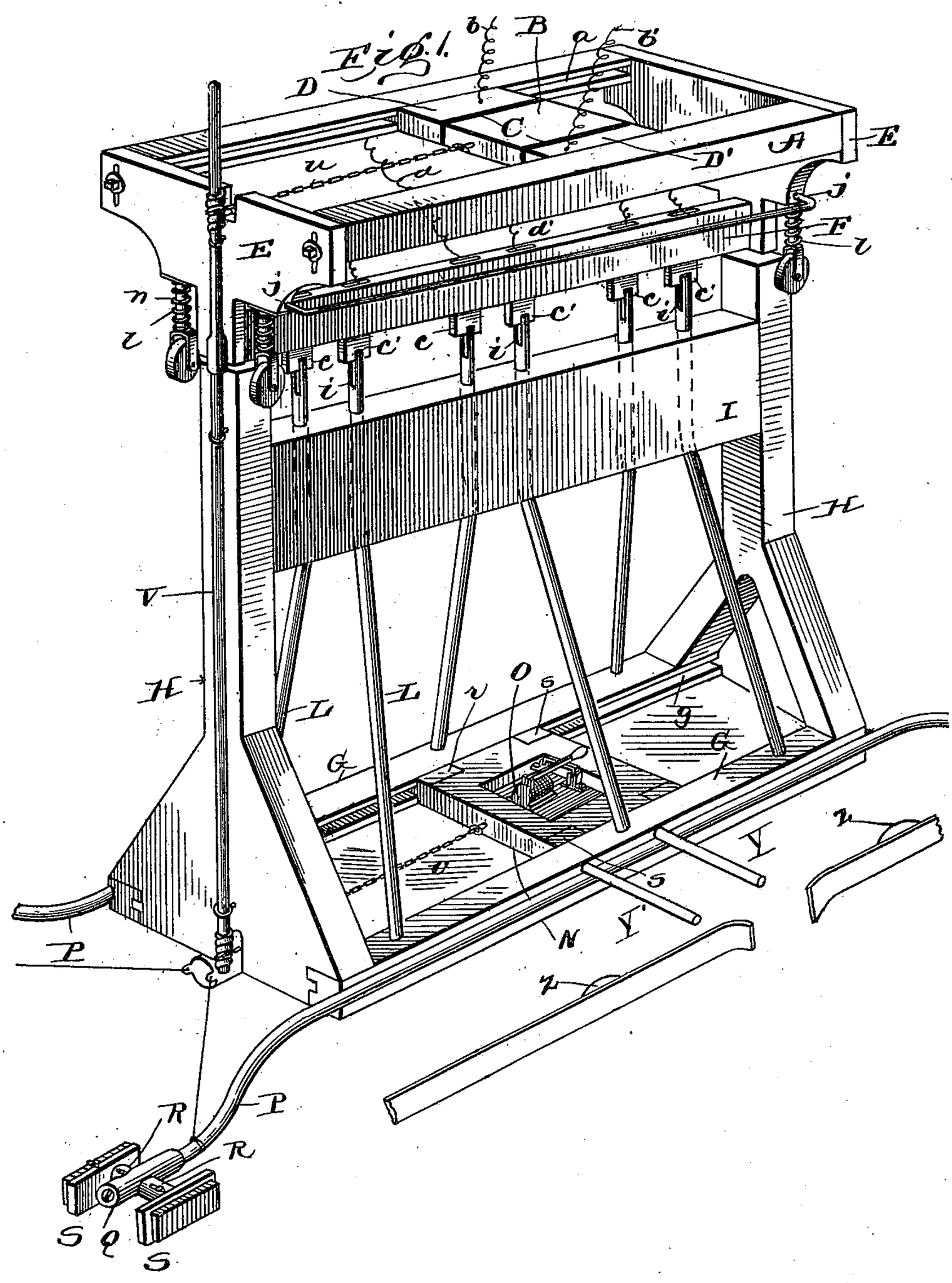
No. 667,079. Patented Jan. 29, 1901.

J. FLOYD.

TRAVELING CONTACT FOR UNDERGROUND ELECTRIC RAILWAYS.

(Application filed Apr. 27, 1900.)

(No Model.) 5 Sheets—Sheet 1.



