J. PINE.

Extension-Ladders.

No. 139,689. Patented June 10, 1873.

Fig: 1

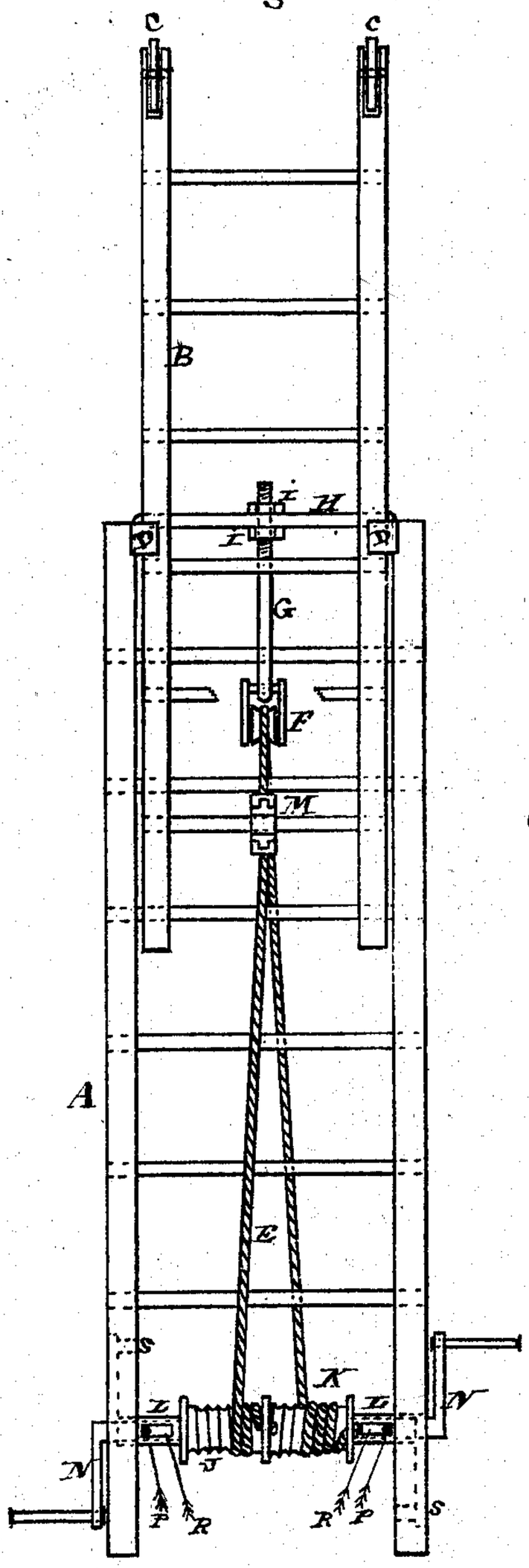


Fig: 2.

