

(No Model.)

2 Sheets—Sheet 1.

R. BITHORN.  
SLIDING LADDER.

No. 475,287.

Patented May 17, 1892.

Fig. 5.

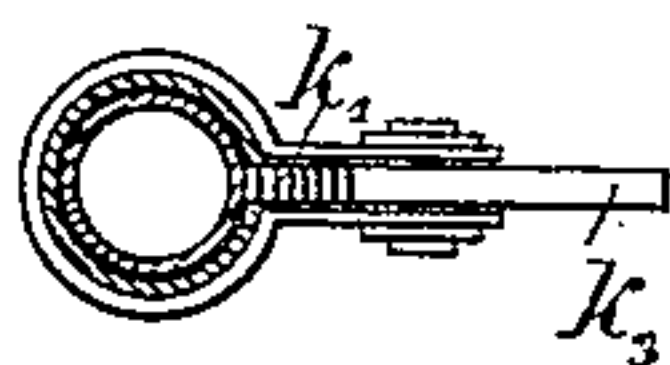


Fig. 3.

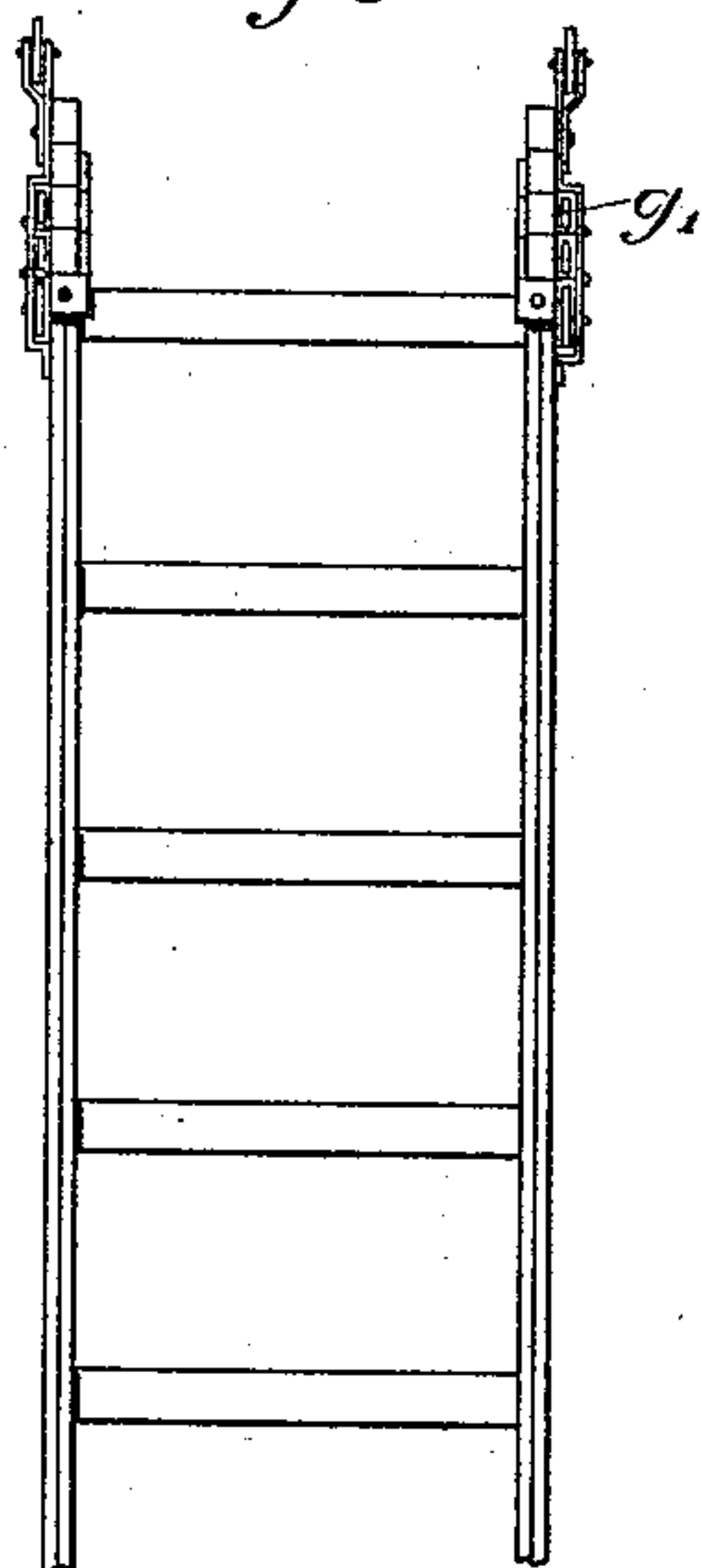


Fig. 1.