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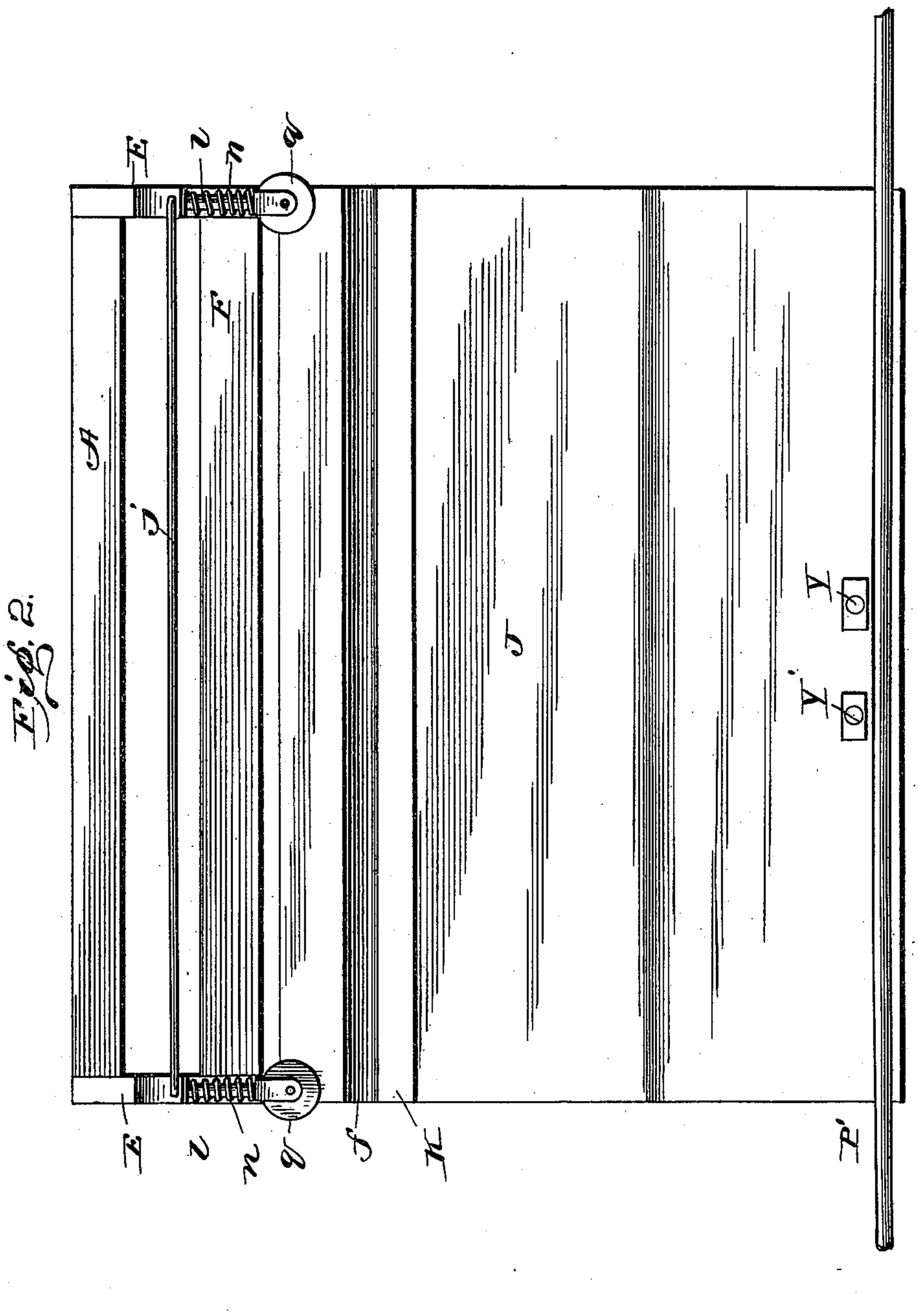

Fig. 2.

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Fig. 3.

