

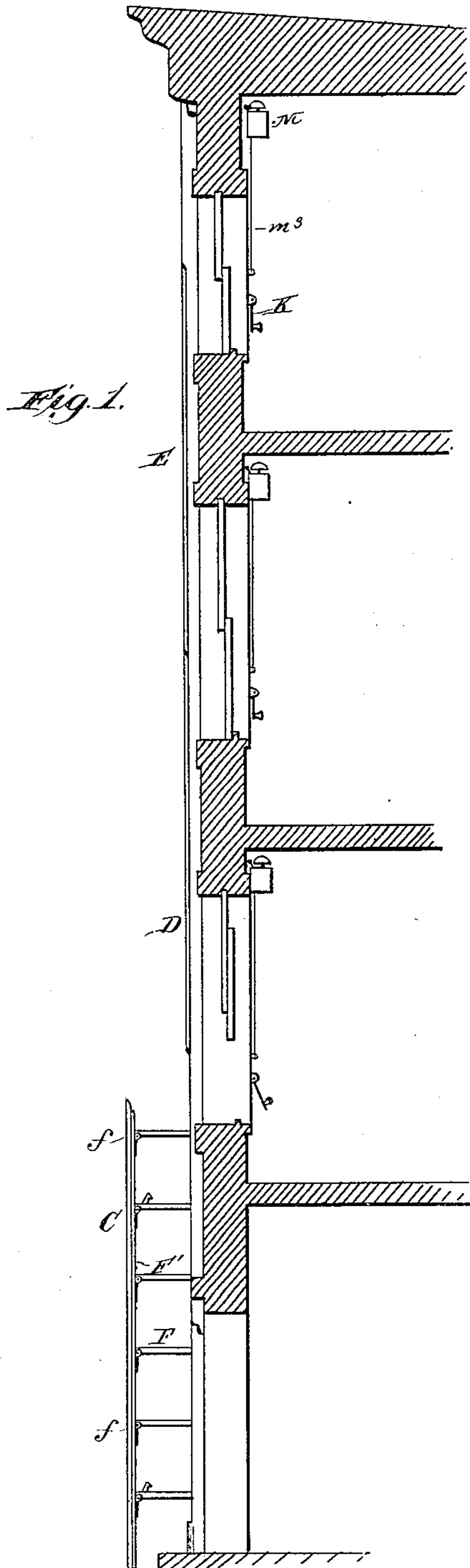
(No Model.)

4 Sheets—Sheet 1.

J. P. DUNN.  
FIRE ESCAPE.

No. 267,504.

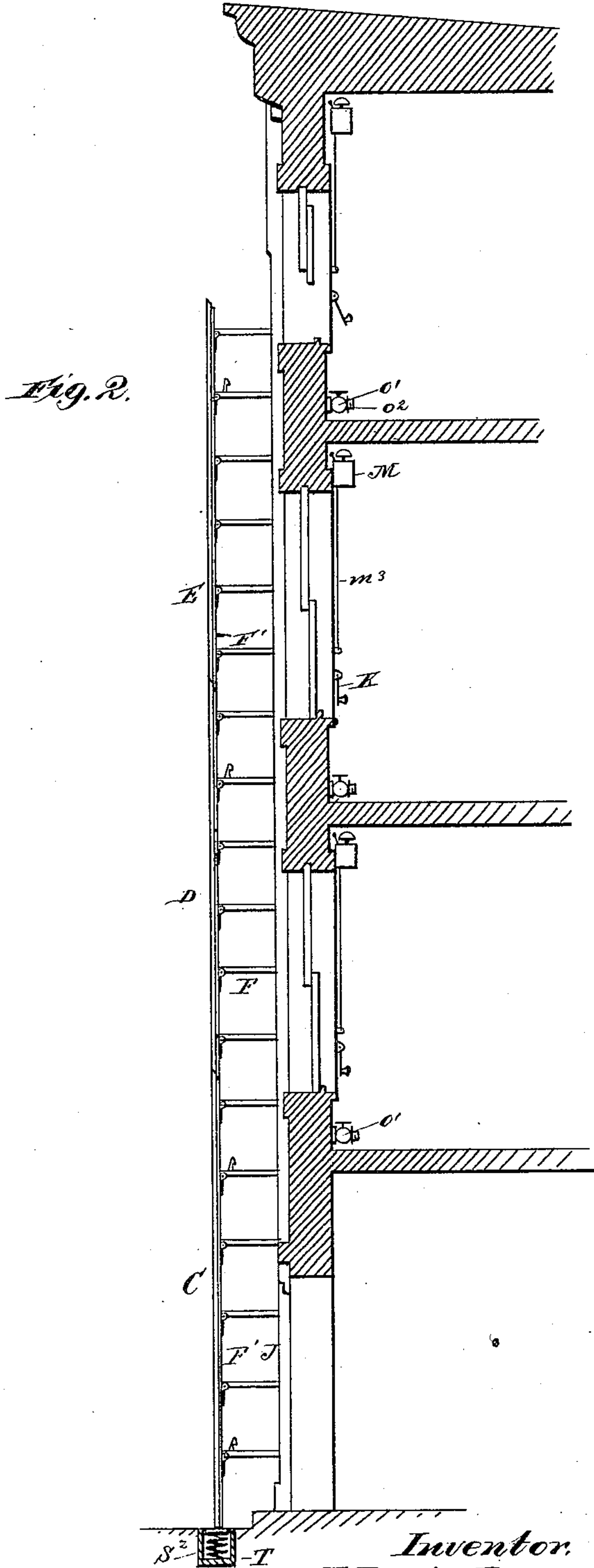
Patented Nov. 14, 1882.



Witnesses.

Robert Everett.

J. A. Rutherford.



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By James L. Norris.  
Atty.

(No Model.)

4 Sheets—Sheet 2.

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FIRE ESCAPE.

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Fig. 3.