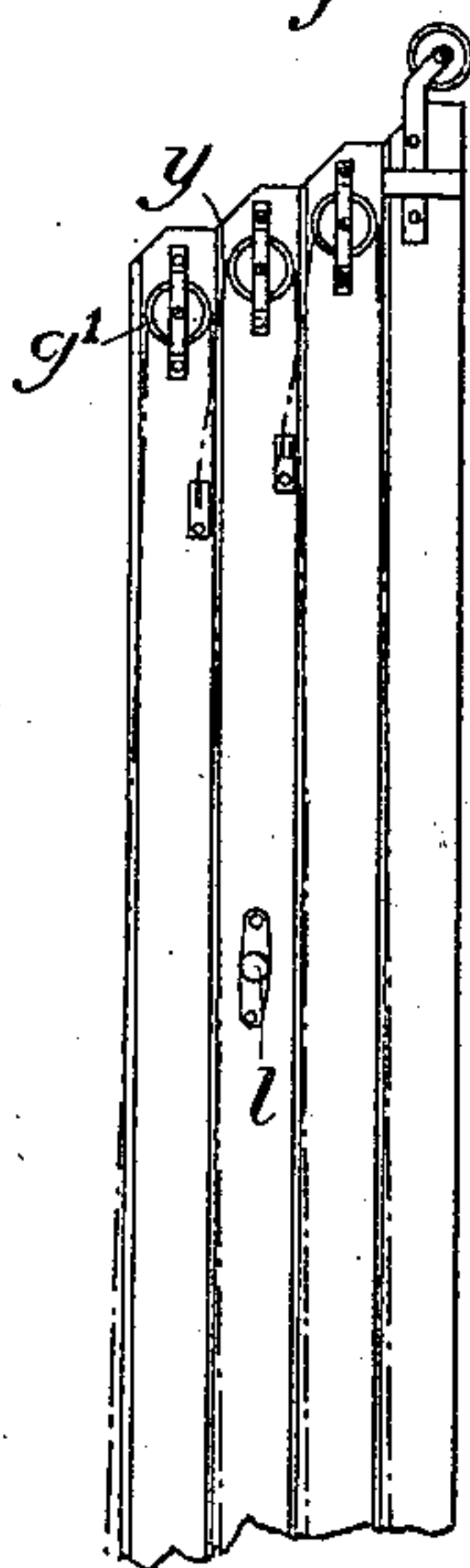
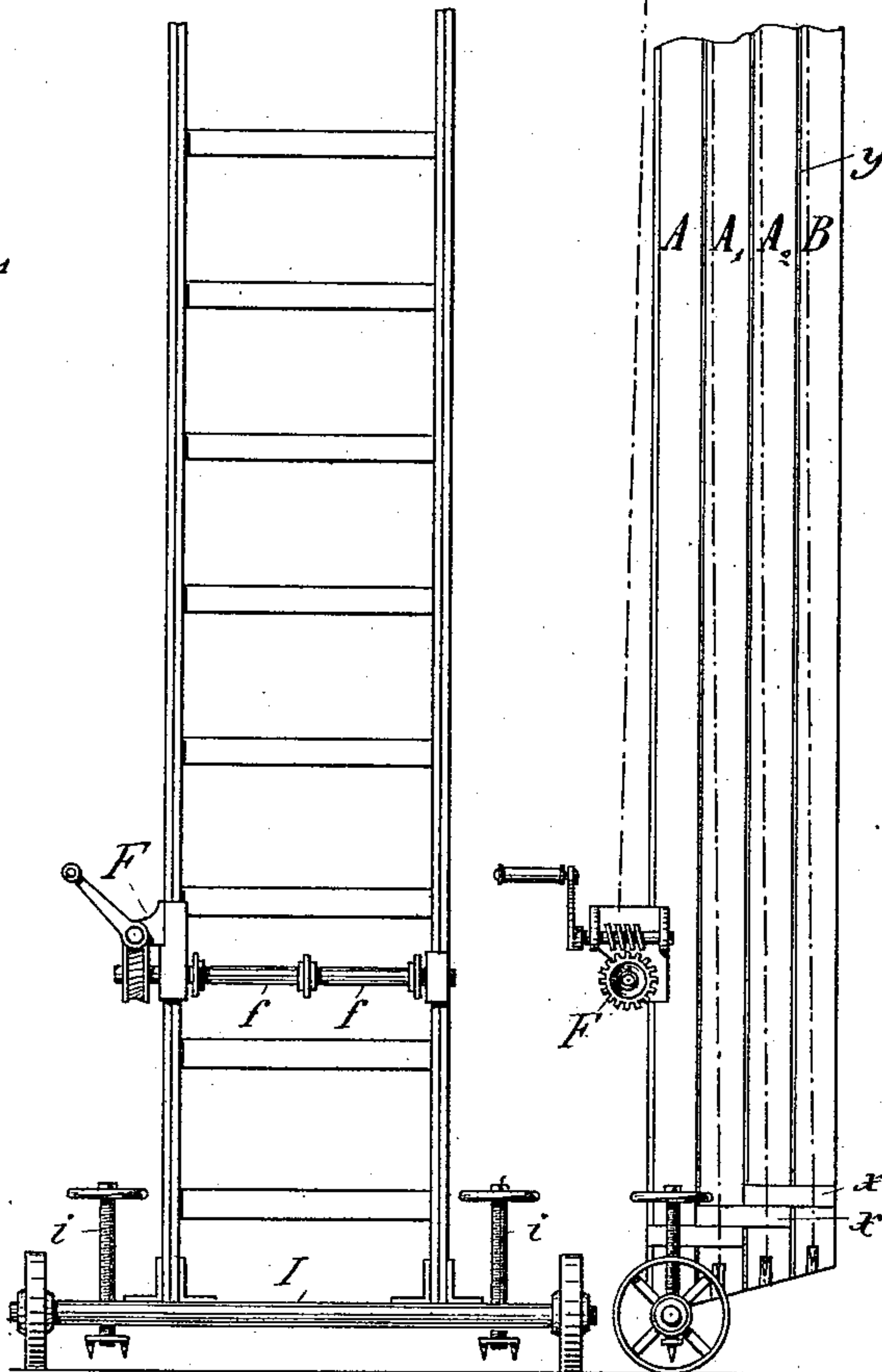
