platform P is rigidly secured to the arms F and F' at f. The arms C bear a rod c which slides in a run-way R, formed by a U-shaped retaining member r secured to the under portion of the platform P. The rod c is free to slide back and forth in this runway, as the ladder is raised and lowered. Between the rod c and the rod f are stretched the double spiral springs s' which are attached at their ends to the U-shaped hooks 12 which are prevented from coming off these rods by the pins 13. The pivot rods 14 and 15 of the arms E, F, and B, C, respectively, are connected by similar springs s² attached to similar hooks 12. The pivotal rods 16 and 17 are under the tension of the springs s³. Secured to the under side of the arms B' are the springs S and S'.

The lower ends of the arms A and D, and A' and D' are each provided with a member 18 having the recesses 18^x into which a head 19 projects. The head 19 is bored out to receive the threaded end of a bolt 20, and a nut 21 is provided which bears upon the head 19, as shown in Fig. 4.

From this figure it will be seen that the member 19 has laterally extending portions 19^x which register with the recess 18^x in the member 18 and inner guide portions 19^y which guide the head 19 in its movement. Each bolt 20 is provided with an eye 20^x to which a cable is attached. The cables 22^x and 22^y extend from the ends of the respective arms A and A' to the respective drums 8^x and 8^y as shown in Fig. 5, while a cable 23^x and a similar cable 23^y (not shown) also extend from their respective arms D and D' to the respective drums 8^x and 8^y. It will thus be seen that when the drums 8^x and 8^y are rotated, the cables 22^x and 22^y, and 23^x and 23^y are played out or wound up according to the direction in which the drums are turned.

The means for turning the drums is shown in Figs. 1, 2, and 3. This consists of a hand wheel H (see Fig. 3) which is mounted on a shaft 24 bearing the sprockets 25^x and 25^y and the ratchet wheel 26. The sprocket chain 27 connects the sprocket 9^x with the sprocket 25^x, while a similar sprocket chain (not shown) connects the sprocket 9^y with the sprocket 25^y. A pawl 28 mounted on the frame, co-acts with the teeth of the ratchet 26 to hold the shaft 24 in position. Rotatably mounted on the wagon box 1 is a shaft 29 bearing a drum 30 around which is wound a cable 31. This cable passes under the pulley 32 carried by a pulley block 33, the latter having a hook 34 arranged to engage the rod 35. The cable then passes upwardly around the pulley 36 on the rod 11 and thence downwardly to the block 33 to which it is attached. The latter is hooked to the rod 35 as shown in the drawing. The drum 30 may be rotated by means of a handle 37 applied at the end of the shaft 35^a and may be kept in its rotated position by means of a band brake 40, the latter being operated by a handle 41 (see Figs. 1 and 3).

At the rear end of the wagon box is a rest, upon which the ladder L may be raised, when the device is in closed position as shown in Fig. 2. The arms on the opposite sides of the ladder thus formed are connected by means of the rungs 42, the rungs of the lower part forming braces for the pivoted arms, while those of the extension L form also steps of the ladder.

From the foregoing description of the various parts of the device, the operation thereof may be readily understood. The normal inoperative position is that shown in Fig. 2. In this position, the springs s', s² and s³ are stretched. In addition to these springs, there are the springs s⁴, s⁵, and s⁶, the spring s⁴ extending between the ends of the arms A and D, the spring s⁵ between the end of the arm D and the bot-

tom of the hanger 6, and the spring s⁶ extending between the end of the arm A and the hanger 6. When the ladder is to be elevated, the pawl 28^a which engages the ratchet on the shaft 29 is released and under the influence of the springs, the ladder rises. This action may be aided by turning the wheel H in the direction indicated by the arrow in Fig. 2, thereby winding up the cables 22 and 23. The pawl 28 engages the ratchet 26 so as to lock the ladder in any position to which it is extended. In order to regulate the movement of the ladder, the band brake 41 may be operated by means of the handle provided for that purpose. As the arms are extended, the rod c is drawn inwardly in the run-way R, but as the rod c and the rod f are always in the same horizontal plane, the platform P is maintained in a horizontal plane. The extension L of the ladder is inclined in the manner shown in Fig. 1 and may be run to a window or other portion of the burning building. The occupants may descend the ladder to the platform. In lowering the ladder, the pawl 28 is released and the handle 37 is turned so as to put the cable 31 under tension. This, it will be seen will result in the downward pulling of the ladder against the tension of the springs. As the lower ends of the arms A, A' and D and D' move upwardly, the head 19 moves in its socket 18^x so as to compensate for the change of direction, thereby giving a straight pull on the cables 22 and 23. In order to give an additional impetus to the start of the ladder, the spring S is provided which is compressed between the arms D and B, as shown in Fig. 2.

I am aware that other forms of the device based on the same general principles might be made, but I consider as my own all such modifications as fairly fall within the spirit and the scope of my invention.

I claim:

In an extension ladder, a support, a rod carried by said support, a pair of lazy tongs pivotally mounted on said rod, a plate secured to each of the lower members of said lazy tongs, said plate being provided with a recess, a head movably disposed in each of said recesses, said heads having a bore, a bolt disposed in the bore of each head and provided with a nut adapted to bear on the head, a pair of drums mounted upon said support, a cable secured to the respective bolts, the opposite end of said cable being wound around one of said drums, and means for rotating said drums.

JOSEPH DUPUIS.

Witnesses:

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IGNATIUS X. CUTTLE.