

D. ISRAEL.
FIRE ESCAPE.

APPLICATION FILED MAY 3, 1910.

983,904.

Patented Feb. 14, 1911.

2 SHEETS—SHEET 1.

Fig. 2.

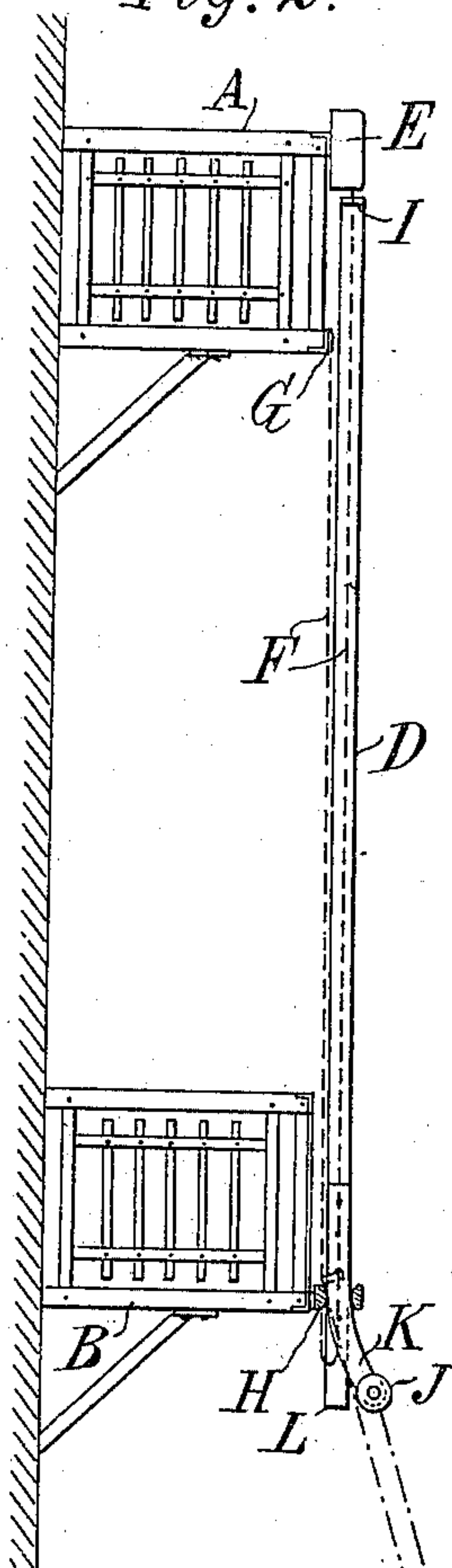


Fig. 1.