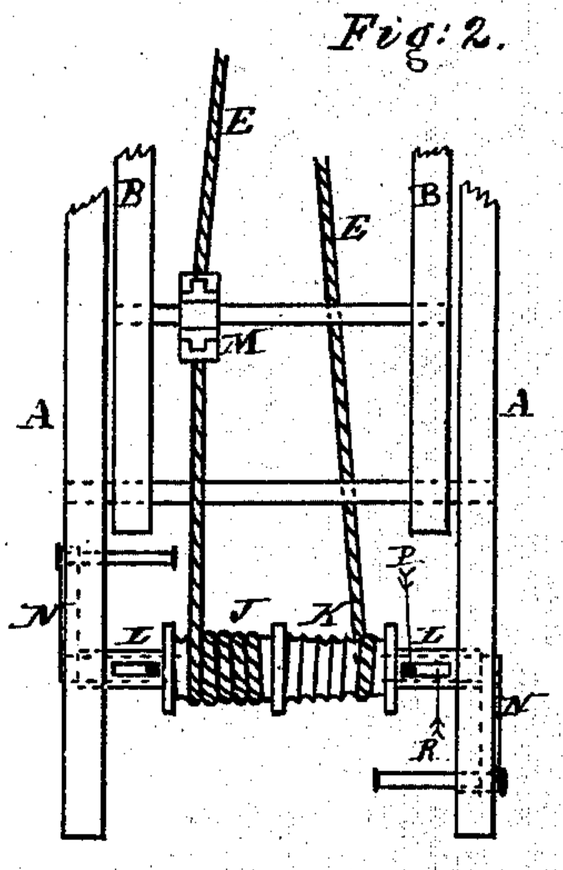
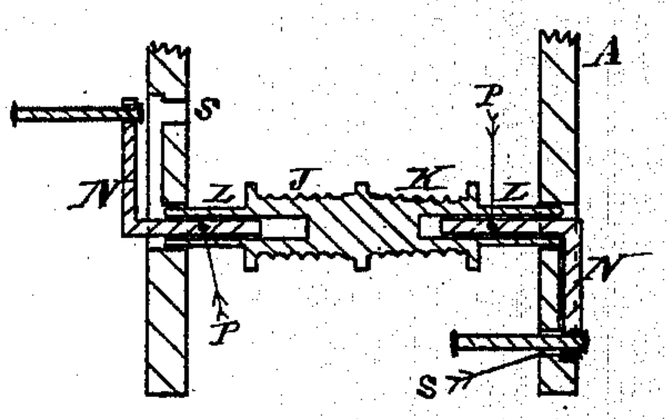


Fig: 3.



Witnesses.

Charles L. Barrett

R. Rawley

Inventor.

Joseph Pine

UNITED STATES PATENT OFFICE.

JOSEPH PINE, OF BROOKLYN, NEW YORK, ASSIGNOR TO EDWARD B. LEVERICH, OF SAME PLACE.

IMPROVEMENT IN EXTENSION-LADDERS.

Specification forming part of Letters Patent No. **139,689,** dated June 10, 1873; application filed April 4, 1873.

To all whom it may concern:

Be it known that I, JOSEPH PINE, of Brooklyn, Kings county and State of New York, have invented certain new and useful Improvements in Extension-Ladders; and I do hereby declare the following to be a full description of the same.

My invention relates specially to "firemen's ladders," where great length can be attained, combined with portability and convenience of handling at places of fires; and the nature of my invention consists, first, in combining, with the extension-ladder, and wire-rope, and carrying-pulley over which the wire-rope runs, a tightening rod or loop, whereby, by means of jam screw-nuts on the tightening-rod, the wire-rope may at all times be set up, to hold the extension-ladder firmly to its place on the main ladder; second, in the method of constructing the barrel or fusee upon which the wire-rope is wound to extend or contract the extension-ladder, with one-half of it, upon which the rope is wound to extend the ladder, of a gradually-increasing diameter, whereby the rope will be kept always taut, as its length increases as the ladder is extended; third, in the method of combining the cranks with the barrel or fusee by means of a hollow axle, whereby the bent ends of the cranks may be inserted into the axle, and, by means of pins passing through them, through slots in the hollow axle, held firmly to the barrel to rotate it as required, and when the ladder is not in use may be sheathed in the hollow axle, so as to be entirely concealed within the sides of the ladder, and thus not only be out of the way, but at the same time always to be found in their place when required. But to describe my invention more particularly I will refer to the accompanying drawings forming a part of this specification, the same letters of reference wherever they occur referring to like parts.

Figure 1 is a front view of the ladder partly extended. Fig. 2 is a representation of the foot of the ladder, showing the method of concealing or sheathing the cranks in the sides of the ladder and hollow axles of the barrel, so as to be out of the way when the ladder is put on the truck. Fig. 3 is a sectional view of the foot of the ladder, showing one of the cranks in the position for extending the supplemental ladder, and the other sheathed or concealed, as the method of securing it when the supplemental ladder has been drawn down.

