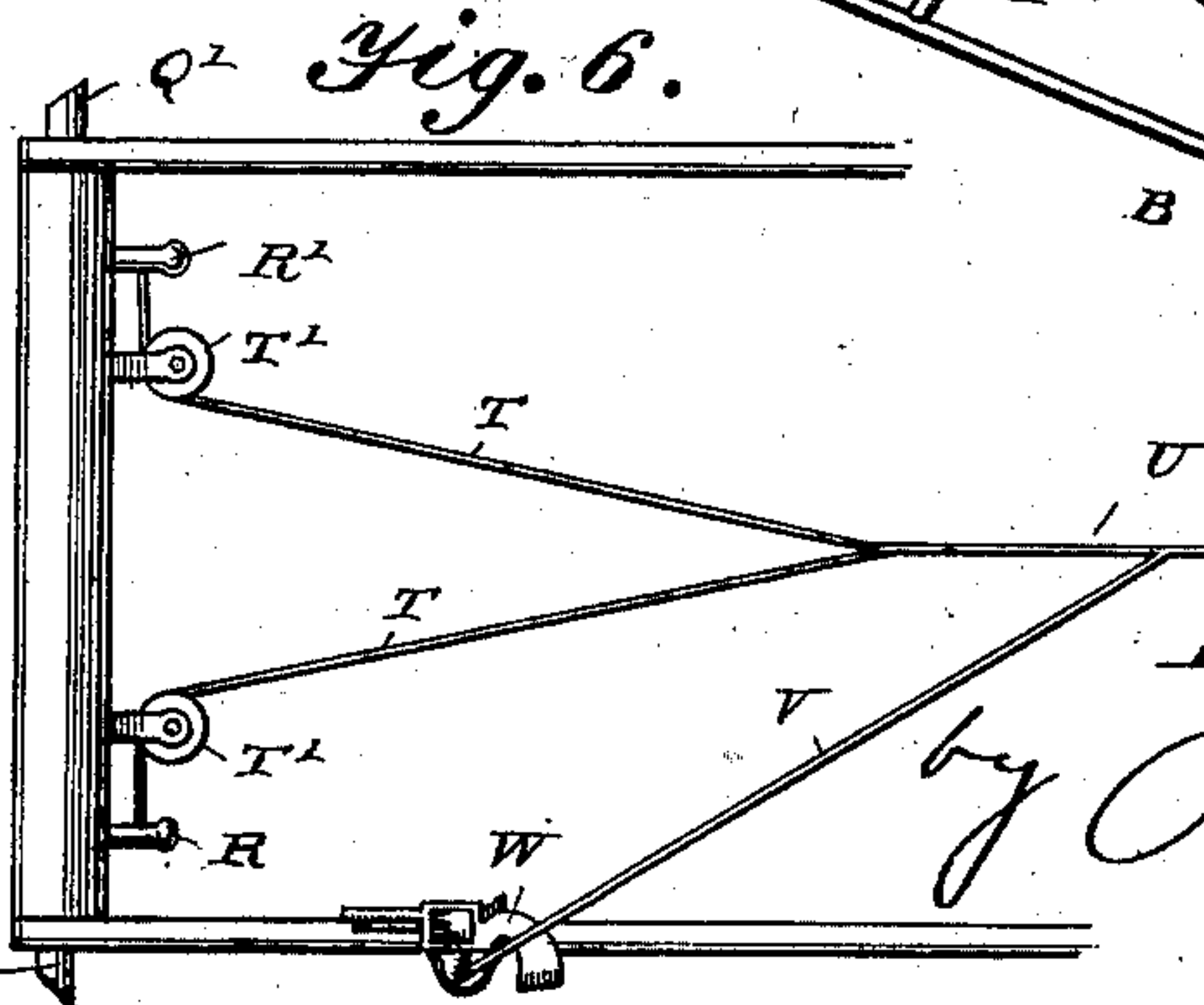