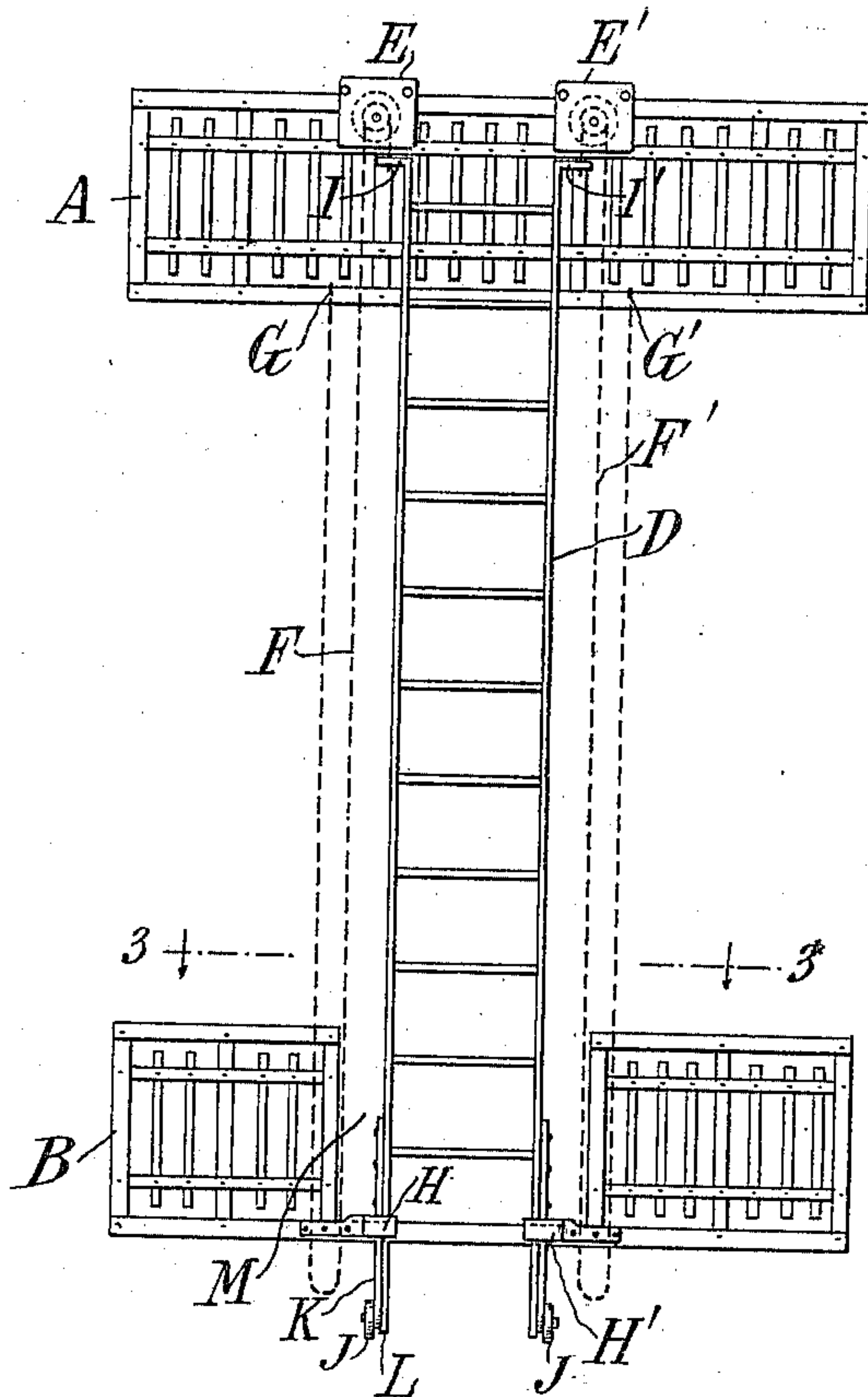
