

W. H. Paige.

Fire Escape.

N^o 43,425.

Patented Jul. 6, 1864.

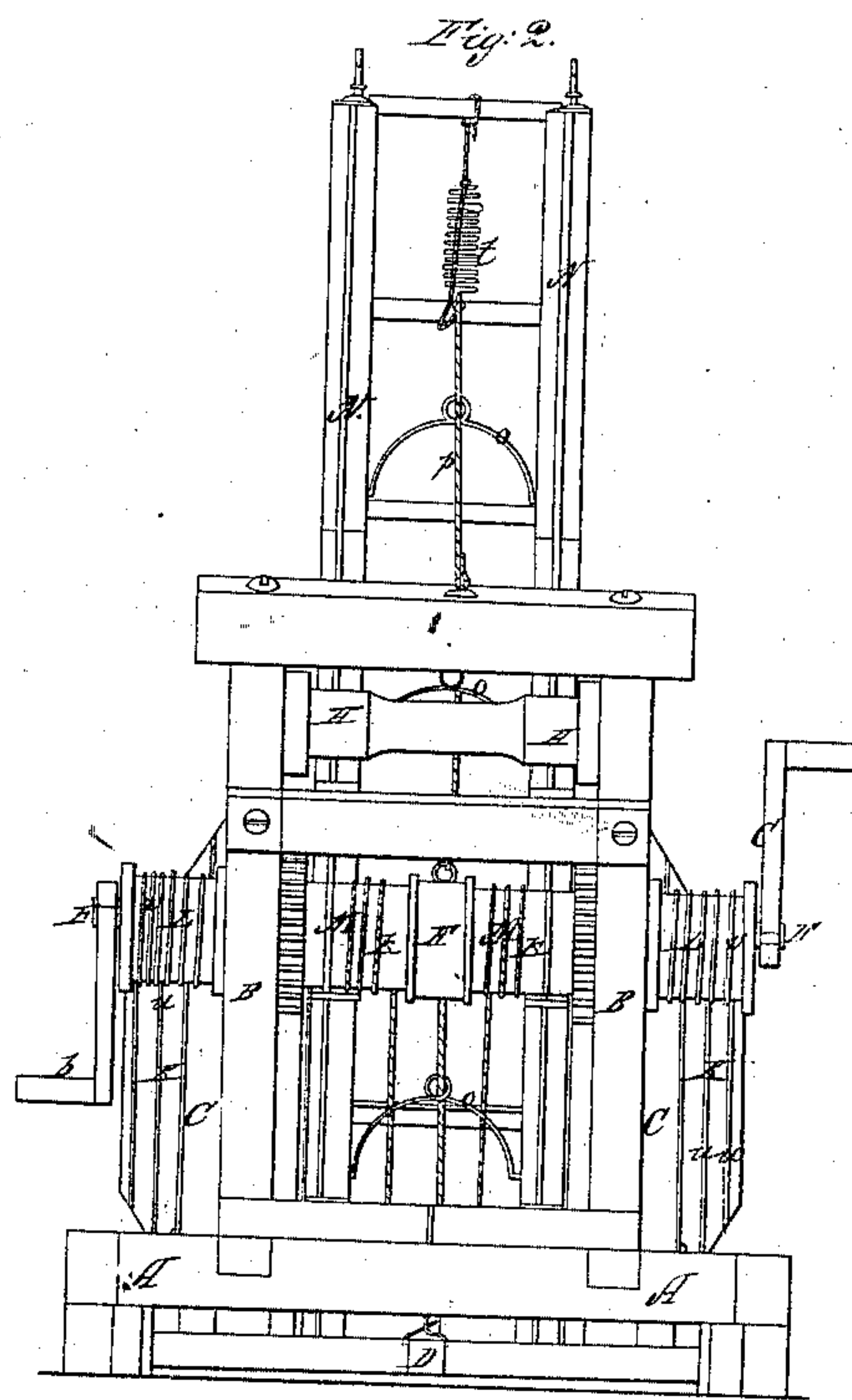
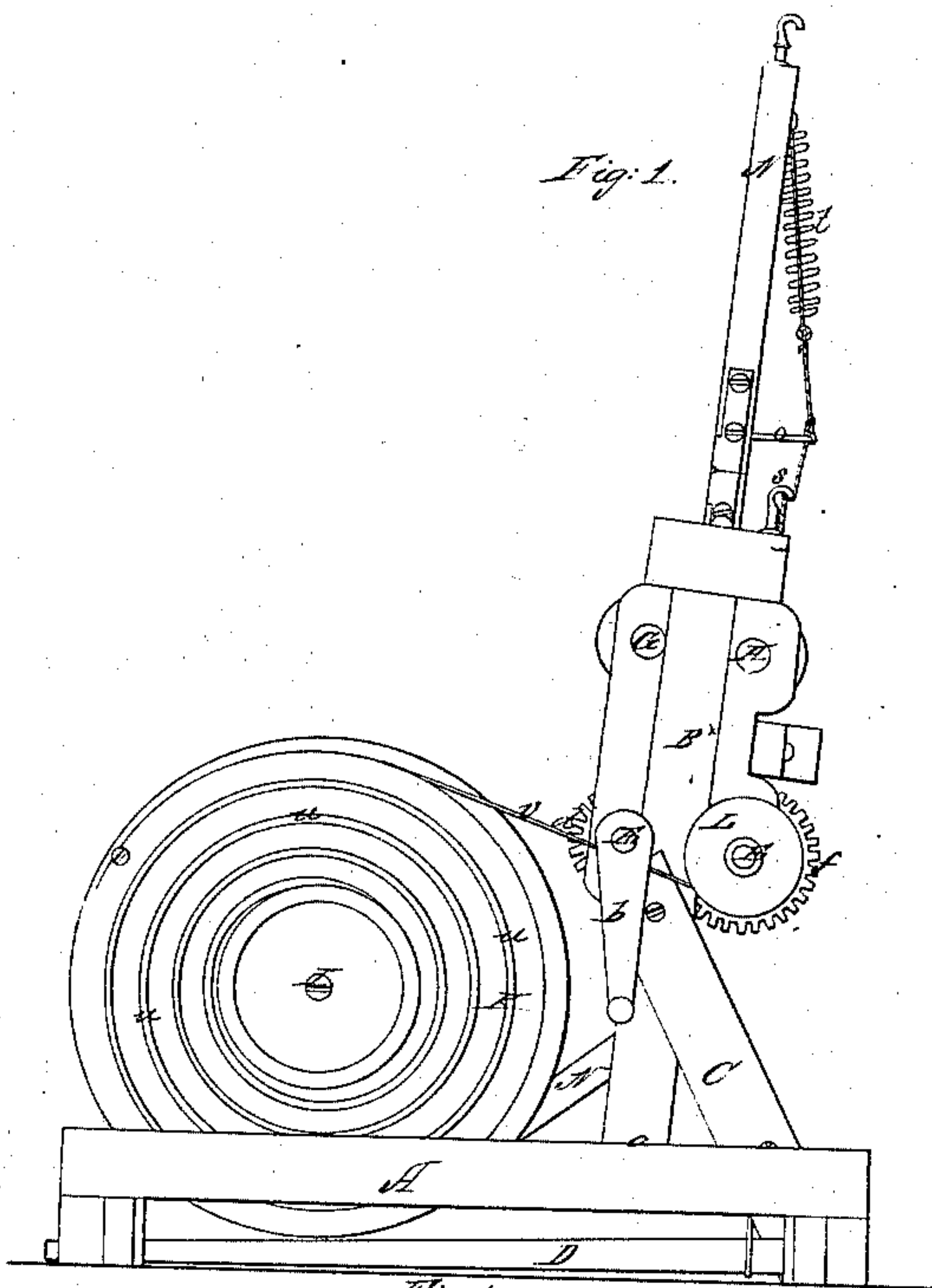