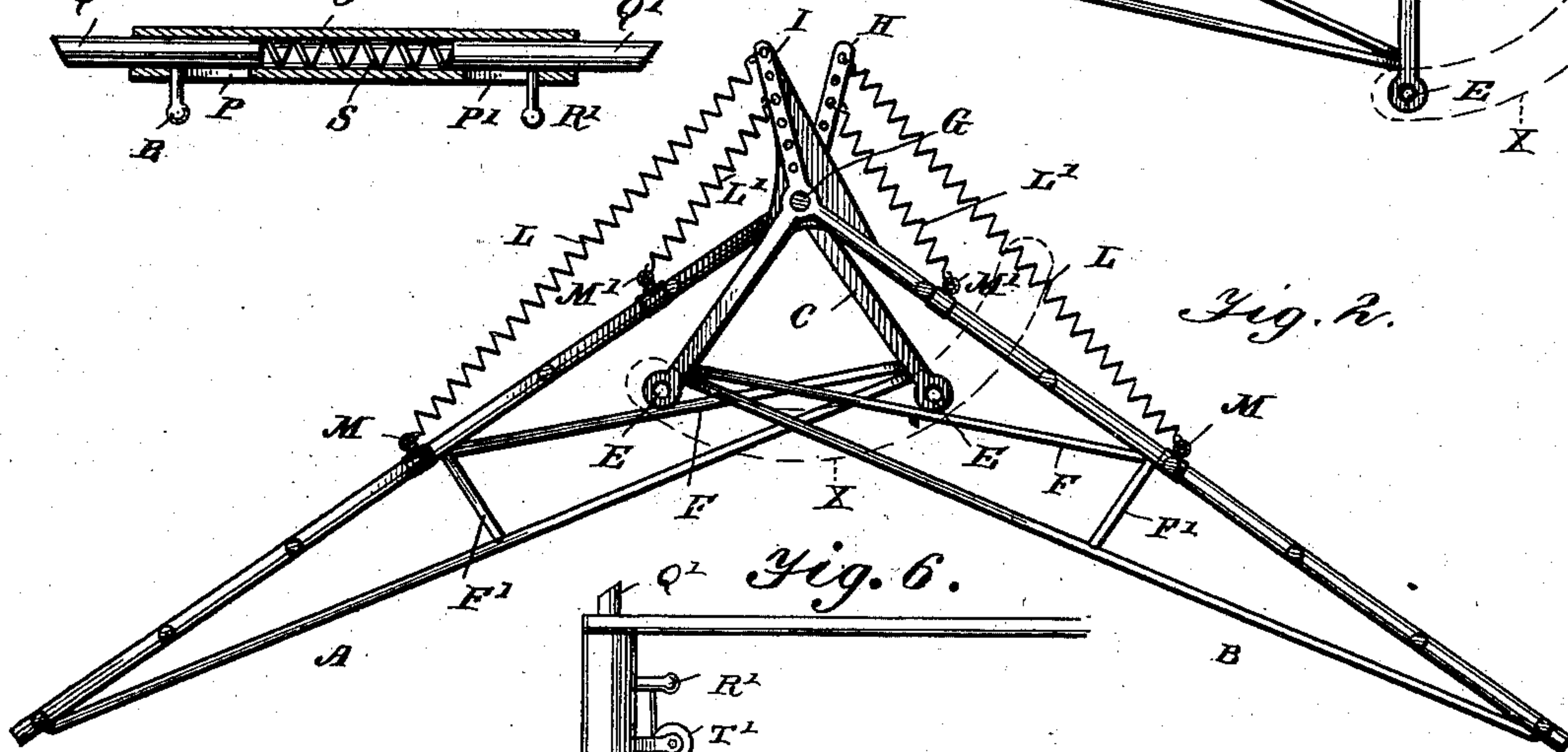