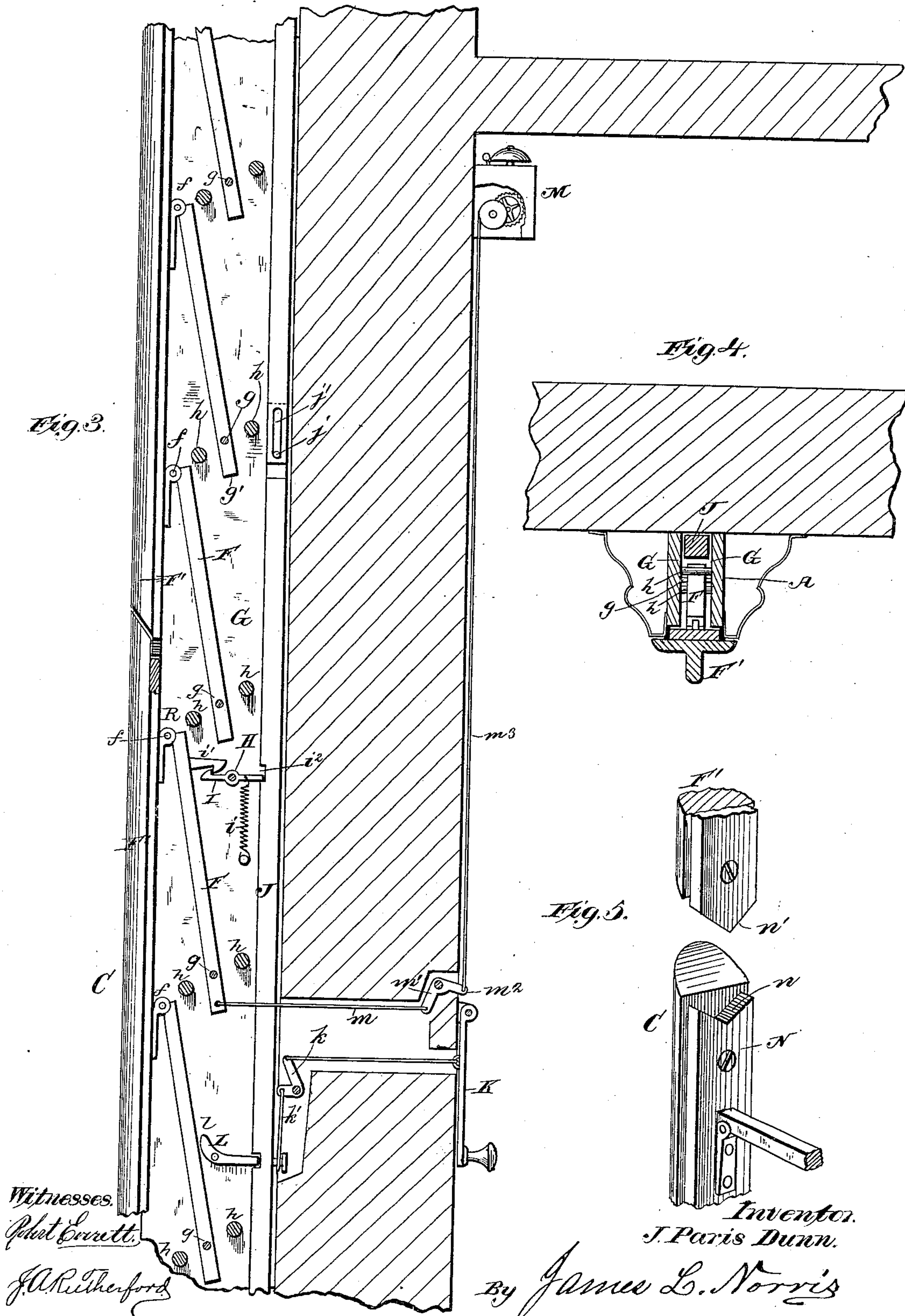


Fig. 4.

