

(No Model.)

2 Sheets—Sheet 1.

M. BROCHU & L. LADRIÈRE.

EXTENSION LADDER.

No. 351,622.

Patented Oct. 26, 1886.

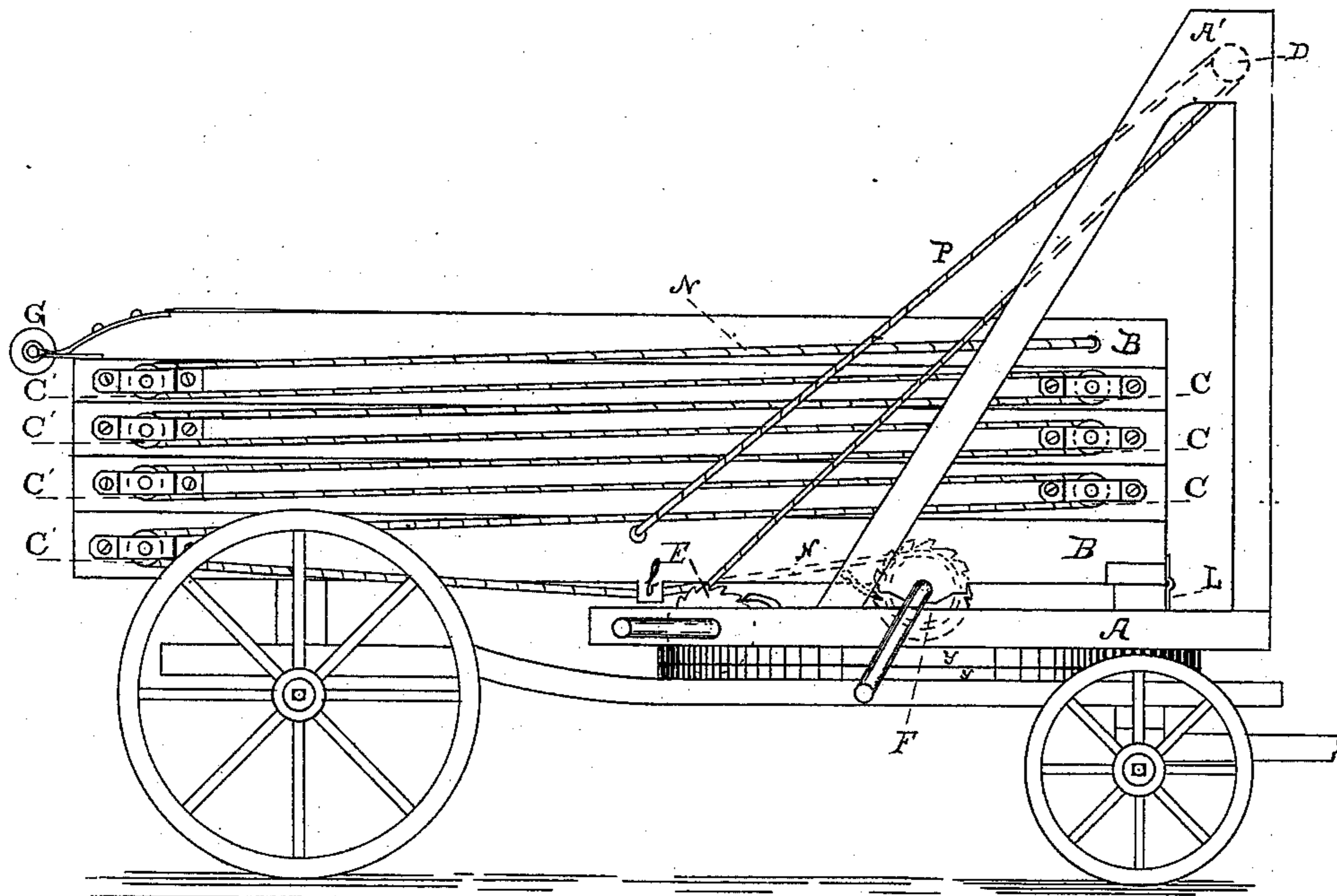


Fig. 1.