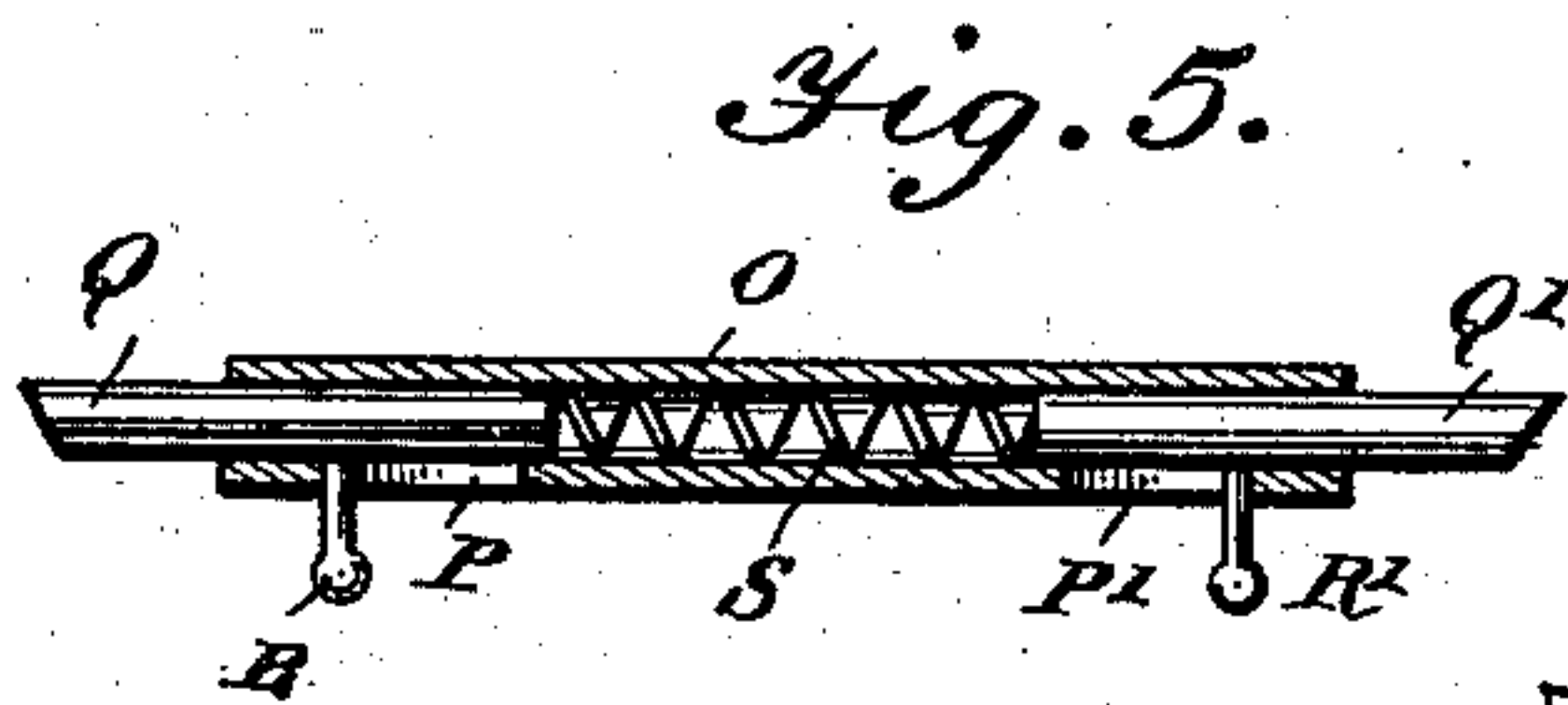
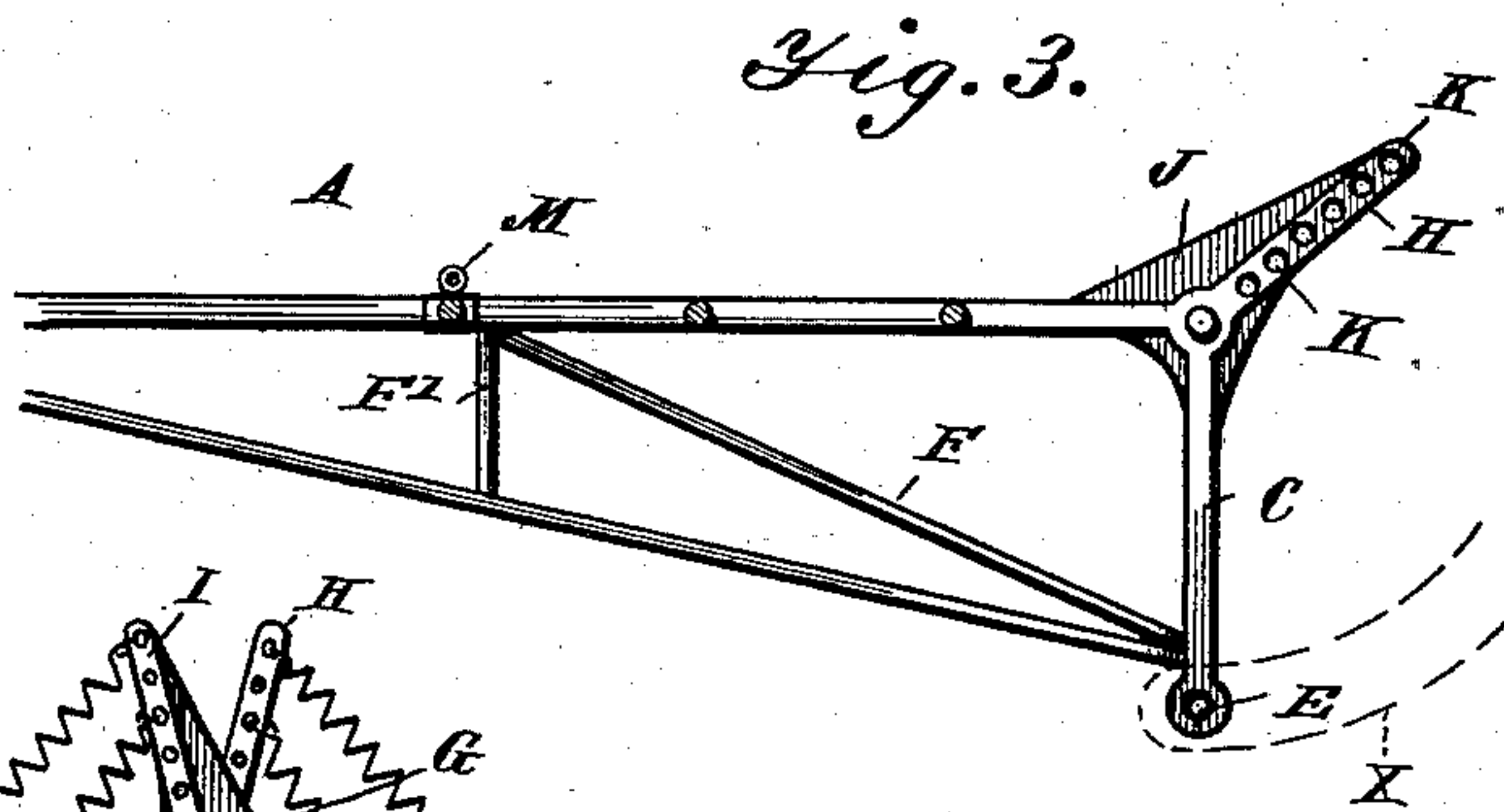