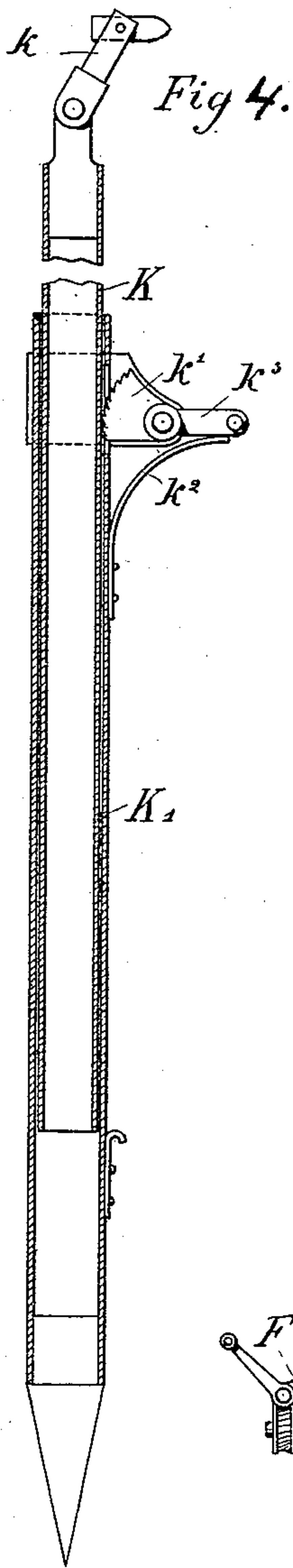
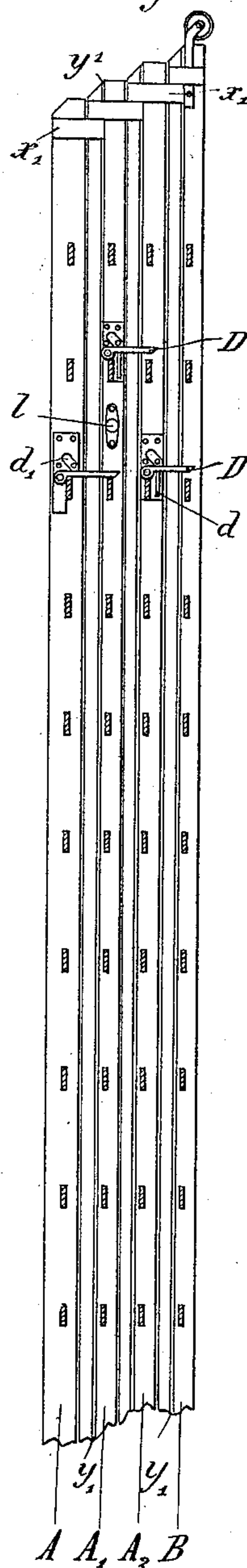