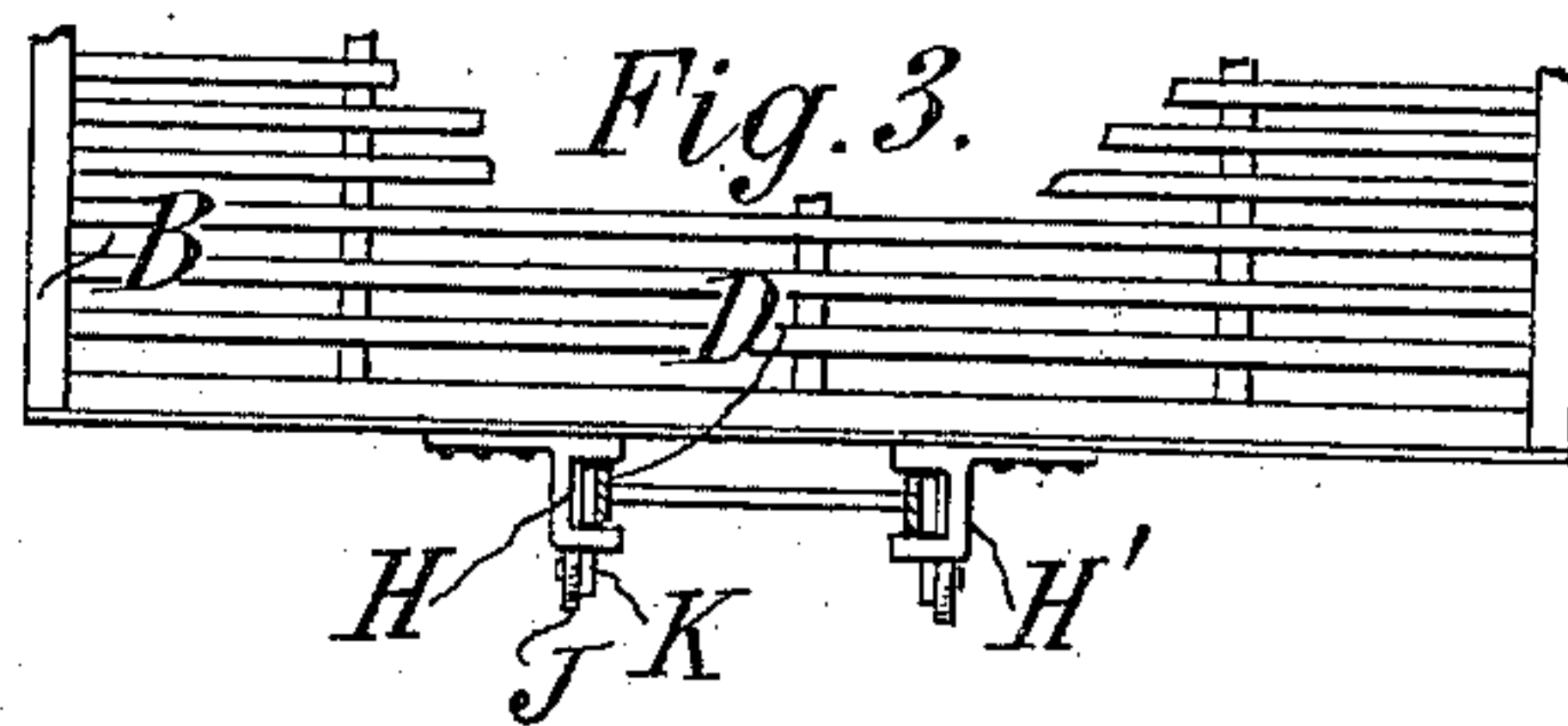