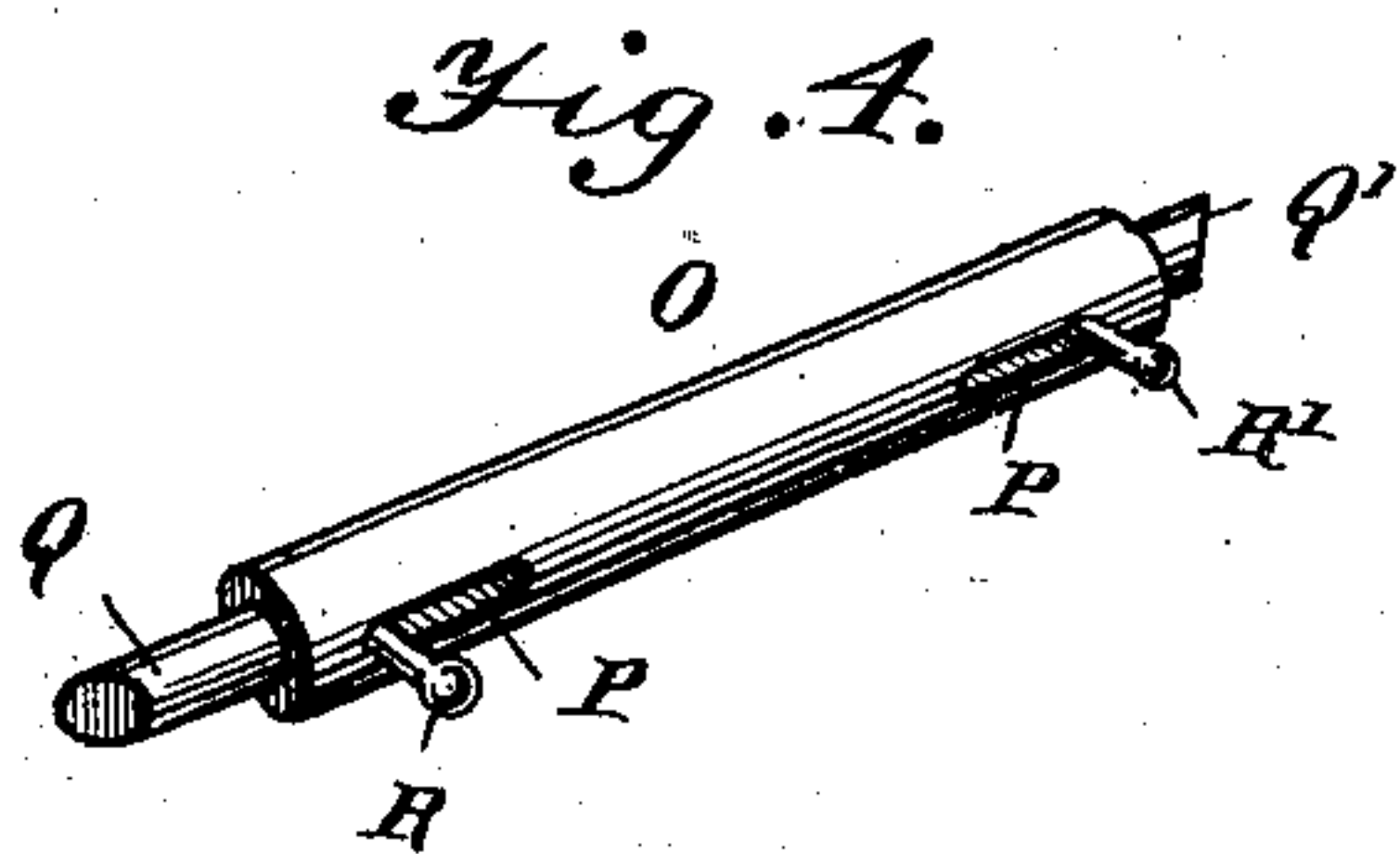