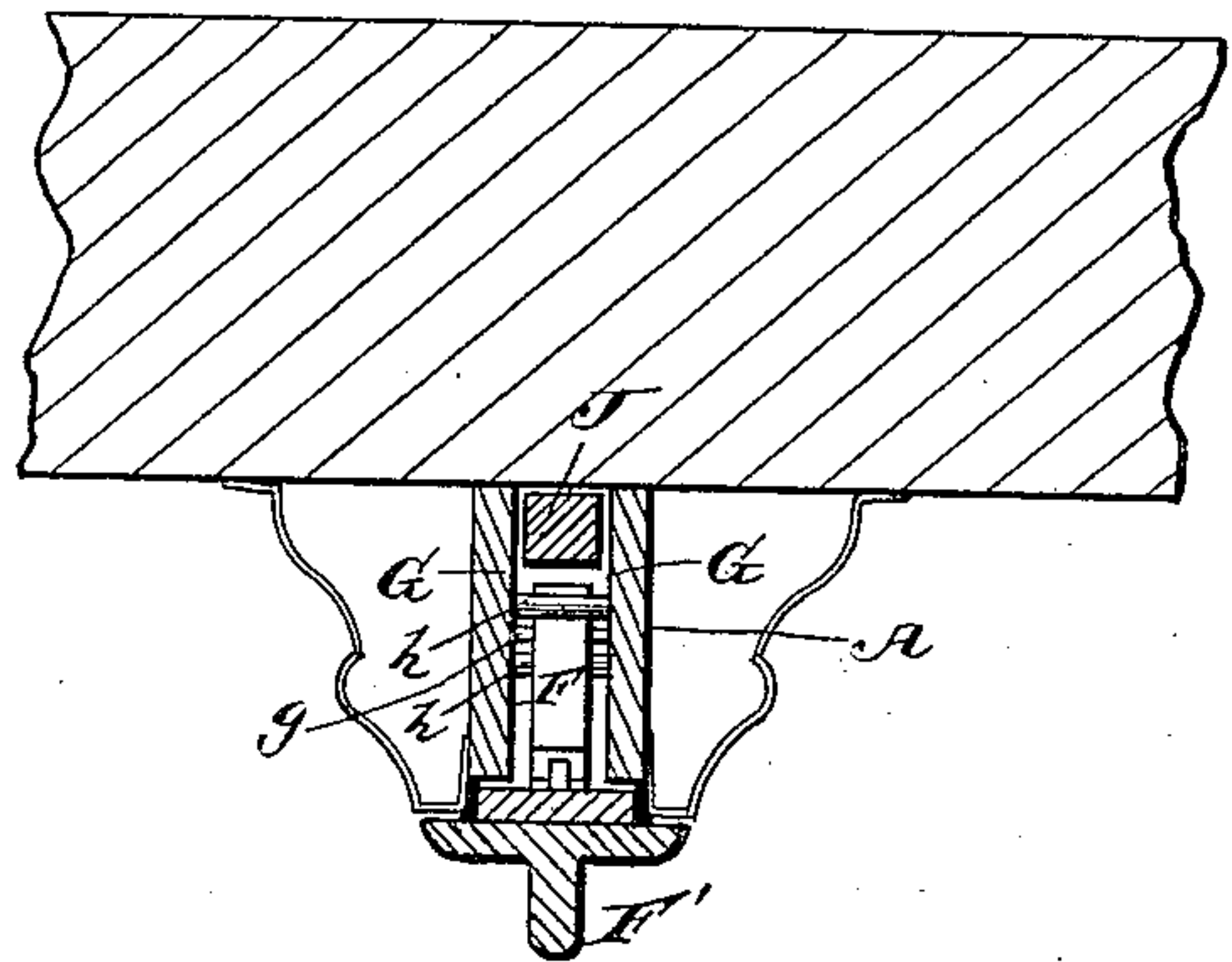
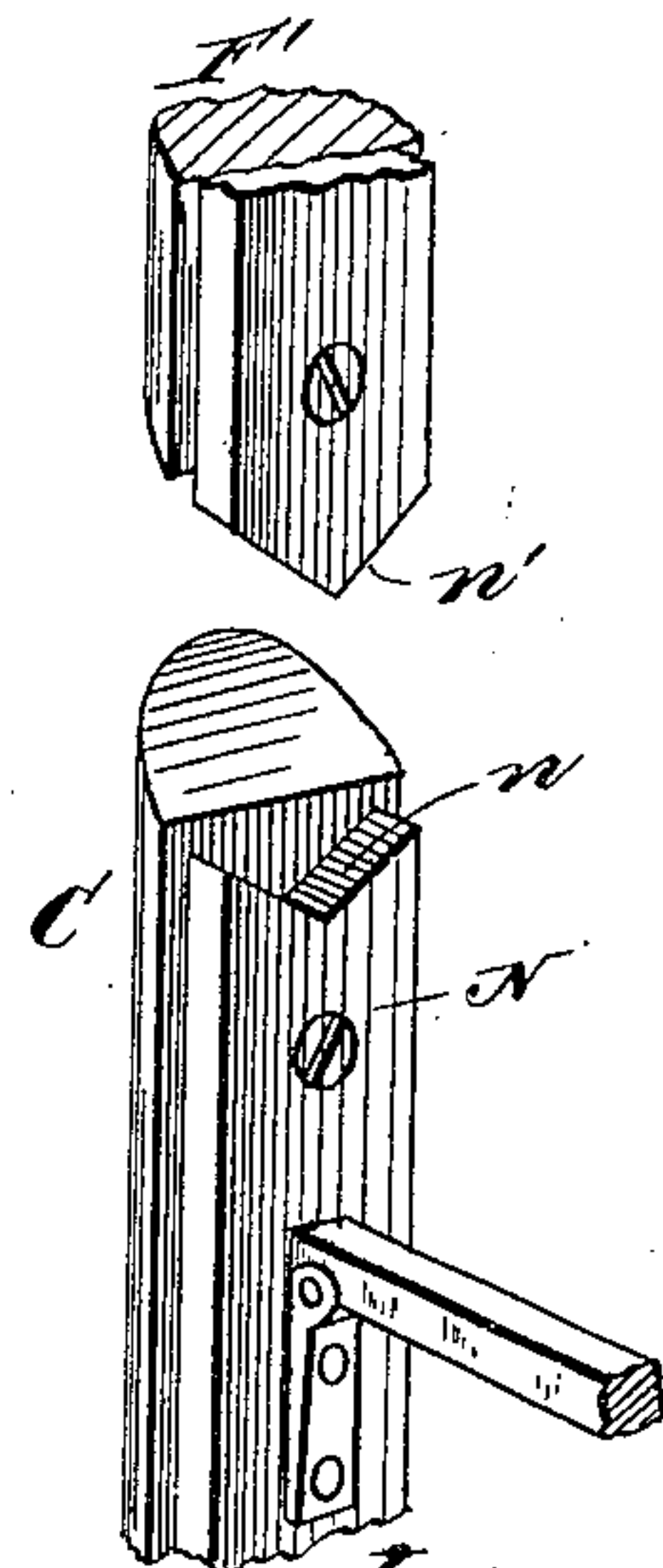


Fig. 5.