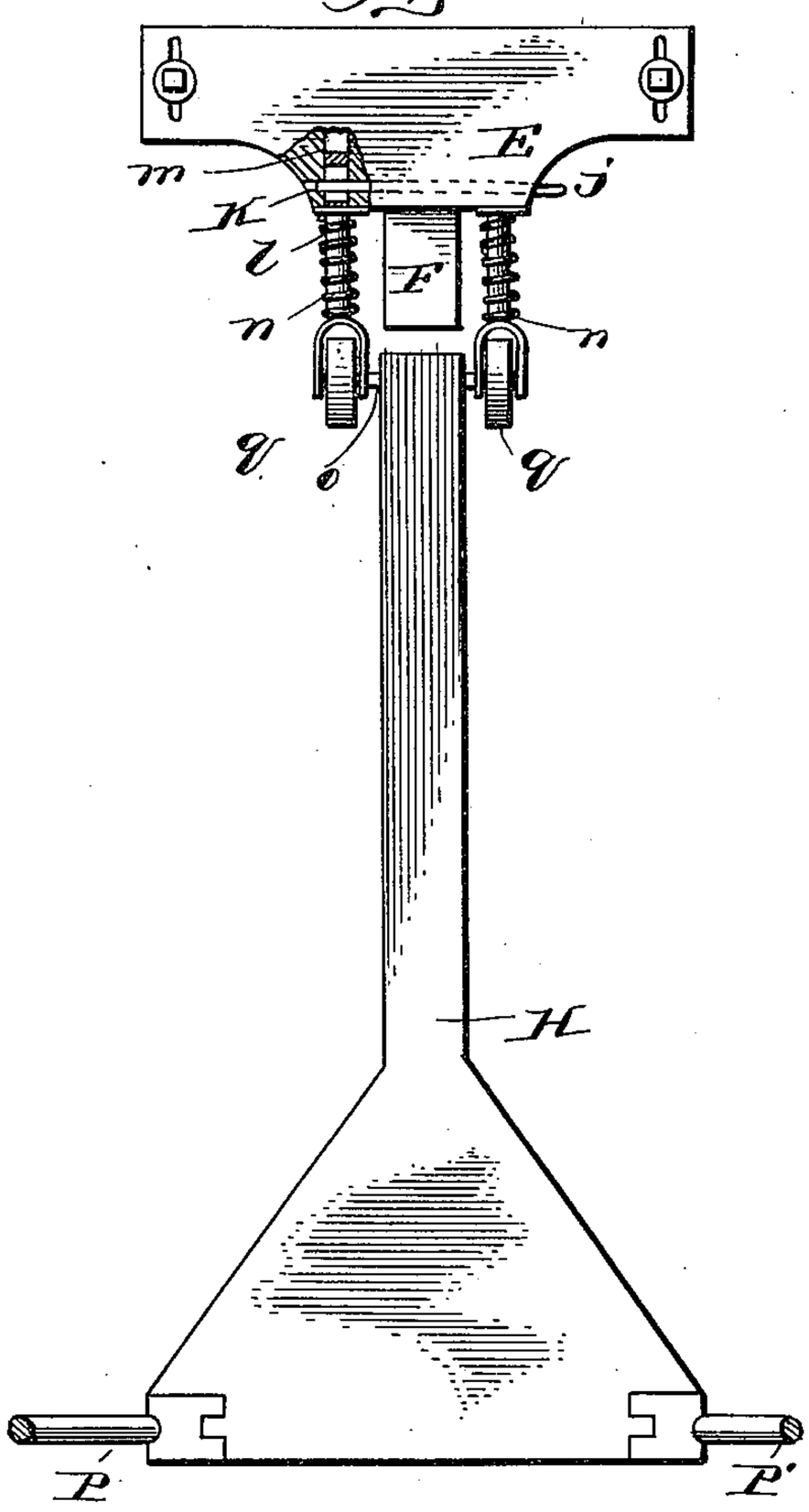

Fig. 4.