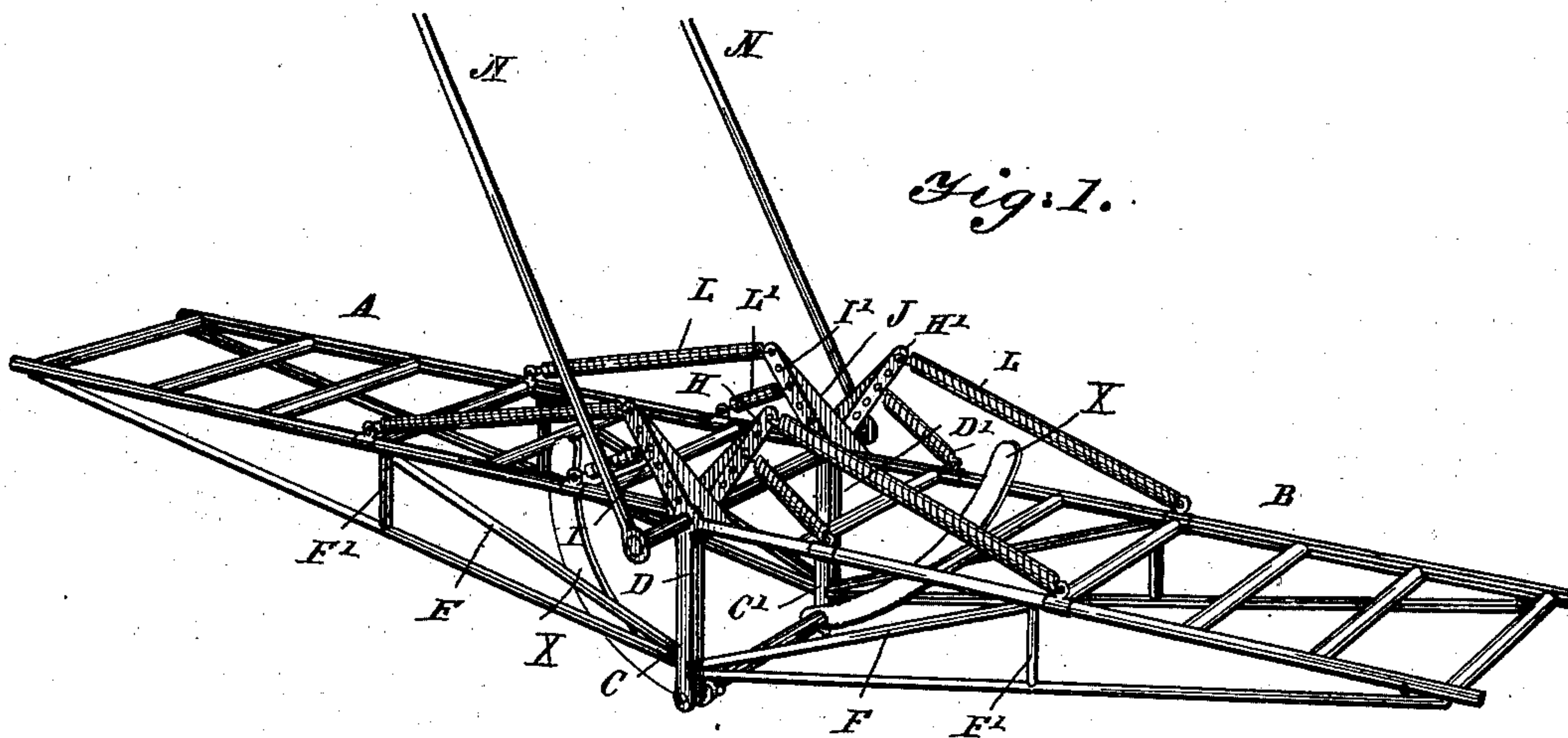