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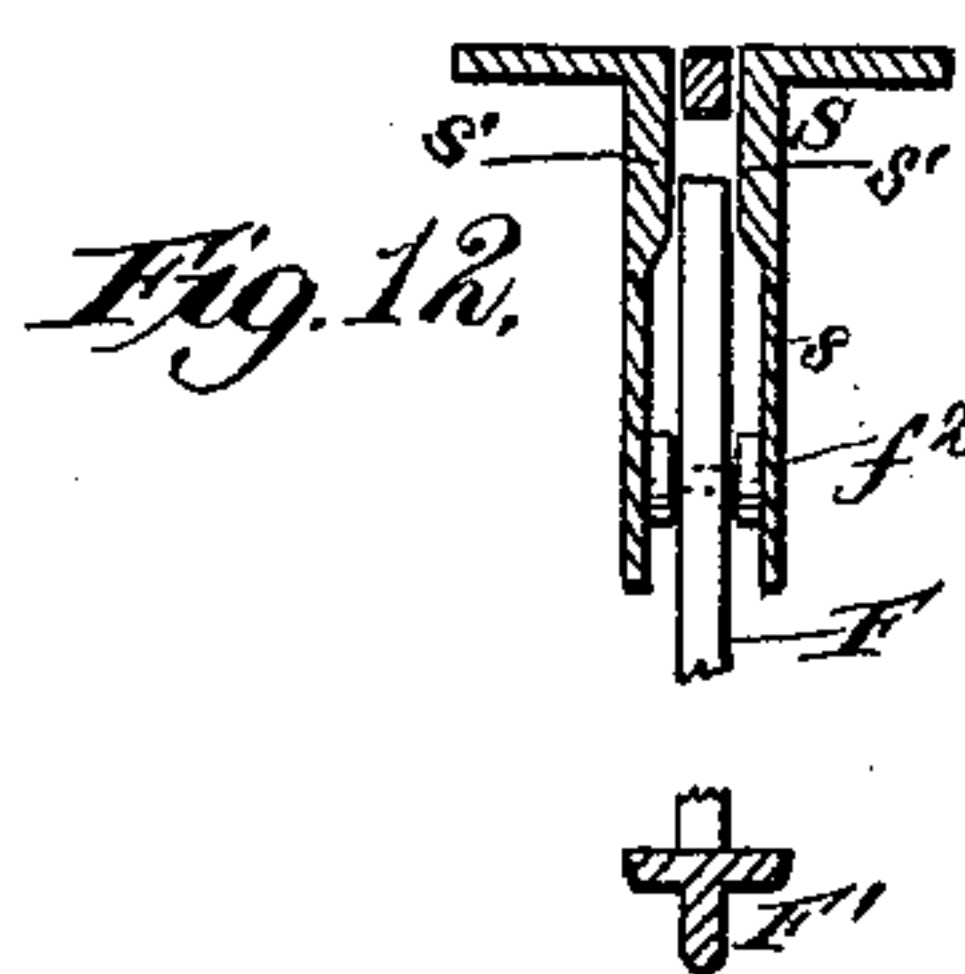
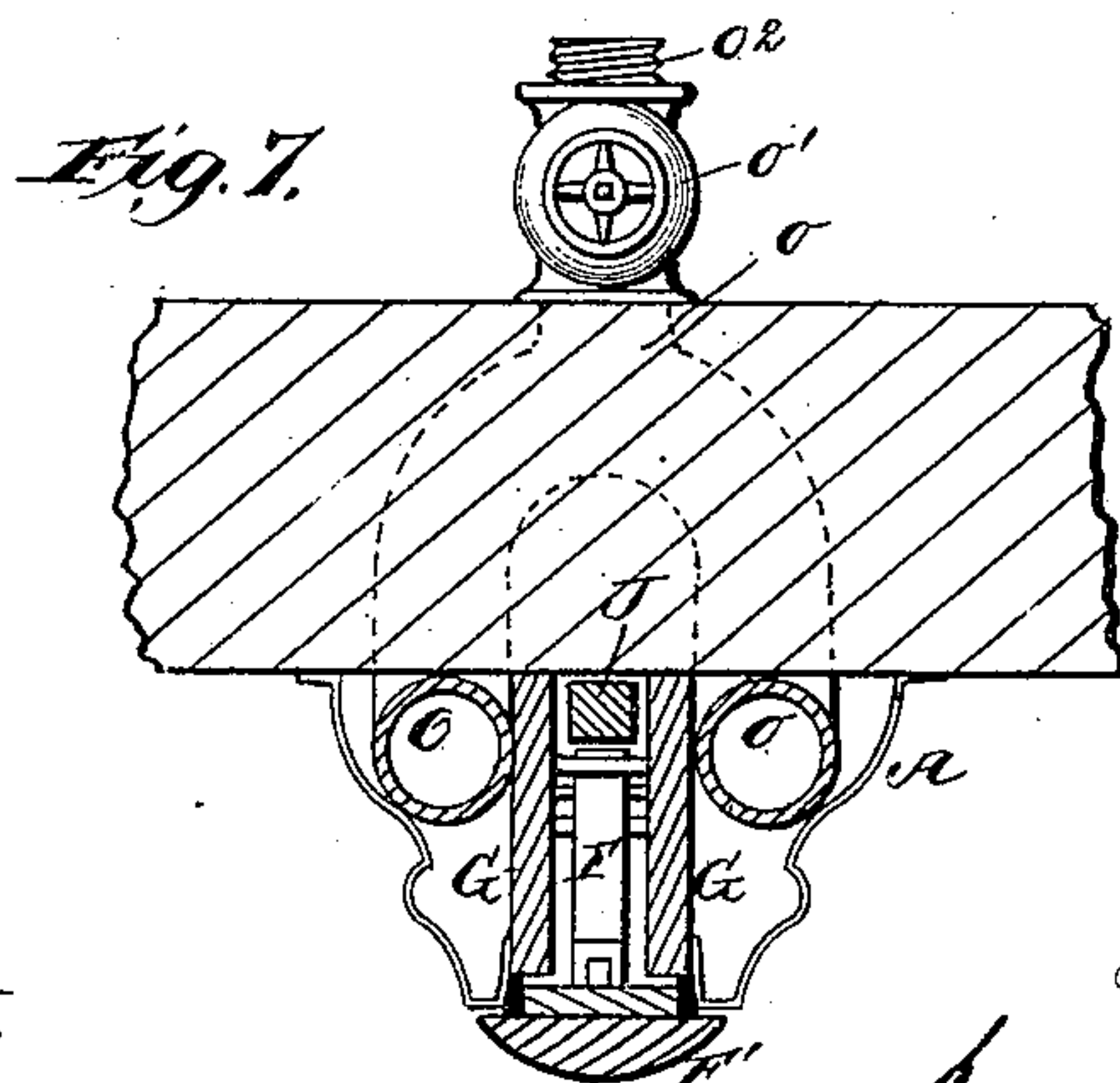
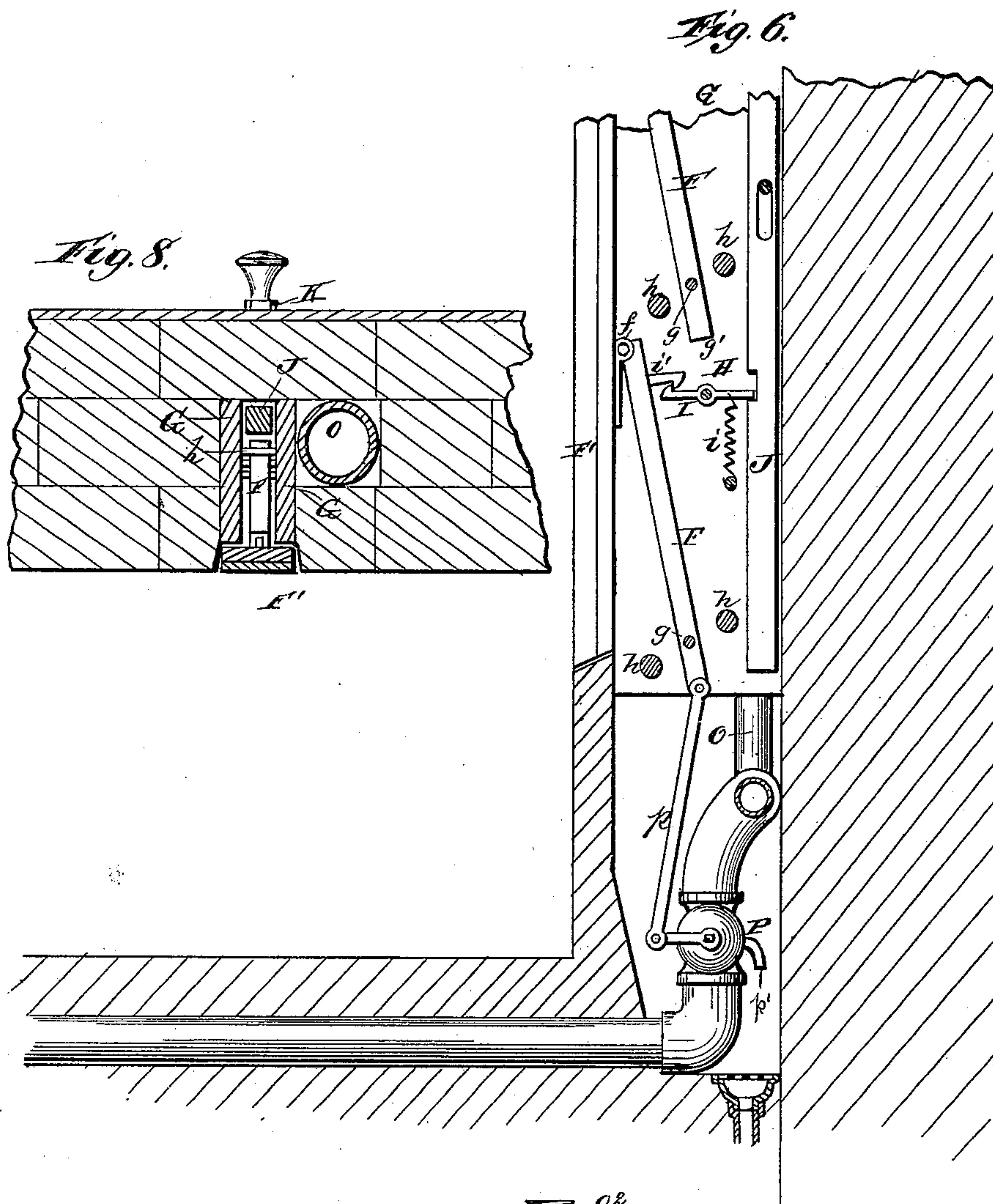
4 Sheets—Sheet 3.