Fig. 2.



Witnesses:-  
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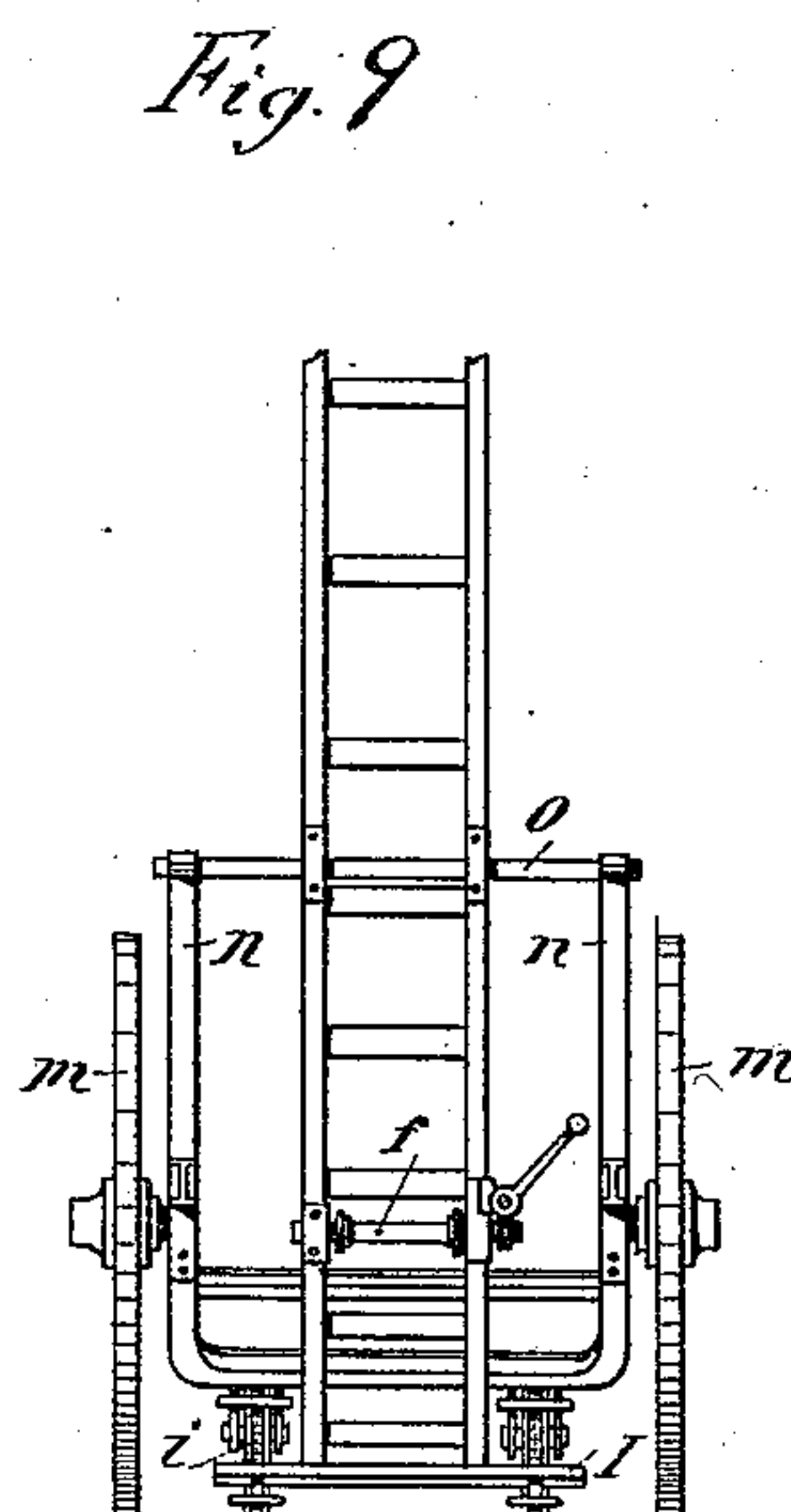