No. 664,414.

Patented Dec. 25, 1900.

F. M. Z. KNIGHT.
BREAKAWAY LADDER.
(Application filed Apr. 10, 1899.)

(No Model.)



Witnesses
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UNITED STATES PATENT OFFICE.

FRANK M. ZOLA KNIGHT, OF NEW HAVEN, CONNECTICUT.

BREAK-AWAY LADDER.

SPECIFICATION forming part of Letters Patent No. 664,414, dated December 25, 1900.

Application filed April 10, 1899. Serial No. 712,457. (No model.)

To all whom it may concern:

Be it known that I, FRANK M. ZOLA KNIGHT, a citizen of the United States, residing at New Haven, in the county of New Haven and State of Connecticut, have invented a certain new and useful Break-Away Ladder, of which the following is a specification.

My invention is in the nature of a ladder for use in aerial gymnastic performances in a circus or theater, the object being to provide a novel device of this class by means of which startling and sensational feats may be performed.

With this object in view my invention consists in the improved construction, arrangement, and combination of parts hereinafter fully described and afterward specifically pointed out in the claims.

In order to enable others skilled in the art to which my invention most nearly appertains to make and use the same, I will now proceed to describe its construction and operation, reference being had to the accompanying drawings, forming part hereof, in which—

Figure 1 is a perspective view of the apparatus complete with the hinged sections extended and locked in their normal positions. Fig. 2 is a view in side elevation, the apparatus being unlocked or broken on its pivotal connection, the curved guard-plate being shown in dotted lines, said plate being omitted in the other figures. Fig. 3 is a view in side elevation of one of the sections detached, the outer end being broken away to shorten the figure. Fig. 4 is a detail perspective view of the locking apparatus detached. Fig. 5 is a longitudinal sectional view of the same. Fig. 6 is a view illustrating the means whereby the ladders are unlocked and the pistol simultaneously fired.

Like letters of reference mark the same parts wherever they occur in the various figures of the drawings.

Referring to the drawings by letters, A and B indicate two ladder-sections, each provided at the inner end of each pole of the ladders with a downwardly-projecting arm, as at C C' and D D', having a hole or bolt-socket E at its lower end, all of said sockets being adapted to register in line with each other when the sections are extended in a

straight line with each other, as shown in Fig. 1. The arms C C' and D D' form each one side of a triangular side frame, a second side being the ladder-pole, and the third side or hypotenuse being a brace connecting the other two at their ends. These triangular side frames stiffen and strengthen these ladder-sections, which are further strengthened by bridge-pieces F and short braces F'.