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(No Model.)

4 Sheets—Sheet 4.

J. P. DUNN.  
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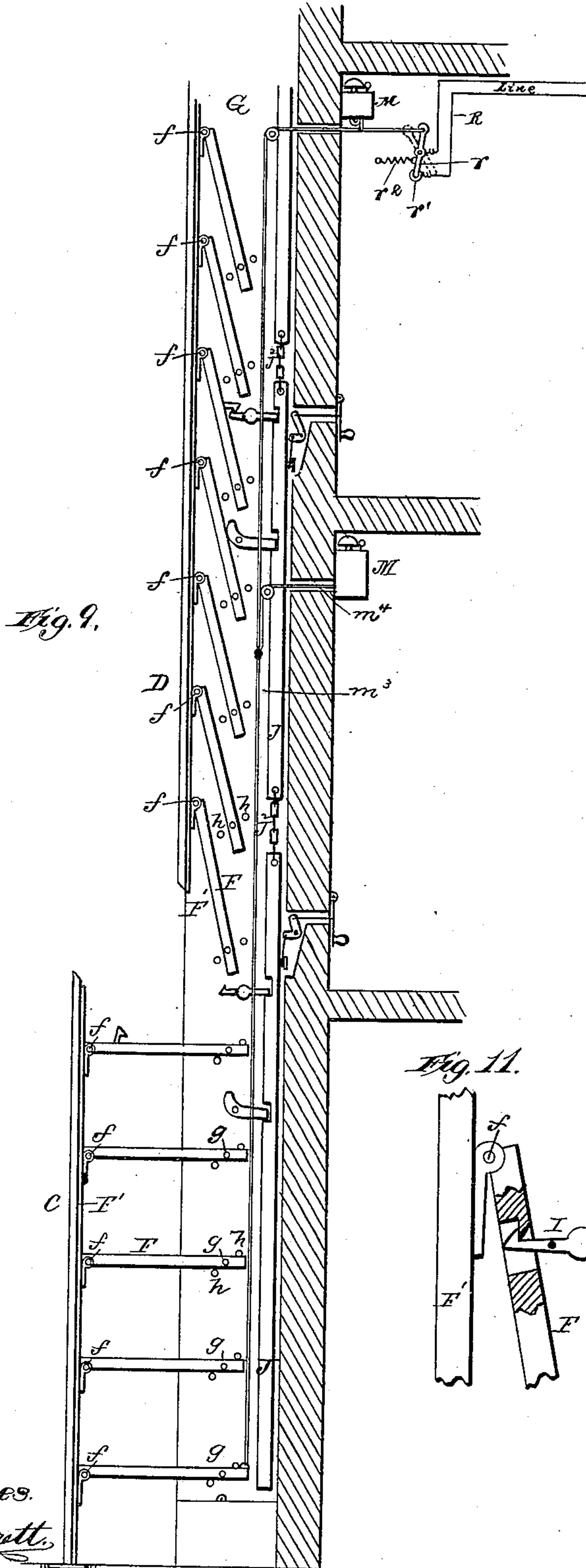


Fig. 9.

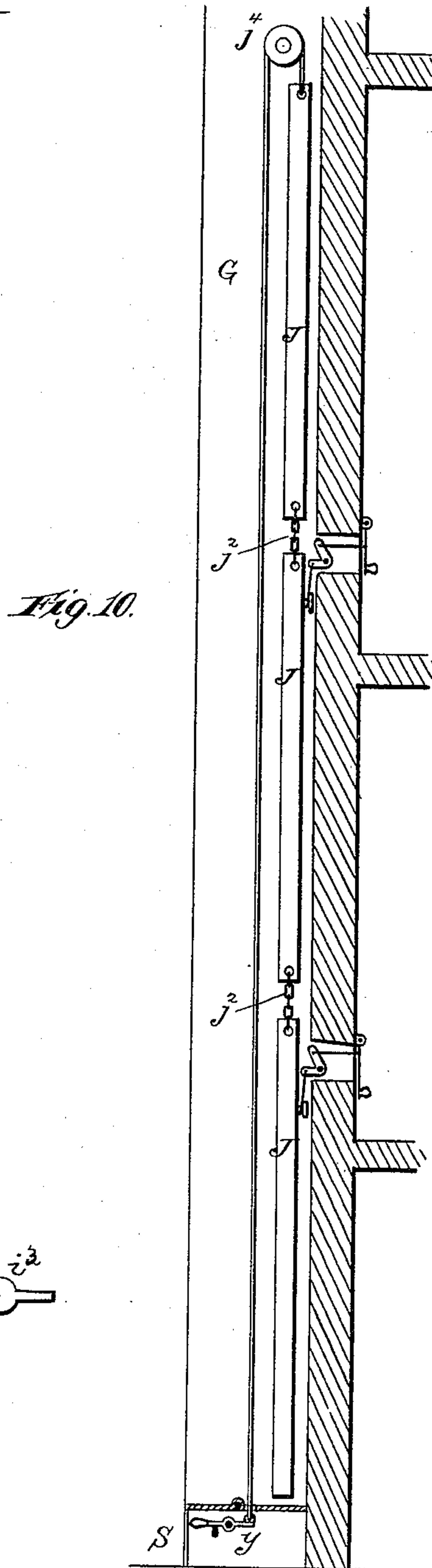


Fig. 10.