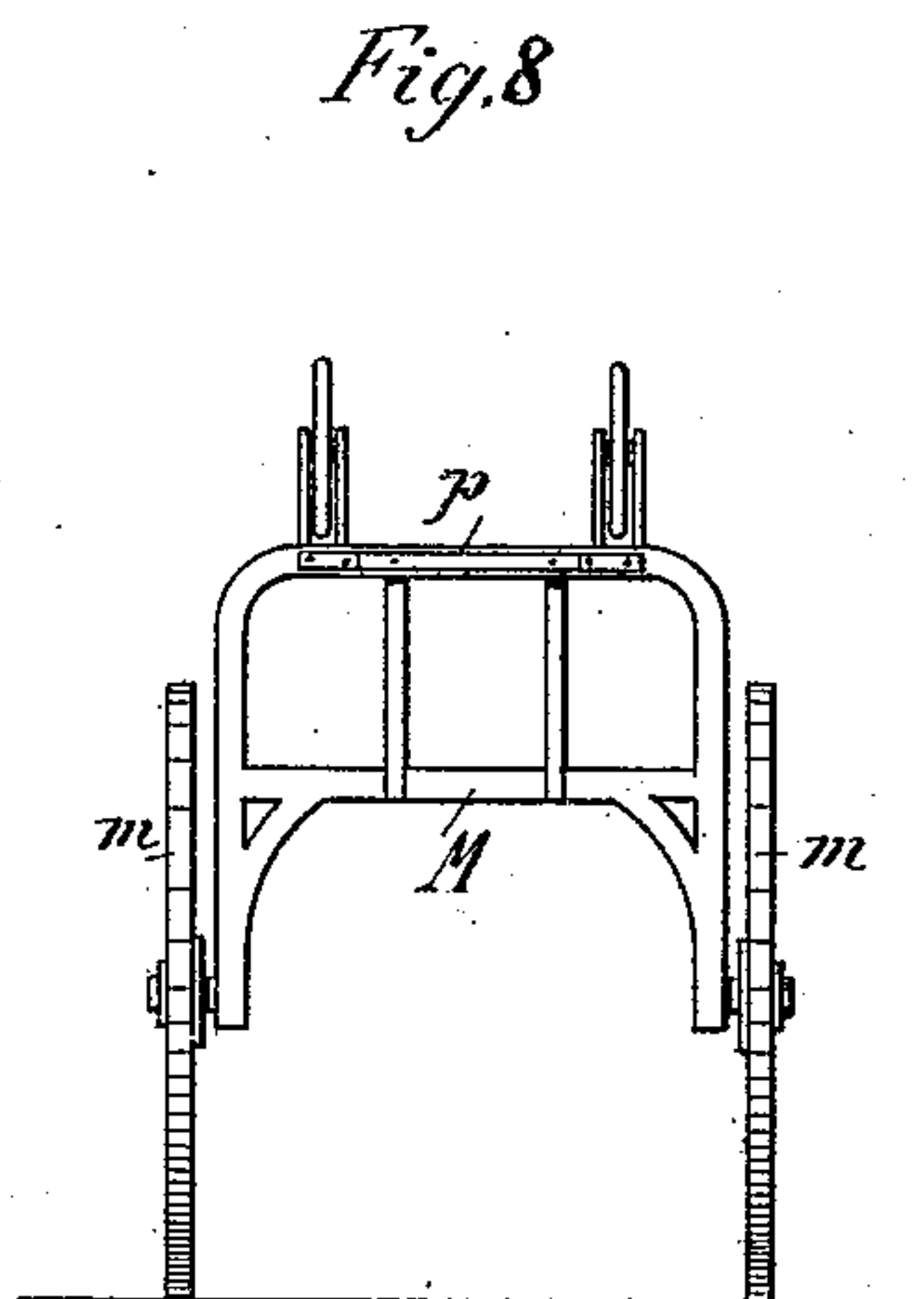
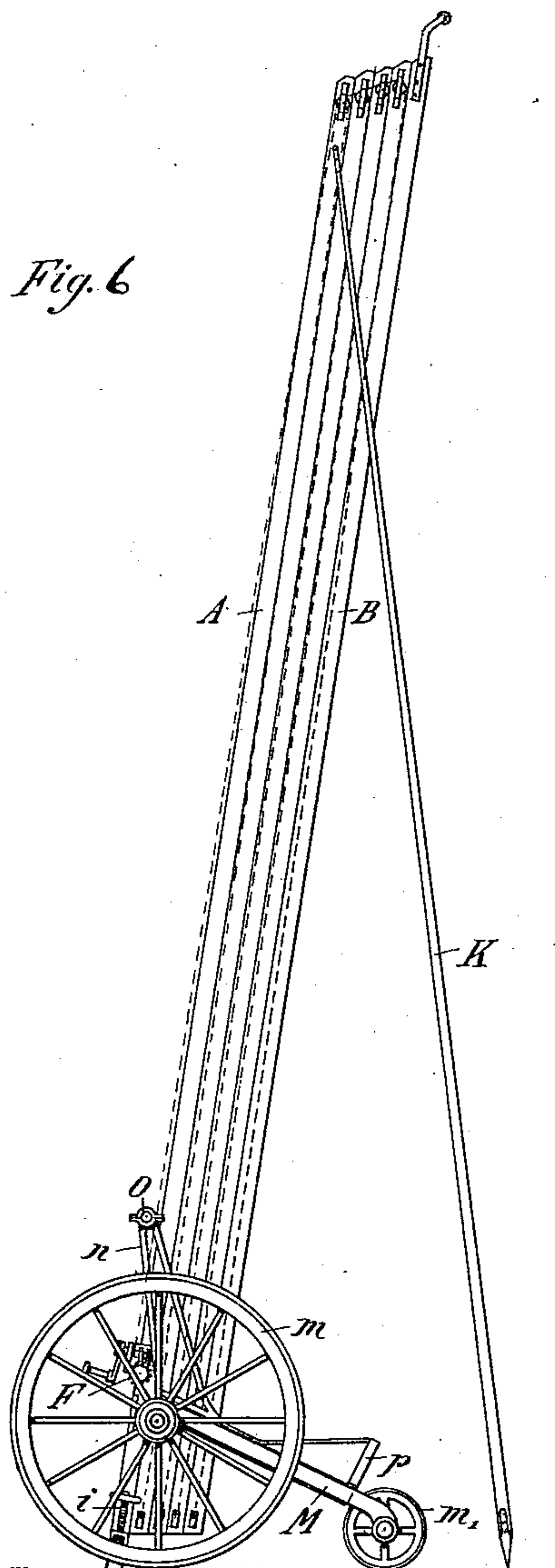