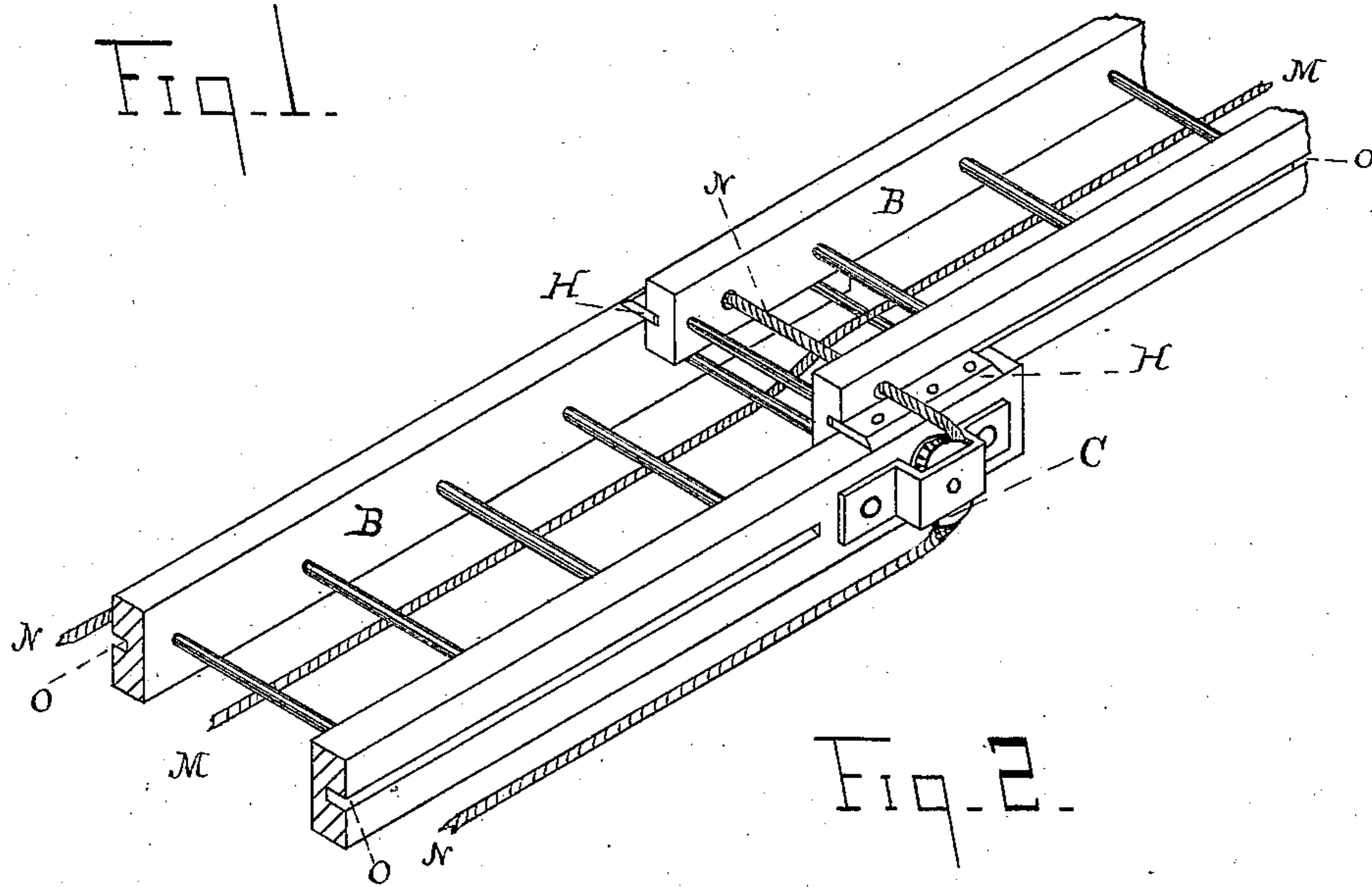


Fig. 2.