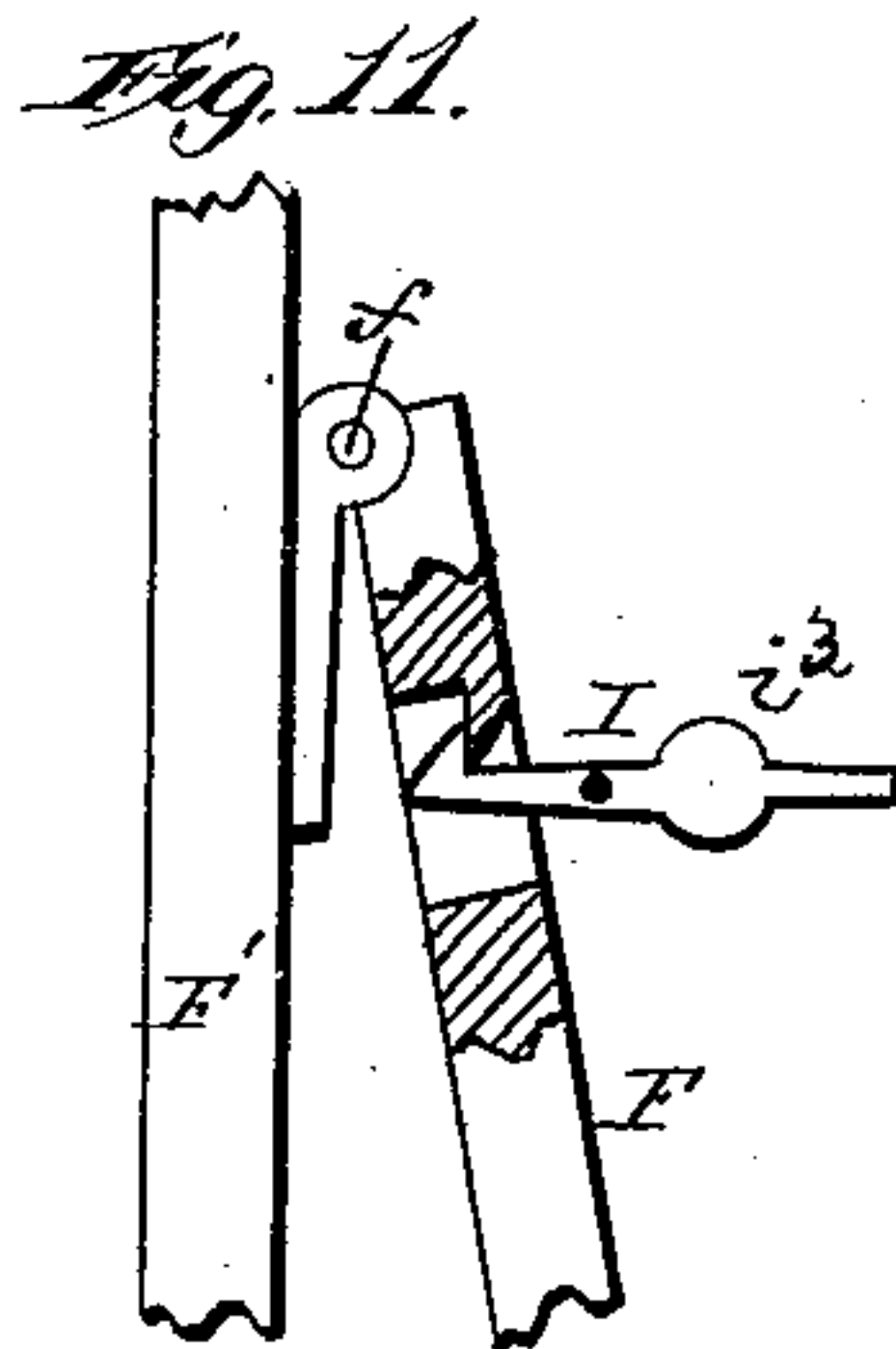


Fig. 11.

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# UNITED STATES PATENT OFFICE.

J. PARIS DUNN, OF BROOKLYN, NEW YORK.

## FIRE-ESCAPE.

SPECIFICATION forming part of Letters Patent No. 267,504, dated November 14, 1882.

Application filed March 6, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, J. PARIS DUNN, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented new and useful Improvements in Fire-Escapes, of which the following is a specification.

In another application for Letters Patent filed by me I have shown a fire-escape similar in some respects to that herein described and shown; and the present invention consists in certain improvements upon the organization and apparatus exhibited in that application, which improvements will hereinafter fully be set forth.

In the accompanying drawings, Figure 1 is a vertical section taken through the windows of a house having my improved fire-escape applied thereto. Fig. 2 is a similar view, with the spring-receptacle for the outside rail of the lower section of the ladder to fall upon when tripped. Fig. 3 is a detail vertical section through the casing of the fire-escape, showing the pivoted ladders and the tripping arrangements. Fig. 4 is a transverse section through the casing; Fig. 5, a detail view, showing the form of joint between the sections of ladder. Fig. 6 is a vertical section through the lower part of the casing, showing the water-pipes which pass up through the casing and the lever arrangement for turning on the water when the lower section of the ladder is thrown down. Fig. 7 is a transverse section, showing the water-pipe projecting into an apartment of the house. Fig. 8 is a transverse section, showing my improved fire-escape built into the wall of a house. Fig. 9 is a view similar to Fig. 1, with the lower section of the ladder thrown out, and includes a modification. Fig. 10 is a vertical part section and part elevation, which includes a modification; and Fig. 11 is a detail view of the catch I engaging directly with one of the rounds. Fig. 12 is a detail sectional view illustrating the ladder-casing, and also showing the ladder-rail in cross-section.

As indicated in the drawings, my improvements may be applied to houses already built, the parts being inclosed in a casing, A, which extends up the side of the house close to the windows, so as to be easily accessible from them, and of course the fire-escape will be applied

principally to houses already erected; but it can built into the walls of houses in course of erection, as shown in Fig. 8, in which event the casing will be flush with the wall, and will not of course be obtrusive in appearance.