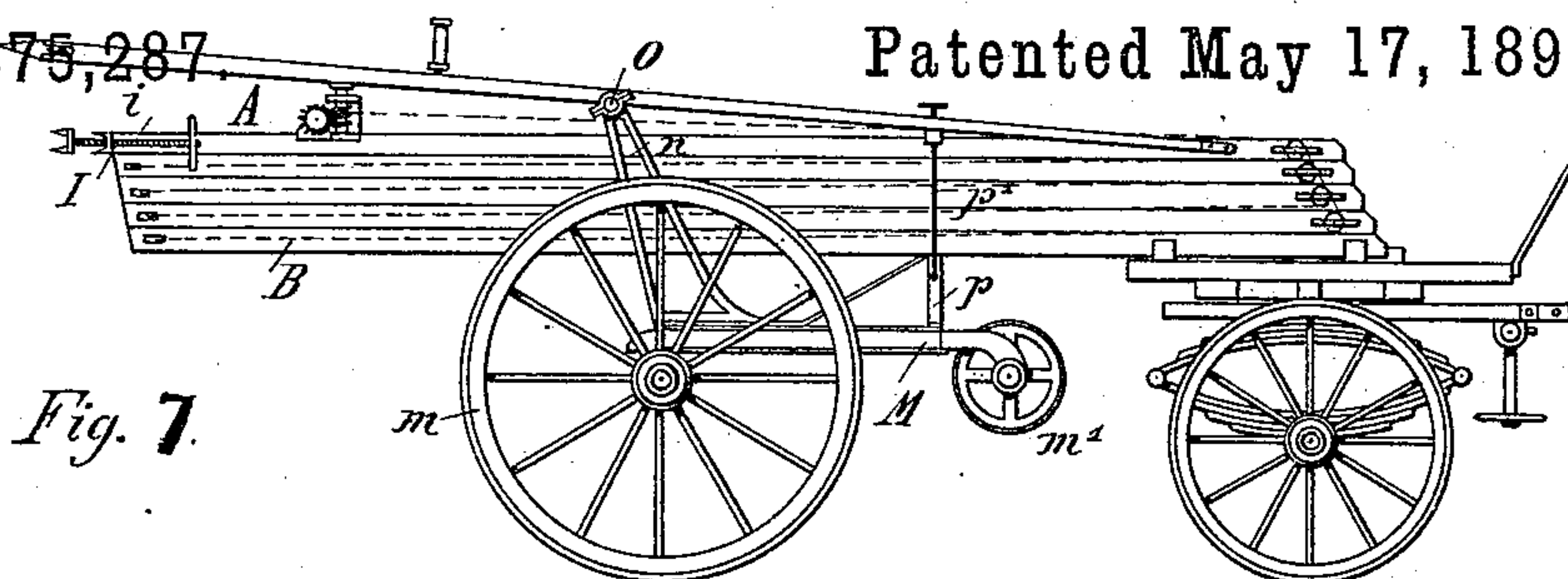
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2 Sheets—Sheet 2.