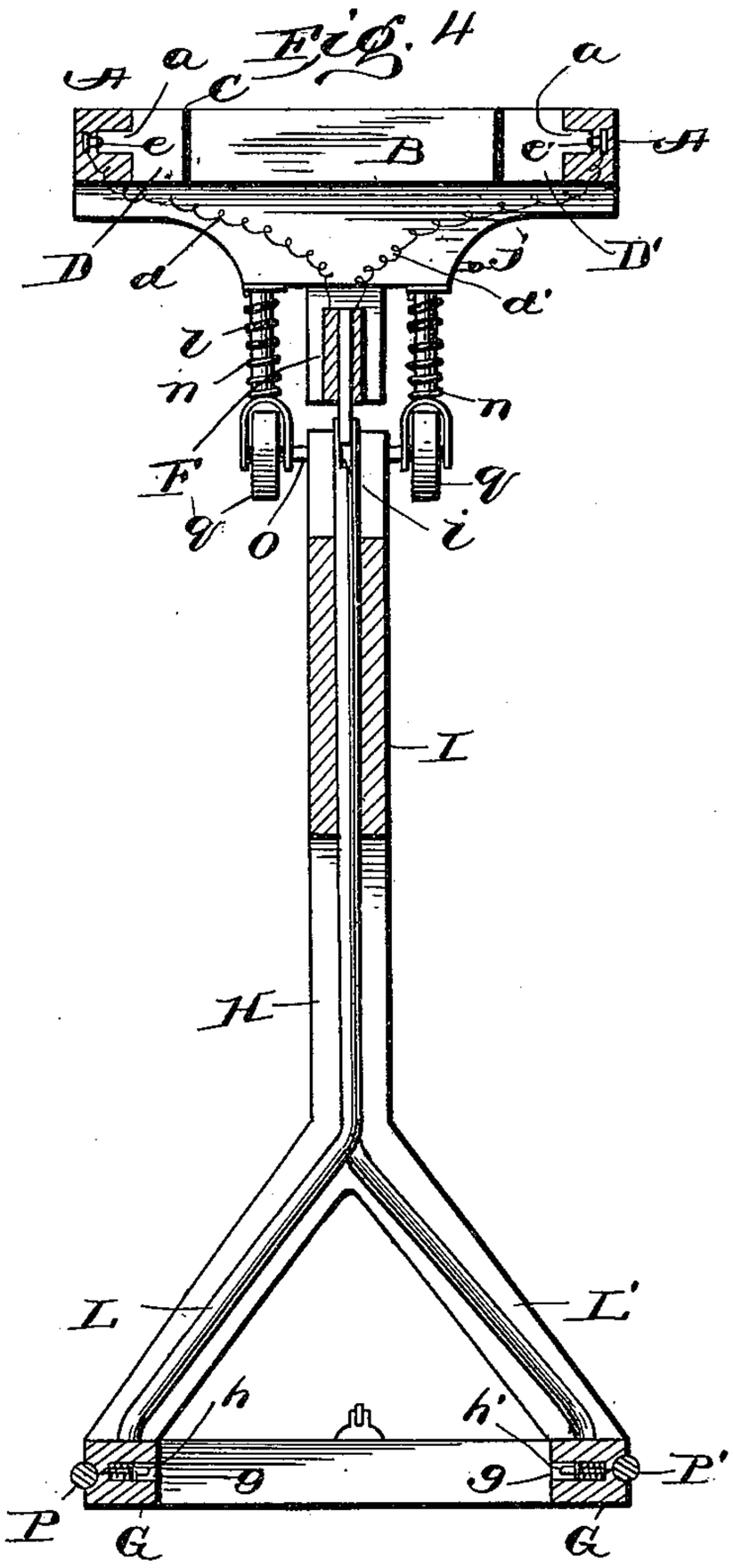

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Fig. 6.