It will be observed that the fire-escape consists of a series of ladders, three, C, D, and E, being shown, one for each story of the building. The rounds F of these ladders are each hinged or pivoted at *f* to the sides F' of the ladders at their outer ends, the inner ends of the rounds being pivoted at *g* between the vertical walls G G. The rounds F are extended, as at *g'*, somewhat beyond their pivots in the walls G, so that when the ladders fall out, when they are to be used, the rounds will be sustained between the two pins or studs *h h*, and all strain be thus taken off the pivots *g*. Each section of the ladder is provided with a tripping device to throw the ladder down and out when it is required for use, as shown in Figs. 1 and 2. One of these trips, H, which also holds the ladder folded up in place, as shown in Fig. 3, consists of a pivoted jaw or latch, I, which is held in normal position by a coiled spring, *i*. This latch engages with a catch, *i'*, on one of the rounds F, or in a notch in said round, as shown in Fig. 11 of the ladder-section, and it is operated from the outside of the casing by a key which can easily be reached from one of the windows of the building. When this latch is thrown down, so as to be disengaged from the catch on the ladder-round, the ladder-section will of course fall outward and downward, and will be sustained in the proper position by the studs *h h*. The other tripping device consists of a series of vertically-sliding bars, J, one for each ladder-section. These tripping-bars are connected by a pin, *j*, in one bar, which works in a slot, *j'*, in the bar next above it, and they are so arranged that the pin rests in the bottom of the slot, so that the tripping of one section of the ladder will not disturb the sections above, but the tripping of any section above will trip all the sections below it, as will be hereinafter set forth. The end of the pivoted latch I rests in a notch, *i''*, in the tripping-bar J, so that when the bar is thrown up it will disengage the latch from the catch on the ladder-round and allow the section of the ladder to fall out. Instead of the



slot-and-pin connection, however, chains  $j^2$ , as shown in Figs. 9 and 10, can be used for connecting the ends of the bars J. The sliding tripping-bar is operated by a pivoted lever, K, within the apartment. This lever connects with a bell-crank lever,  $k$ , which is connected by a link,  $k'$ , with the vertically-sliding tripping-bar J. By operating the lever the bar is thrown up and the ladder-section is allowed to fall out, as above described. In order, however, to positively insure the falling out of the ladder-section, I provide a cam-lever, L, which is pivoted in the walls G, and the inner end of which rests in a notch or slot in the tripping-bar. Its outer cam end,  $l$ , bears upon a round of the ladder, so that when the tripping-bar is thrown up to trip the ladder the cam end  $l$  is forced against the pivoted round of the ladder and forces it out, thus overcoming any binding or sticking that might occur, due to ice, or to rusting of the parts, or to any other cause.

The lower section of the ladder operates an alarm, M, of any ordinary construction, one of which alarms can be placed in one or more of the apartments of every floor by which the ladder passes, as shown in Fig. 9. A link-rod,  $m$ , extending from the end of one of the ladder-rounds, preferably the one carrying the catch which engages with the tripping-latch I, is connected with a bell-crank lever,  $m'$ , the other arm of which,  $m^2$ , operates a chain or wire,  $m^3$ , which connects directly with the alarm in such manner that when the ladder-section is tripped and thrown out the alarm will be sounded. Thus, in case of fire, should any one of the ladder-sections be thrown out by the person in the building discovering the fire, the ringing of the alarm would give warning to other occupants of the house; and should the section thrown out be the top one or one of the upper ones, it would trip all the sections below it, as will presently be described, and ring their respective alarms, and thus give warning of danger.

I have said that the alarms M are of any ordinary construction; but they should be so constructed that when the wire  $m^3$ , connected with a pulley in the alarm, is drawn down and unwound by the ladder-section being folded up into place it will wind up or compress its spring, so that it will be in order to ring when the ladder-section is again tripped and thrown out. Where several alarms are employed each alarm mechanism will be connected with the chain or wire  $m^3$  by a suitable wire or chain,  $m^4$ , (see Fig. 9,) so that when the ladder is thrown out all of the alarms will be sounded, thus giving notice of the fire to the occupants of each floor. These short chains or wires  $m^4$  will pass through openings in the wall of the building, and will pass over suitable pulleys mounted either within the ladder-casing or in bearings secured to the wall of the building. As the pins on the vertically-sliding tripping-bars rest in the bottoms of the slots in the bars next above, the throwing up of the upper bars

will draw up all those below it, and thus should the topmost bar be operated it would throw out all the ladder-sections and afford means for escape from the top of the house down.

As an additional means of safety to the inmates of the building and a convenience to the fire department, it is designed to place on each ladder, if so desired, a fire-alarm box, S, securely locked and under control of the fire or other authorized departments, as shown in Fig. 10, and hereinafter described. Attached to the upper end of the upper section of the sliding tripping-bar J is a chain or cable which passes over a pulley,  $j^4$ , Fig. 10, and then down within the case near the ground, where it will be attached to a lever,  $y$ , within the alarm box S. The object of this arrangement is that should the building be discovered to be on fire on the roof or elsewhere by persons outside the house, a member of the fire department having the key to the alarm-box could open the ladder its entire length by operating said lever, thus alarming all the inmates of the building and notifying them to escape, and also affording facilities for the members of the fire department to reach the flames at once.

In order to give a secure joint between the ends of the ladder-sections to prevent lateral play or separation of the ladders from any cause, I make a notch or recess,  $n$ , in the upper end of the inner plate, N, on the side of each ladder-section, and correspondingly shape the lower end,  $n'$ , of the ladder-section next above, so that the parts are interlocked and rendered rigid and secure.

In order to prevent the ends of the section from being battered when the ladder is tripped and thrown out, it is designed to place a spring-cushion,  $S^2$ , in the sidewalk or flagging, onto which spring-cushion the lower end of the outside rail will fall when opened. The spring can be made of solid rubber, or of a spiral spring or its equivalent, and placed in a box, T, Fig. 9.

It will be obvious that, no matter how high the ladder, each round has two stops or pins,  $h h$ , with which to sustain its own weight, so that whether there may be one or six sections tripped and thrown out at a time the strain on the pins would be the same.

It is designed to put a metal covering on top of the spring-cushion and to place the spring-cushion in such position that when the ladder is opened the lower end of the lower outside rail will strike it before the rounds strike the stops or pins  $h h$ . By this arrangement it will be observed that even if one or more of the lower sections shall have been opened before the upper ones, this device will still act as a spring for said upper sections, and will prevent any battering of the ends of said sections when they strike.

The great objection to outside fire-escapes is their liability of being wet, or coated with ice, or rendered slippery from frost, thus becoming practically useless. It has been shown,



however, that this device is closed and therefore not liable to the above objection; yet as a further protection it is designed (when so desired) to cover the rounds or steps with rubber or cloth. This will also obviate the necessity of taking hold of frosty iron in cold weather. Where no covering is used on the rounds or steps the round itself may be corrugated, so that a person can get a firm hold without the liability of slipping off. The rounds can be made of tubing for lightness, and they can be cast with the hinge on, or the hinge may be cast separate and fastened to the round by means of a screw or pin.