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 4.

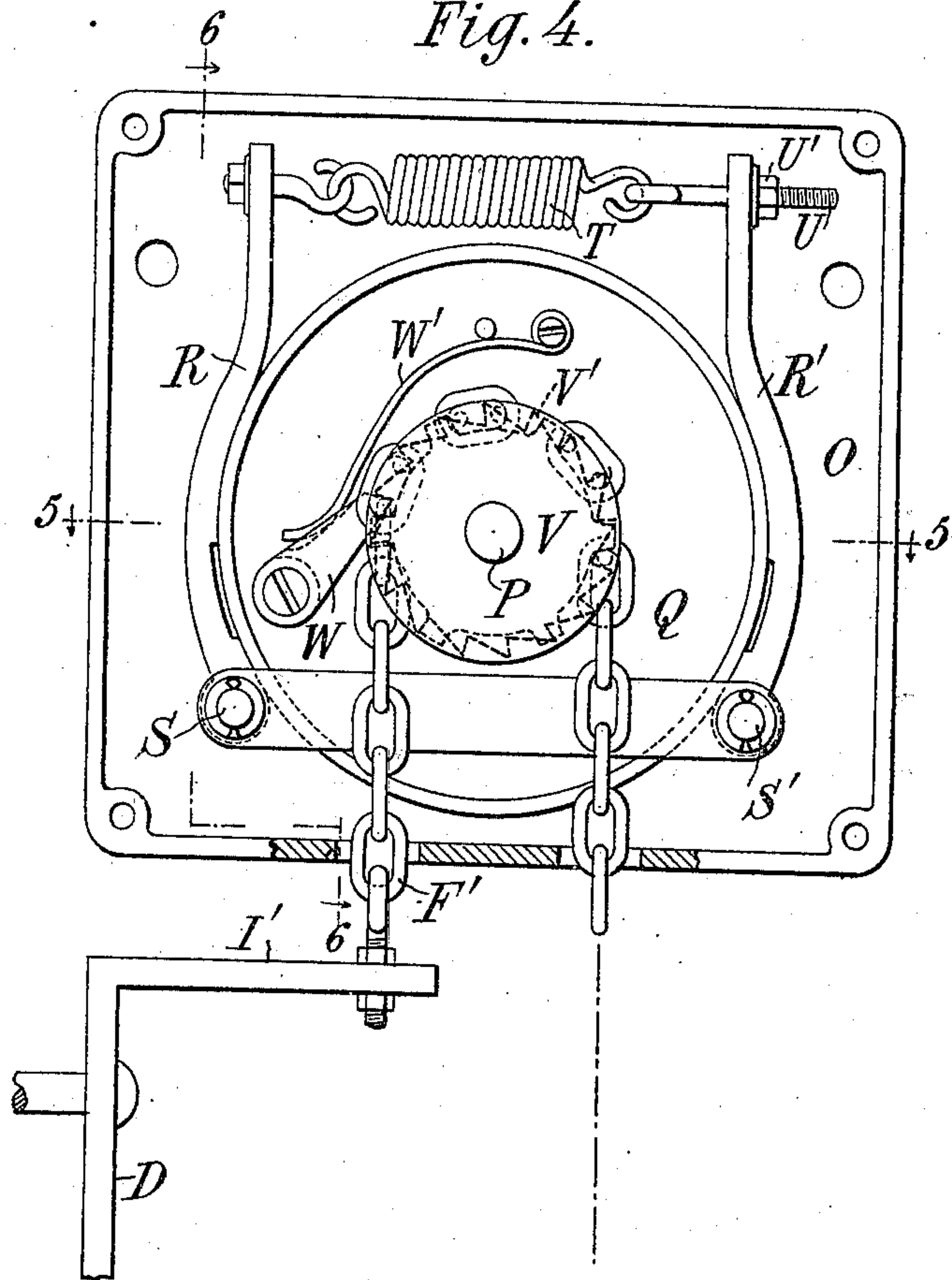


Fig. 6.