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SLIDING LADDER.

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Patented May 17, 1892.



Witnesses:-  
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# UNITED STATES PATENT OFFICE.

RICHARD BITHORN, OF VIENNA, AUSTRIA-HUNGARY, ASSIGNOR TO HERMANN ELTBOGEN, MORITZ ELTBOGEN, AND WILHELM ELTBOGEN, OF SAME PLACE.

## SLIDING LADDER.

SPECIFICATION forming part of Letters Patent No. 475,287, dated May 17, 1892.

Application filed August 19, 1889. Serial No. 321,269. (No model.)

*To all whom it may concern:*

Be it known that I, RICHARD BITHORN, of the city of Vienna, Austria-Hungary, have invented certain new and useful Improvements in Extensible Ladders, of which the following is a description.

This invention relates to improvements in extensible ladders, the objects of the same being to facilitate the extension of the parts, to increase the power, safety, and stability of the ladder, to permit of the ladder being applied to various purposes or being affixed to any desired height, and to produce a system by means of which large ladders can be readily transported and the single parts of the same extended successively by means of a windlass or winch.

In the accompanying drawings, Figures 1, 2, and 3 represent, respectively, in side elevation, section, and front elevation a ladder embodying my improvements. Figs. 4 and 5 represent in longitudinal and cross-section an extensible stay. Figs. 6 to 9 represent in elevation, side, and end view a ladder with transporting device.

The characteristic feature of the ladders represented in the accompanying drawings is that the separate parts of the ladders are of like breadth, so that the beams cover each other when the parts are not extended, whereby the ends of the parts of the ladder are connected by clamps of a construction to be hereinafter described, attached to the ends of the beams, said clamps gliding on and forming guide-pieces for the said ladder-beams. In order that the two or more parts of ladders connected with each other may lie snugly beside or above each other in closing the ladder, the exterior surface of each upright or side beam is provided with a rabbet  $y$ , in which is guided the clamp  $x$ .