The ladder-sections are pivotally connected at their inner upper corners by a rod or bolt G, and from this point arms H H' and I I' project upward, inclining away from the ladder-section pivot-rod in the plane of the side frame to which they are attached and overhanging the other section. These arms are protected on their inner sides by guard-plates J J' and are provided with a series of openings K. Spiral springs L L' connect the arms H H' and I I' with eyes M M', secured on the side poles of the ladders, the springs connecting the arms of one section with the eyes of the other, and the strength of the springs being regulated by varying the places of attachment in the series of openings more or less distant from the pivotal center. The pivot rod or bolt G is extended laterally and is pivotally mounted in the lower ends of suspension-rods N, placed far enough apart to permit the whole device to swing entirely around between them.

In Figs. 4 and 5 I have shown in detail the locking mechanism by means of which the sections are maintained in position when extended in line with each other, as in Fig. 1. This locking mechanism consists of a barrel O, secured between arms C of section A, having two longitudinal slots P P' and two bolts Q Q', mounted slidably in and projecting from the ends of the barrel, two handle-pins R R', projecting through slots P P' into bolts Q Q', and spiral spring S in the barrel, bearing outward against the inner ends of each bolt, the normal tendency being to force the ends to their outer positions, as in Figs. 4 and 5. When the sections are forcibly brought to their extended positions in line with each other, as shown in Fig. 1, the locking mechanism is between the lower ends of arms C C' D D', with the bolts drawn inward, and the bolts then allowed to assume their normal outer positions in the registering bolt-sockets

E in said arms, locking them in that position until the bolts are withdrawn by means of the handle-pins R R'.

In Fig. 6 I have illustrated means whereby the locking-bolts may be withdrawn by the performer and a pistol discharged at the same time. In this mechanism, T T indicate cords connected to the handle-pins R R', passed around pulleys T' T', journaled in brackets secured to any suitable part of the structure, in this instance to the barrel O. These cords join, forming a single cord U, extending outward to within reach of a performer, preferably at the outer end of the ladder at any convenient point. A branch cord V extends to the trigger of a pistol W, secured on the ladder, so that when the cord U is pulled the bolts Q Q' are drawn, breaking the ladder, and the pistol fired at the same time. When the ladder-sections are thus broken away, they will swing on their pivotal rod G, the weight of the sections and performers being sustained yielding by the springs L L', and during said swinging the lock-bolts will bear against the curved guard-plates X, (see dotted lines in Fig. 3,) which will prevent them catching on the bars of the other section.

The complete apparatus, or "break-away ladder," as I have designated it, being mounted as described, a performer on each ladder-section will go through any suitable gymnastic actions, including the whirling of the whole device around continuously on the pivotal rod G. When broken apart, as in Fig. 2, the sections are still pivotally connected or swing on rod G, and each section is yieldingly supported from the other by means of the springs.

Surprising and sensational aerial gymnastic performances are possible upon my break-away ladder, and the invention affords an attraction unique, startling, and profitable to the manager of the circus or theater.

While I have thus illustrated and described the best means now known to me for carrying out my invention, I do not wish to be understood as restricting myself to the exact forms and constructions shown, as many slight

changes or variations therefrom might be made without departing from the spirit and scope of my invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination of two ladder-sections pivotally jointed at their inner ends, spring connections between the sections, extending from some intermediate point of each ladder-section to an arm projecting from the other ladder-section to a point above the pivot, and means for locking the sections in extended position in line with each other, substantially as described.

2. The combination of two ladder-sections pivotally connected together, arms projecting from each section and overhanging the other, springs connecting each section with the arms of the other at a point above the pivot, and locking mechanism to secure the sections in extended position, substantially as described.

3. The combination of two ladder-sections, pivotally connected upon a suspended bar, of upwardly-projecting arms extending from the inner end of each section, a spring connected to each arm and the other ladder-section and locking mechanism for holding the sections in a horizontal position, substantially as described.

4. The combination of two ladder-sections each having triangular braced side frames with bolt-sockets, upwardly-projecting arms extending beyond the pivot-point of the sections, springs extending from the arms on one section to an intermediate point on the other section, a double-ended spring-bolt mechanism to be placed between the triangular frames and engage in the registering bolt-sockets, and a curved guard to prevent the bolts striking the ladders when disengaged, substantially as described.

FRANK M. ZOLA KNIGHT.

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