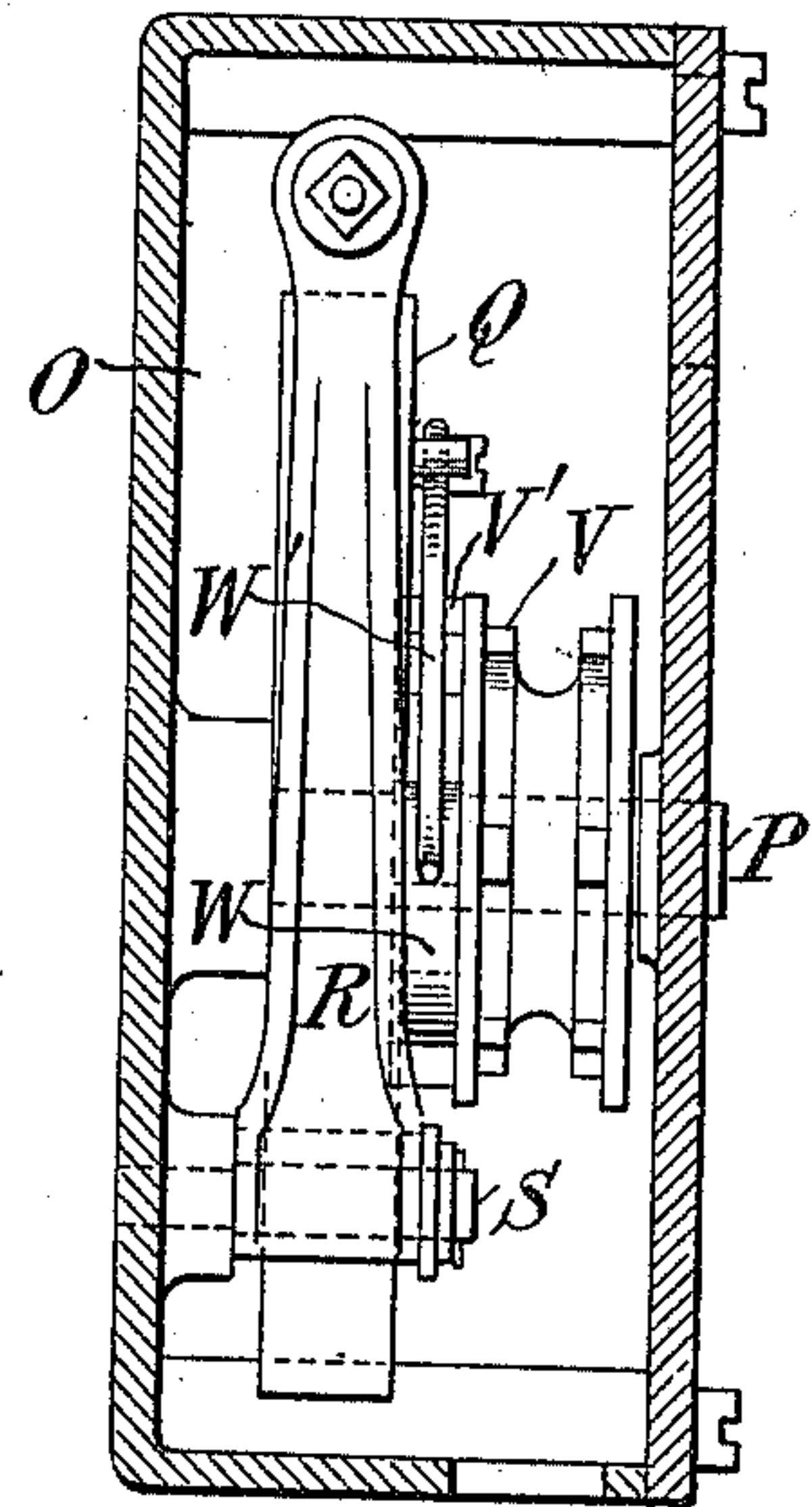
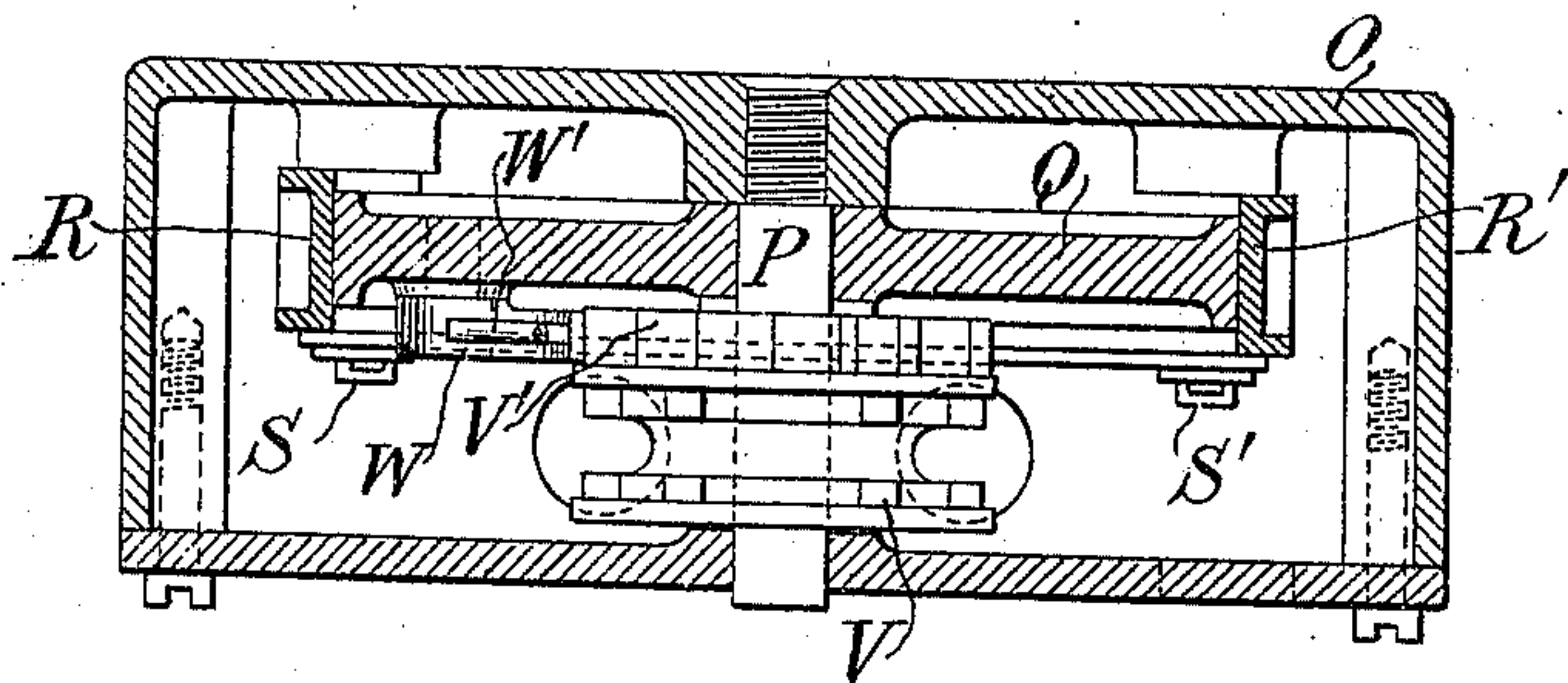