Letter A represents the main ladder, and B the supplemental ladder, having in its upper ends friction-rollers C to facilitate its riding up against the side of a wall or building, and secured to the front side of the main ladder by clamps D, in such a manner as to admit of the supplemental ladder freely sliding up and down for the purposes of extension or contraction. This is effected by means of a wire-rope, E, running over a carrying-pulley, F, secured into the lower end of an adjustable extension-rod, G, attached to the upper end of the main ladder by means of a cross-head, H, and two jam screw-nuts, I, or other suitable means, whereby the rod may be securely and solidly held to support the supplemental ladder when extended, and at the same time be easily adjustable to tighten up the wire-rope, as it may expand or contract by the influence of the atmospheric changes of temperature and moisture, as well as the natural tendency to elongate by constant use. The ends of the wire-rope, after passing over the carrying-pulley, are then secured to a double or right-and-left grooved fusee or barrel, J and K, having a hollow axis, L, for the support of the barrel in suitable boxes in the lower ends of each of the side rails of the main ladder. The fusee K is made slightly tapering from the middle toward its outer end, while the fusee J is of uniform diameter. The object of this is to take up the slack of the wire-rope as it is lengthened by the extension of the supplemental ladder, and therefore keeps the wire-rope perfectly taut, and at the same time the supplemental ladder securely steady at the point of its elevation. For the elevation of the supplemental ladder a link-coupling, M, is secured to the lowermost round of the supplemental ladder, and the wire-rope from the fusee J attached thereto in a solid and permanent manner.

By this means it will be obvious that as the barrel is rotated from left to right the supplemental ladder will be extended, and when from right to left, will be contracted again, in

consequence of its attachment to the wire-rope by means of the coupling-link.

Letters N are the cranks for rotating the barrel or fusees on which the wire-rope is wound. The axes of these cranks are made to work or fit in cavities of the hollow axles of the wire-rope barrel, and are held in connection therewith by pins P, inserted in them through longitudinal slots R in the axles of the wire-rope barrel or fusee. The object of this method of attaching the cranks to the axles of the wire-rope barrel or fusee is, first, to secure the cranks permanently to the axles of the wire-rope barrel, and thus prevent the possibility of delay in using the ladder in the confusion and emergency of a fire, when the misplacement of a crank might jeopardize the lives and property of a whole household; second, to conceal or sheath the cranks when the ladder is not in use, as shown in Fig. 2, and thus be out of the way in handling the ladder. To accomplish this the handles of the cranks are made to slide in and out, and by means of recesses and holes S through the foot of the ladder the crank is concealed in the recesses, while the handles are inserted through the holes, and thus they are entirely out of the way, and yet when required for use are always ready. The cranks are secured to the hollow axles at half-stroke. The object of this is, first, to equalize the application of power to elevate the supplemental ladder; and, second, to facilitate the method of locking the ladder when extended. This is effected by inserting the handles of the cranks into the holes S at the required point of elevation of the supplemental ladder, and as each are at half-stroke, of course the two handles will be opposite to each other, and readily enter the holes in the rails of the main ladder to hold the supplemental ladder firmly in its elevated position.

Having now described my invention, I will proceed to set forth what I claim and desire to secure by Letters Patent of the United States:

1. In combination with the wire-rope and extension-ladder, as described, the adjustable extension-rod G, cross-head H, and carrying-pulley F, substantially as described.

2. In combination with the wire-rope of an extension-ladder, the right-and-left-grooved barrel or fusee J and K, when made as described, and for the purposes hereinbefore set forth.

3. The method of securing the cranks N to the right-and-left-grooved barrel or fusee, by means of a slotted hollow axis and detent-pin, all made and operating substantially as described.

4. The recesses and holes S in the lower ends of the main ladder, in combination with the cranks N and slotted hollow axis, all arranged and operating for the purposes hereinbefore set forth.

JOSEPH PINE.

Witnesses:
CHARLES L. BARRITT,
R. ROWLEY.