In order to give a supply of water in case of fire, I bring water-pipes O up from the ground through the casing A, and on each of the vertical walls G. These pipes are connected with pipes o, Figs. 2 and 7, which extend into each apartment with which the fire-escape is connected. The pipes o are provided with stop-cocks o', and are screw-threaded at o<sup>2</sup> for the reception of a hose, which can be kept in some convenient place within the apartment, and, if desired, could be permanently attached to the pipe. The water is turned on by a cock, P, operated by a lever-connection, p, attached to the lower round of the lower ladder-section, as shown in Fig. 6, so that when that section is thrown down for use the cock P will be opened. When the ladder is closed it shuts the water off from the pipe and opens an escape, p', which will be provided, to allow the water in the pipe to run out into any suitable pipe, which can connect with the street-sewer. Of course the arrangement for supplying water above described may be omitted and the fire-escape used without it, if desired.

My improved fire-escape does not mar the appearance of the building, like the unsightly stairways and other devices which have sometimes been employed; but, as shown in the drawings, the ladder folds up snugly in the case A, the sides F' being rounded and fitting over the edges of the case present a smooth, finished appearance. It affords most ample means of escape and of warning all the occupants of the building of danger in case of fire. It is so constructed as to be perfectly strong and safe, and is so simple that it may be operated by the most ignorant person. Should the lower section only be needed in case of fire, it alone will be thrown out for use, while there will always be a passage to the ground from whatever point at which the escape may be needed.

Of course much of the apparatus above described is similar to that shown in my other application above referred to; but I have deemed it best to fully describe the construction herein shown, in order that the invention may be fully understood without reference to that application.

If desired, a weight, i<sup>3</sup>, could be substituted for the spring i on lever I, as shown in Fig. 11, whereby the defects incident to the use of springs—such as their liability to become weakened by long use—will be avoided.

In Fig. 12 I have shown means for transmitting a signal to an engine house or station when the ladder is thrown out or unfolded. This signal apparatus can be constructed in a variety of ways; that shown, however, being sufficient to illustrate my invention. In said figure, R indicates the main wire in an electric circuit, and r a combined circuit maker and breaker, consisting of a pivoted lever connected at one end by an insulated cord, wire, or rod with the alarm mechanism M, already described. The pivot of this lever forms the contact-point with one end of the wire, the other contact being indicated at r'. This lever is so connected with the alarm mechanism M that when the ladder is folded up and the alarm mechanism actuated to prepare the alarm to be sounded when the ladder is next again unfolded the lever will be turned about its pivot, so as to break the circuit. When, however, the ladder is unfolded, the tension upon the lever will be released, and by the action of a spring, r<sup>2</sup>, it will be brought from the position shown in dotted lines to that shown in full lines, thereby establishing the circuit and giving notice to the engine house or station, where a suitable electric-alarm apparatus will be provided.

Of course the alarm M and the circuit maker and breaker can be located in any other desired locality than that herein shown; and, if desired, an alarm could be located outside of the building upon the ladder-casing.

In order to strengthen the ladder casing and the ladder, and to provide a sufficient means for securing the casing to the wall of a building, I form the sides of said casing of L or angle iron, as particularly shown in Fig. 12, and I form the ladder-rail of T-iron, as also shown in said figure. I form the sides of the ladder-casing thicker at its angular portion, as at S, and between the ladder-rounds and the outer thinner portion, s, of the ladder-casing and the ladder-rounds I arrange washers f<sup>2</sup>, upon the pivots on which the rounds are supported and turn, whereby the latter will be prevented from lateral vibration. These parts of the casing that are thus reduced in thickness afford ample room for the rounds; but when the ladder is unfolded the inner ends of the rounds will be brought into the contracted space between the thicker portions s' of the casing-walls, and fit within the space between the same, thus affording additional security against any lateral movement or swaying of the ladder while it is in an unfolded condition.

By forming the rail of the ladder-section of T-iron it can be made light, and at the same time possess such stiffness or rigidity that it will enable the parts of the ladder to be accurately brought into position for locking when the ladder-section is folded into the casing.

Having thus described my invention, what I claim is—

1. The combination, in a fire-escape, of the pivoted ladder-section with the vertically-sliding bar J, the spring-latch I, pivoted to the fixed



casing, and the catch *i'*, secured to one of the ladder-rounds, as described.

2. The combination of the pivoted ladder-section with the latch I, the vertically-sliding bar J, with slots or notches, in which one end of said latch rests, the cam L, and a spring or weight connected with the latch, substantially as described.

3. The combination of the ladder-section, the vertically-sliding tripping-bar, mechanism operated by the bar to trip the ladder, the operating-lever within the apartment, and the lever-connection with the tripping-bar, substantially as set forth.

4. The combination of the tripping-lever within the apartment, the bell-crank lever, and the connections between it and the tripping-lever, and vertically-sliding tripping-bar, the latch operated by it, and the pivoted ladder, substantially as set forth.

5. The combination of the pivoted ladder-section, the connecting-rod *m*, extending from the end of the rounds of the ladder to the bell-crank lever, the wire *m*<sup>3</sup>, the alarm M, and mechanism for tripping the ladder and sounding the alarm, substantially as set forth.

6. The combination of the pivoted ladder-section, the system of water-pipes, the cock in the water-pipe, the lever-connection with the pivoted ladder, and mechanism for tripping the ladder, and thus turning on and off the water, substantially as set forth.

7. The combination of the pivoted ladder-section with the tripping mechanism operated by the sliding bar J to trip the ladder, the alarm-box at the foot of the ladder, and the

wire passing from the alarm-box up over a pulley and connecting with the slide-bar of the upper section of the ladder, whereby the ladder can be thrown out by a person controlling the end of the wire at the alarm-box, substantially as described.

8. The combination of the ladder-section with mechanism for tripping the ladder, and the spring-cushion arranged to receive the lower end of the outer ladder-rail when the ladder is tripped, and to thereby take up the shock, substantially as described.

9. The combination, with the ladder capable of being folded and unfolded, substantially as described, of an electric circuit maker and breaker located in an electric circuit and controlled by the movement of the ladder, so as to establish the circuit when the ladder is unfolded, for the purpose of giving an alarm at some remote station.

10. The combination, with the pivoted ladder-section, of the L or angle iron forming the two sides of the casing, through which the bolts pass to secure the same to a building, said sides being thickened near their corners to form a contracted space, in which the ends of the ladder-rounds fit when the ladder is unfolded, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

J. P. DUNN.

Witnesses:

ALBERT H. NORRIS,  
J. A. RUTHERFORD.