Fig. 5.



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UNITED STATES PATENT OFFICE.

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FIRE-ESCAPE.

983,904.

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To all whom it may concern:

Be it known that I, DAVID ISRAEL, a citizen of the United States, residing in the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Fire-Escapes, of which the following is a specification.

This invention relates to fire escapes, and aims to provide certain improvements therein.

The invention is particularly directed to fire escapes of that type in which each floor is provided with a balcony, the several balconies being connected with each other by means of ladders or stairways. While the connecting ladders between the several balconies are ordinarily permanent, it is not customary to provide a permanent ladder between the lowermost balcony and the ground or sidewalk. A common expedient has been to provide a ladder, the upper end of which is hooked over the second balcony with its lower end at about the level of the first balcony, it being the intention that in case of fire the ladder shall be lifted from its hooks and lowered to the ground. The weight of the ladder, however, is necessarily so great as to prevent its manipulation by children and other persons of little strength. Furthermore, in the excitement of a fire there is great liability of misplacement of the ladder or accident in lowering.

My invention in its preferred form is designed to avoid these several disadvantages. It includes a ladder or other similar device temporarily supported with its lower end above the ground, and adapted to be moved to its lowermost position by a simple pulling or pushing action on the part of the user. Preferably it is supported by chains which pass around friction devices which are preferably adjusted in such manner that while the weight of the ladder is adequately supported, the latter may be moved easily from its upper to its lower position. Means are also provided whereby the ladder is properly guided in its movements and retained in its lowered position so that its upper end cannot slip from the balcony.

My invention provides other features of improvement which will be hereinafter more fully described.

Figure 1 is a front view of a fire escape provided with my invention. Fig. 2 is a

side view partly in section. Fig. 3 is a sectional plan on the line 3—3 of Fig. 1. Fig. 4 is a front elevation of the friction device provided by the invention, the front plate being removed. Fig. 5 is a section on the line 5—5 in Fig. 4. Fig. 6 is a side elevation of Fig. 4, the casing being shown in section on the line 6—6 in Fig. 4.