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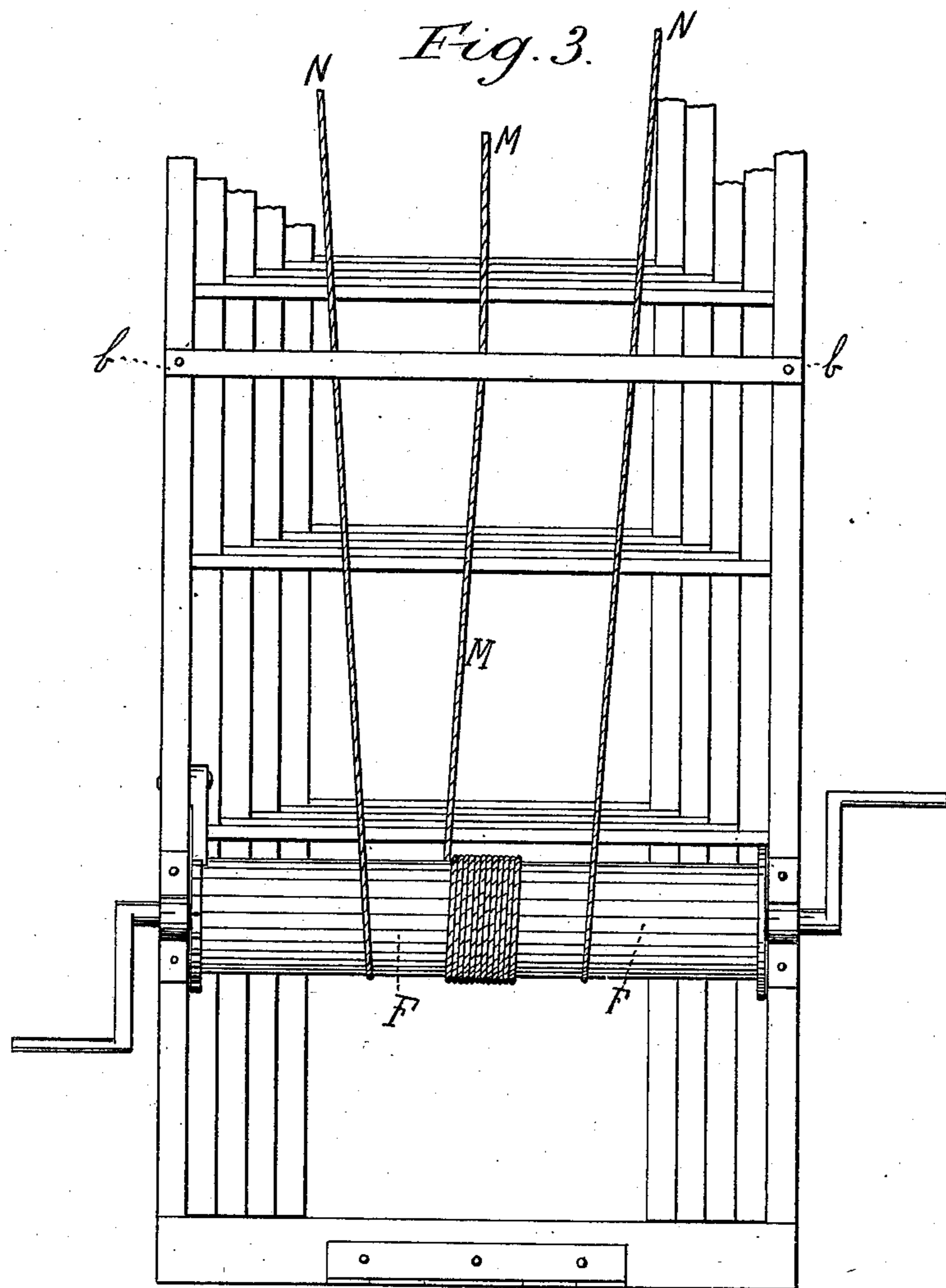
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Witnesses

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UNITED STATES PATENT OFFICE.

MICHAEL BROCHU AND LOUIS LADRIÈRE, OF GRAND RAPIDS, MICH.

EXTENSION-LADDER.

SPECIFICATION forming part of Letters Patent No. 351,622, dated October 26, 1886.

Application filed January 7, 1886. Serial No. 187,931. (No model.)

To all whom it may concern:

Be it known that we, MICHAEL BROCHU and LOUIS LADRIÈRE, both citizens of the United States, and residents of the city of Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Extension-Ladders, of which the following is a specification.

Our invention relates to extension-ladders designed to be used in scaling high walls, and particularly designed for use at fires; and its object is to construct ladders for that purpose in a cheaper, more efficient, and more convenient form than any now in use. This object is accomplished by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of our device closed and mounted upon a truck, and Fig. 2 is a perspective view of portions of the two upper sections of the ladder when opened. Fig. 3 represents the winch with the ropes wound upon it in opposite directions.