Fig. 4.

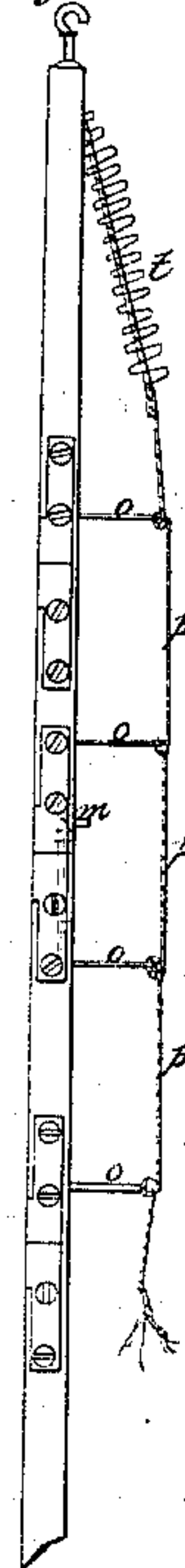
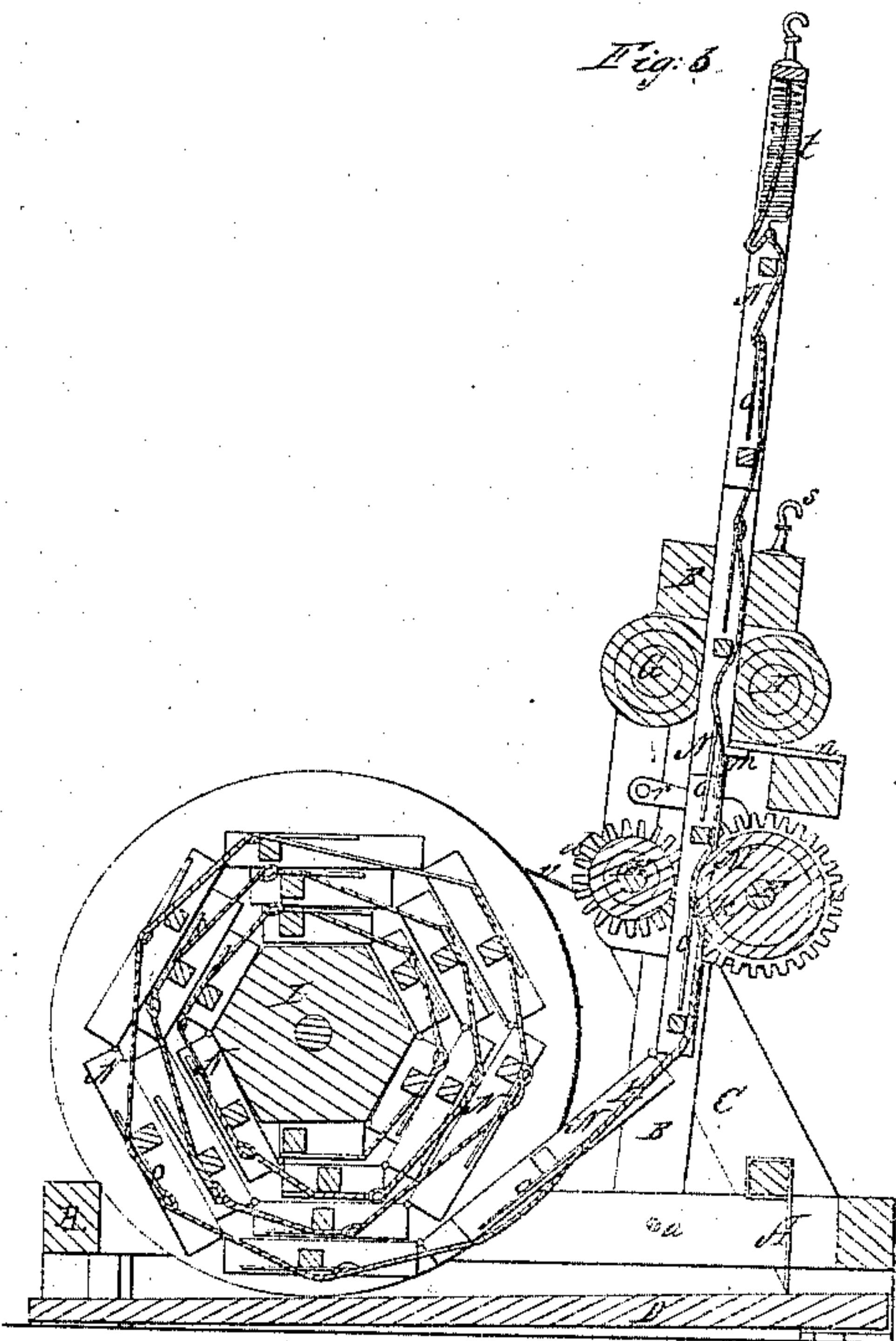


Fig. 6.



Witnesses:
Alonso Ballou
Wm. Bradley

Inventor:

W. H. Paige

UNITED STATES PATENT OFFICE.

WILLIAM H. PAIGE, OF SPRINGFIELD, MASSACHUSETTS.

IMPROVEMENT IN FIRE-ESCAPE LADDERS.

Specification forming part of Letters Patent No. 42,425, dated July 5, 1864.

To all whom it may concern:

Be it known that I, WILLIAM H. PAIGE, of Springfield, in the county of Hampden and Commonwealth of Massachusetts, have invented a new and Improved Means of Escape from Burning Buildings; and I do hereby declare that the following is a full, clear, and exact description of the same.

The object of my invention is two-fold: first, to produce a combination of mechanism capable of being reduced to a compact form convenient for transportation, and which also may be very quickly extended, so as to form a means of escape from the highest buildings; second, so to arrange certain parts of said mechanism that when extended partially or entirely it shall be perfectly reliable and safe.

As the desirableness of a good fire-escape is so well known and so many have been invented, I will not dwell on that point, but proceed at once to explain my arrangement.