Referring to the drawings let A indicate a fire escape balcony of ordinary construction located for instance on the second floor of a building, and B the balcony on the first floor above the ground. These balconies may be of any usual construction, and so far as my invention is concerned might even be omitted. Customarily the balcony A is connected with the balcony B by an inclined ladder which is more or less permanent in its construction and mounting. This ladder forming no part of the present invention is omitted from the drawings. In most instances it is not desirable to permanently connect the balcony B with the ground level C in order to prevent access to the balcony by unauthorized persons, and in order that the ground below the balcony may be unobstructed. It hence becomes necessary to provide some means whereby in case of fire the balcony B may be connected with the ground. Several ways have been proposed for accomplishing this result such as the provision of a loose ladder having hooks at its upper end which are designed to engage the upper balcony A and to be lowered into proper position in case of fire. It has also been proposed to pivot a ladder to the balcony B and counterweight it so that in case of fire the weight of the user will bring its end to the ground. These methods are quite objectionable in practice. In the first case the weight of the ladder and the difficulty in lowering it by persons of immature age or deficient strength has prevented its proper use, while in the second case the counterweights are very apt to carry the ladder up and injure the users, particularly when stepping off the ladder upon the ground. Other objections are also incident to the use of such constructions.

According to my invention I provide a ladder D which is preferably supported as best shown in Fig. 1 upon the balcony A in such manner that it may be easily lowered or depressed in case of necessity by the exercise of very little strength so that a child or old person can quickly and certainly

bring it into proper position. Preferably also the ladder is so supported that when it is lowered it has no tendency to rise. To this end I preferably provide a friction device or devices which are designed to hold up the ladder with just sufficient friction to prevent its falling by its own weight or by accidental shocks or movements which it customarily receives. Such friction devices are indicated in Figs. 1 and 2 by the reference letters E E'. In the construction shown chains F F' are connected to the upper end of the ladder and pass through the devices, the chain being of sufficient length to form loops extending approximately to the level of the lower balcony, their upper ends being connected at G G' to the balcony A. The friction devices E E' are preferably mounted on the front side of the balcony A so that the ladder D when hanging vertically will lie in front of both balconies. By this means the balconies are free from any obstruction, and the ladder is free from any substantial frictional resistance except that provided by the devices E E'. The ladder D is preferably guided in suitable guides H H' fastened to the front of the balcony B by rivets or bolts, such guides embracing the sides of the ladder D and insuring that the latter will be accurately guided in its descent. In order that the chains F F' shall be a sufficient distance away from the sides of the ladder to prevent their becoming entangled in any way with the ladder, the latter is provided with offsets or arms I I' at its upper end to which arms the chains are fastened. The arms I I' also serve the important purpose of preventing any possibility of escape of the upper end of the ladder from the balcony B when the ladder is lowered to its lowermost position.

I prefer to provide means whereby the ladder will more or less automatically assume an inclined position when lowered. To this end I mount a roller or rollers J at or near the lower end of the ladder upon inclined arms K, the parts being so proportioned that the rollers extend slightly beyond the end of the ladder proper L so that they strike the ground in advance of such end, being slightly off the longitudinal line of the ladder, the ladder will tilt and run upon the rollers until its inclination reached such a degree that the ends L contact with the ground. By the construction just described the ladder may be lowered into position without any care upon the part of the user. The guides H H' are preferably curved on their inner faces so as to permit this tilting movement. These various features will adapt the device for use under the conditions which usually obtain in case of fire.

The lower balcony B is preferably provided with an opening or gateway M which

is properly located to permit the user to pass through it while stepping on the ladder D. Preferably the ladder in its normal position is so hung that its lower end extends partly or entirely across the opening, and thus forms a gate for the opening to prevent persons from accidentally falling from the balcony through the opening. This construction is illustrated in Figs. 1 and 2.