Similar letters refer to similar parts throughout the several views.

In the drawings, A is the frame upon which the ladder is mounted.

B is the ladder, composed, in the example shown, of five sections.

C C C are side pulleys near the bottoms of the sides of the second, third, and fourth sections, respectively; and C' C' C' C' are similar side pulleys near the tops of the first, second, third, and fourth sections, respectively.

D is a pulley attached to the inside of the top of the elevated part A' of the frame A.

G is a roller attached to the upper end of the side of the top section.

P is a rope or cable attached at one end to the winch indicated by E in Fig. 1, at the other end to a point in the first section of the ladder, as shown, and passing up and around the pulley D.

All the parts so far described are duplicated upon the other side of the ladder.

F is a winch operated by a crank in the usual manner, and held in position by a ratchet and pawl, as shown by the dotted lines. This winch extends across the frame, and upon the other end is a similar crank, ratchet, and pawl.

L is a hinge or other suitable device for enabling the ladder to be turned upon the frame A.

y and y are two circles of iron or steel, piv-

oted to each other at their center, the upper one rigidly attached to the frame A and revolving upon the lower one, which is firmly attached to the truck.

N is a rope, or for heavy ladders preferably a wire cable, which at its lower end is fastened to the drum of the winch F, passes through a hole in the cleat, the end of which is shown by b, which hole serves as a guide in winding the cable upon the drum, and then passes over the pulleys C' C' C' C' C' C', and is attached to the bottom of the top section of the ladder. Upon the other side is a similar rope or cable; or the one may pass through the top ladder and down on the other side, as shown in Fig. 2. These cables are attached to the drum near its ends, while at its center is attached so as to wind in the opposite direction a rope, M, for retracting the ladders. This rope M passes through a hole in the center of the cleat b, serving as a guide to keep it wound separately from N N.

On the outside of the side rails of each ladder-section except the lowest are cut grooves, as shown by O in Fig. 2, while to the upper surface of each side rail except those of the top section are attached flat metallic plates H H, which project inwardly from the side rails and slide in the grooves O O.

The operation of our invention is as follows: The ladder being closed in the position shown in Fig. 1, it is drawn on the truck to the place where it is desired to be used. By operating the winch E the entire ladder, still closed, is raised to any desirable angle, and held by the ratchet and pawl shown, or by any suitable mechanism. The entire frame A, and the ladder with it, is then turned upon the circles y y to any position that may be necessary to enable the ladder to rest squarely against the building or wall to be scaled. By then winding the elevating-rope N upon the barrel of the winch F the second and remaining sections are raised the entire length of the first section, the plates H H sliding in the grooves O O until the end of the groove is reached, as shown in Fig. 2. At the same time the retracting-rope M is unwound just as much as N is wound, and is always taut, so that the ladder is always under perfect control. As the winding of the rope N continues, the subsequent sections will be raised in the same manner as far as desired.

The upper end of the ladder, which rests against the wall, is provided with the rollers G, which permit the ladder to be raised without friction against the wall. The ladder is retracted by reversing the motion of the drum F, and is held at any point desired by the pawl and ratchet shown or by any suitable stop.

We are aware that extension-ladders are not new, and that they have been used in various forms; but we are not aware of any device operating as simply and effectively as ours. By our arrangement of the ropes, pulleys, and winches the entire width of the ladder is preserved for use, and the ladder is at all times under perfect control. In the drawings we have shown a ladder having five sections, and we think this number the most practicable for general use; but the number may be increased or diminished, if desired.

Having thus described our invention, what we claim to have invented, and desire to secure by Letters Patent, is—

1. In an extension-ladder, the combination

of the several sections of the ladder with each other and with the rope or cable N, for elevating the ladder, and the rope M, for retracting the same, both ropes wound in opposite directions upon and operated by the winch F, so that turning the winch in one way will elevate and in the other way will retract the ladder, substantially as described.

2. In an extension-ladder, the combination of the ladder, the winch F, the cables M and N, and the cleat b, said cleat having near its ends holes through which the cables N pass, and near its center a hole for the rope M, said holes serving as guides to keep the cables N and M wound separately and upon the proper portions of the winch F, substantially as described.

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