In the drawings making a part of this specification, Figure 1 is a side elevation, Fig. 2 a front elevation, Fig. 3 a vertical section, and Fig. 4 a detail view, of ladder, showing the truss more plainly.

A is a frame to support the mechanism, and which for convenience of transportation would be mounted on wheels. B is an upright frame hinged to A at *a*, and supported in a position nearly or entirely perpendicular by the bars C C', which are attached to the lever D, by means of which the frame B may be inclined more or less from a perpendicular position. E is a roller provided with the cranks *b c* and gears *d e*, and having bearings in the frame B. F is another roll, connected with the roll E by the gears *f g*. G H are two guide-rolls having bearings in the frame B above E and F. I is a reel supported by bearings in the frame A. K K' are two conical pulleys, provided each with a spiral groove of a peculiar construction for receiving a chain. L L' are drums on the ends of roll E. M is another drum, in the center of and forming a part of E. N is a ladder formed of sections of variable lengths hinged together, and which is coiled on the reel I. Now, it is evident that the ladder being composed of rigid sections, it must coil onto the reel in the form of a polygon, and in order to make it coil compactly the lengths must gradually increase just in proportion as the size of the polygon is

increased by the addition of each succeeding coil of the ladder, so that the joints of the ladder shall coincide with radial lines from the center of the reel through each corner or angle of the original polygonal prism forming the body of the reel. From the reel the ladder passes between the rolls E F and G H into a position more or less perpendicular, according to the inclination of the frame B. Attached to the reel and coiling with the ladder are the two chains *k k'*, which are coiled on the drum M as the ladder is carried up by the rotation of the rolls E F. Now, of course, as the ladder passes up through the rolls and leaves the frame B the joints must become rigid, so as to make the ladder self-supporting. This I accomplish as follows: Each joint is provided with a slide-bolt, *m*, which is held in whatever position it is placed by friction. *n n'* are two springs attached to frame B, and which catch on the heads of bolts *m* and slide them down into place, so as to lock the lengths together sufficiently firm to render the ladder self-supporting, the bolt for each joint being operated upon as it passes up past the springs. In the same way the joints are unlocked as the ladder passes down past the springs. Now, in order to give the ladder sufficient strength to make it perfectly safe and reliable, it is provided with a truss constructed as follows, (more clearly seen in Fig. 4, but represented in the other views:) *o o* are swinging bows or standards, to which is attached a chain, *p*. When the ladder has been run up sufficiently high, (in which position it is securely held by means of the chains *k k'*, attached to drum M, and the pawl *r* falling between the teeth of the gear *f*;) the chain, *p* is drawn down taut and confined to the hook *s* in the top of frame B, thereby swinging the standards *o o o* into a position perpendicular to the ladder, and forming a perfect truss, as seen in Figs. 1 and 4. When it is desirable to run the ladder down, release the chain *p* from hook *s*, and the spring *t* at the top contracts, and, drawing up the chain, swings all the standards *o o o* into a position parallel to the ladder, so that the ladder is then ready to be coiled up again on the reel; but in order to accomplish that the reel must have a motion variable with relation to the roll F and drum M—i. e., when the reel is empty it must turn faster relatively to the motion of the rolls, in order to coil up the lad-

der as fast as it passes through the rolls (or, what is the same thing, as fast as the chains *k k'* are uncoiled,) whereas when the ladder has been coiled on and the effective size increased the rotary speed of reel should decrease relatively to the motion of the rolls. To accomplish this result, I provide the reel with the conical pulleys *K K'*, having each a spiral groove, *u u u*, to receive the chain *v v'* from drums *L L'*. The spiral groove *u u* is so formed as to progress from the center of the reel just in proportion as the effective size of the reel is increased by the coils of the ladder. Thus, when the drum *M* rotates so as to uncoil the chains *k k* the reel receives a corresponding motion through the chains *v v'* and pulleys *K K* sufficient to keep the ladder coiled up. The frame *B* is hinged to *A* at *a*, so that the ladder having been run up it may be inclined to a certain extent to reach the walls of the building.

Now, having fully described the construc-

tion and operation of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The hinged ladder *N*, having its several sections of unequal lengths, when said inequality is graduated as herein described, in combination with reel *I* and other suitable mechanism for operating it.

2. The combination of the hinged ladder *N*, swinging standards *o o o*, and chain *p*, when arranged and operating substantially as herein described.

3. The combination of a hinged ladder with a reel, *I*, and spirally-grooved cone *K*, operated by chain *v*, or its equivalent, substantially in the manner and for the purpose herein set forth.

W. H. PAIGE.

Witnesses:

ALONZO BALLOU,
MILTON BRADLEY.