Any suitable means may be provided for normally upholding the ladder, but I prefer to utilize the construction shown in Figs. 4 to 6 wherein O is a casing or housing adapted to be bolted to the balcony A, said housing having mounted therein a shaft P on which is mounted to turn a friction wheel Q. Arms R R' are pivoted at their ends to the casing O at S S', while at their upper ends they are connected by a spring T which is provided at one end with an adjusting bolt U. The bolt U passes through the arm R', and is provided with a nut U' by means of which the tension of the spring T may be varied to place a greater or less friction upon the periphery of the wheel Q. The chain F passes upwardly within the casing as shown and over a sprocket wheel V mounted on the shaft P and having fixed to it a ratchet wheel V'. Upon the friction wheel Q is mounted a pawl W adapted to engage the ratchet wheel V', a spring W' being provided to maintain the pawl in engagement with the teeth of the ratchet wheel. By this construction when the ladder is pulled downward, the ratchet wheel being connected to the friction wheel, the latter rotates with such freedom as is permitted by the friction arms R R'. This friction is preferably adjusted to such a degree that it will support the weight of the ladder while permitting the latter to be easily moved downward. As the ladder descends its movement will become somewhat easier since there will be an increasing weight of chain upon one side of the friction wheel, while the weight on the other side will be decreased. Hence there is little difficulty in lowering the ladder until it touches the ground, even though the ladder be so short that its upper end lies at the bottom of the balcony B when its lower end is in contact with the ground. In order to raise the ladder it is necessary only to pull downwardly upon the loops of the chain F, in which operation the sprocket and ratchet turn without moving the friction wheel, so that it is necessary only to raise the weight of the ladder without overcoming the friction of the wheel. The latter in this operation remains substantially fixed while the pawl W permits the reverse rotation of the ratchet wheel, holding it at any point to which it may be moved.

The device herein described may be formed of any suitable material or materi-

als, but I prefer to construct the friction devices of metal or other material which will not rust during the long periods of disuse to which devices of this kind are subjected.

5 While I have shown in detail one form of the invention, I do not wish to be limited thereto since various changes can be made therein without departing from the invention.

10 What I claim is:—

1. In a fire escape, the combination of a suspended rigid ladder, and means for yieldably supporting the same in an elevated position said means being adapted to
15 permit the ladder to be lowered without tending to raise it.

2. In a fire escape, the combination of a suspended rigid ladder, and frictional means for supporting the same, said means
20 permitting the ladder to be lowered.

3. In a fire escape, the combination of a suspended rigid ladder, flexible members connected to said ladder, and frictional means over which said members pass, said
25 means permitting said members to move through the same to lower said ladder.

4. In a fire escape, the combination of a balcony having a passageway through it, and a rigid ladder suspended in front of
30 said balcony, and movable vertically to raise and lower the same, and closing said passageway when in its raised position and opening the same when in its lowered position, and frictional means for supporting
35 said ladder in its raised position and per-

mitting it to be moved to its lowered position, by a pull exerted upon the ladder.

5. In a fire escape, the combination of a suspended rigid ladder, and frictional means for supporting the same, said means
40 permitting the ladder to be lowered, and said frictional means comprising a wheel, means for frictionally engaging the same, and means for connecting said ladder therewith.
45

6. In a fire escape, the combination of a suspended rigid ladder, frictional means for supporting the same, said means permitting the ladder to be lowered, said frictional means comprising a wheel, means for frictionally engaging the same, and means for
50 connecting said ladder therewith, and means for disconnecting it therefrom.

7. In a fire escape, the combination of a suspended rigid ladder, and frictional
55 means for supporting the same, said means permitting the ladder to be lowered, said frictional means comprising a wheel, a sprocket, flexible members passing over said sprocket, a ratchet wheel, a pawl adapted to
60 connect said sprocket and said wheel and means for frictionally engaging said wheel.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

DAVID ISRAEL.

Witnesses:

GUSTAVE R. THOMPSON,
EUGENE G. MYERS.