When several parts or sections are used for single or double ladders, the clamps to the lower ends of the row of uprights  $A A' A^2$  &c.,  $B$ , are fixed to the exterior surface and the clamps for the upper ends to the interior surface of the uprights in such manner that the upper clamps  $x$ , fixed to the interior surface of the uprights  $A A' A^2$ , Fig. 2, are always attached to those uprights on which the clamps

$x$ , attached at the lower outer surface, glide. In order to guide the clamps  $x'$ , applied to the interior surfaces, the uprights are provided with grooves  $y'$ , into which the clamps  $x'$  gear. It will be evident that the upper and lower clamps may also be employed in reverse order.

The extended parts of the ladder can be fixed or rendered stationary by means of an automatic device consisting, as shown in Fig. 2, of movable levers  $D$ , arranged on both sides of the beams and which are retained in horizontal position by stationary stops  $d$ .

When the ladder is extended, the levers  $D$  are raised by the steps and fall when the step has passed by their own weight into their normal position, so as to prevent all retrograde movement of the extended part of the ladder, as the step, which has last passed the lever, will be supported by the same. On lowering the parts of the ladder the levers must be held in released position by a suitable catch, Fig. 2.

The extension of large ladders or ladder-scaffolds is effected by a windlass  $F$  of well-known construction, the rope  $g$  running from the rope-drum  $f$  to the pulleys  $g'$ , fixed to the outer surface of the beams.

For single ladders and ladder-scaffolds I employ stays, Figs. 4 and 5, consisting of telescopic tubes  $K K'$ , so that when the ladder is extended by the windlass the stay will be automatically extended a corresponding length. These stays are attached to the ladder by means of a jointed pivot  $k$ , inserted into and fixed in orifices  $l$  in the uprights or beams, Fig. 1. When the stay is extended, the inner tube of the same is held in fixed connection in the outer tube by means of a toothed sector or eccentric  $k'$ , which is pressed by a spring  $k^2$  against the inner tube  $K$ . When pressure is exerted on the stay, the segment  $k'$  comes into snug contact with the tube  $K$  and securely holds the same in position, but must be released when the stay is to be lowered, for which purpose a rope or chain is attached to the lever  $k^3$  of the sector.

In order that large fire-ladders or fire-escapes may be readily transported and erected, the same are mounted on a carriage and provided with removable front frame-work, Figs. 100



6 to 9. The carriage, consisting of a frame M, with two small and two large wheels  $m m'$ , is attached in two layers  $n$ , the forward part of the ladder being movably connected to the axle  $o$ , so that the ladder can be set at any desired angle by means of the stay K, Fig. 6, the wheels  $m m'$  being continuously on the ground. When in transportable condition, Fig. 7, the ladder is carried on the layers  $n$  and on the front frame, which is provided with wheels. The small wheels  $m'$  of the carriage are raised and held in raised position by attaching the trestle  $p$  to the ladder, so that the said wheels are not in operation during the transport of the ladder.

Having now particularly described my said invention, what I claim is—

1. In ladders and ladder-scaffolding of the kind herein described, extensible stays attached to the uprights and consisting of telescopic tubes K K', whereby the said stay can be rendered stationary or fixed at any desired height by means of a sector  $k'$  with lever-

arm for releasing same and attached to the exterior tube K', substantially as and for the purpose set forth and shown on the accompanying drawings.

2. In extensible single ladders of the kind herein described, a carriage consisting of a frame M with two large and two small wheels  $m m'$ , supporting two bearings  $n$ , carrying the axle  $o$ , on which the forward part A of the ladder turns, and a trestle  $p$ , which during transport is attached to the ladder, so that the small wheels  $m'$  are kept out of operation, substantially as and for the purpose set forth and shown on the accompanying drawings.

In witness whereof I hereunto set my hand in presence of witnesses.

RICHARD BITHORN.

Witnesses:

JOHANN DÖLE,  
RUDOLFSON CLARK,  
JULIUS GOLDSCHMIDT,  
*U. S. Consul-General.*