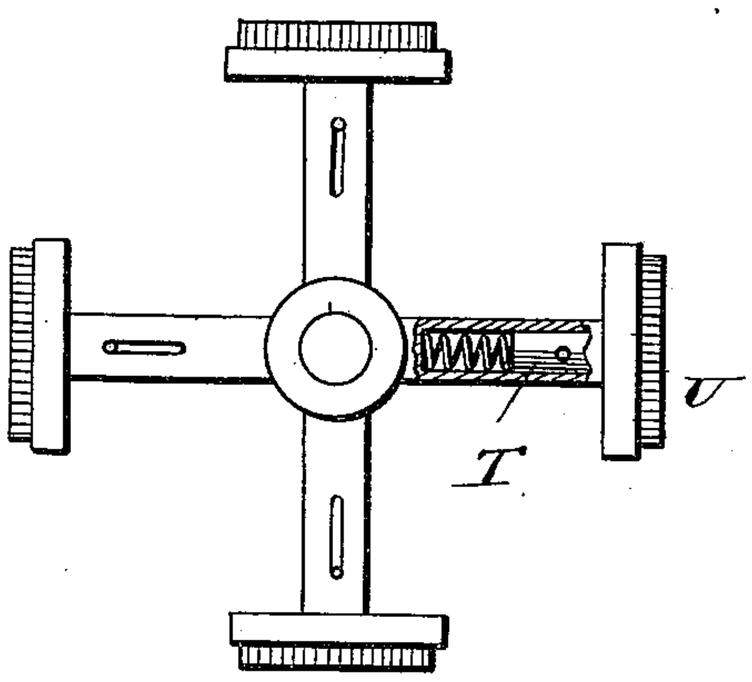
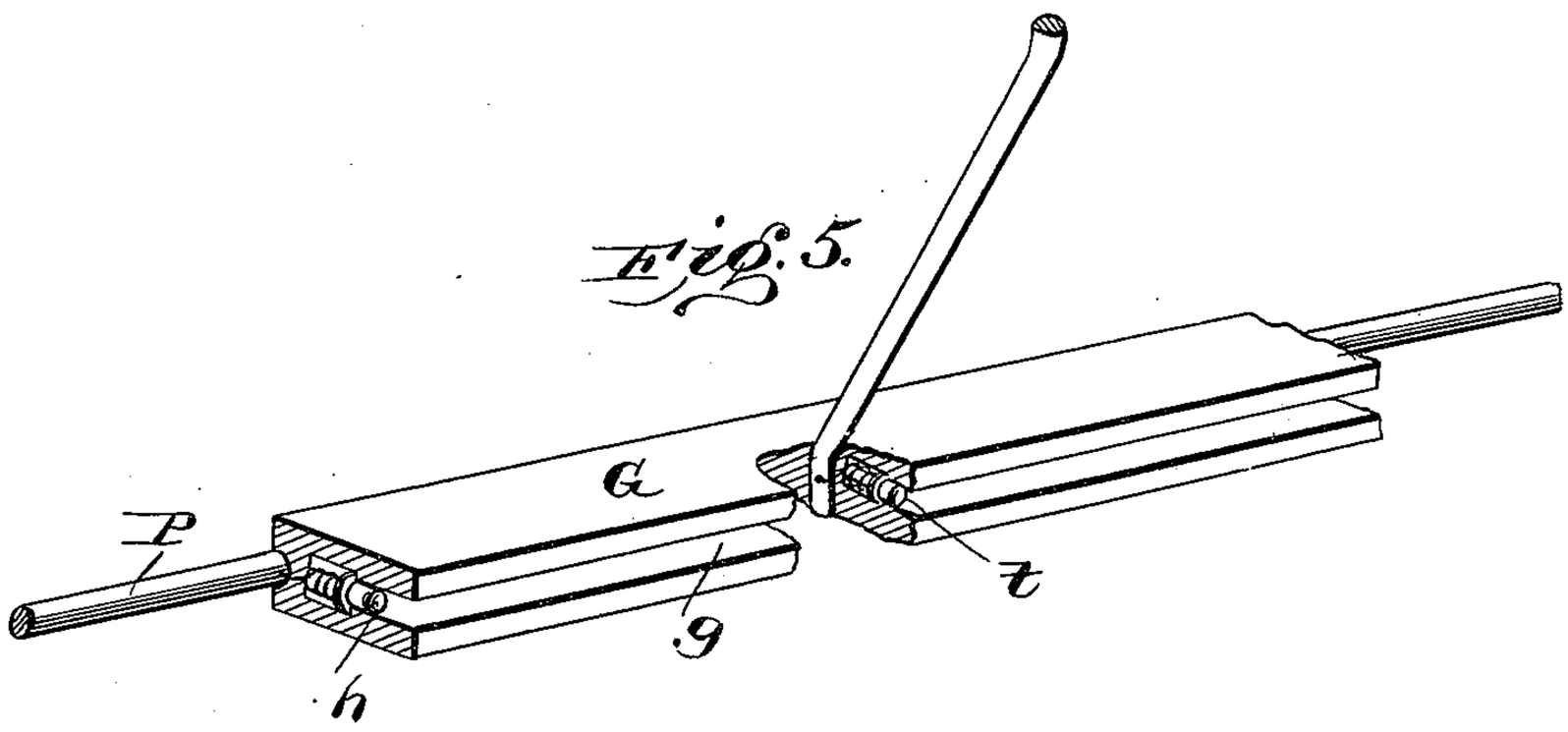


Fig. 5.



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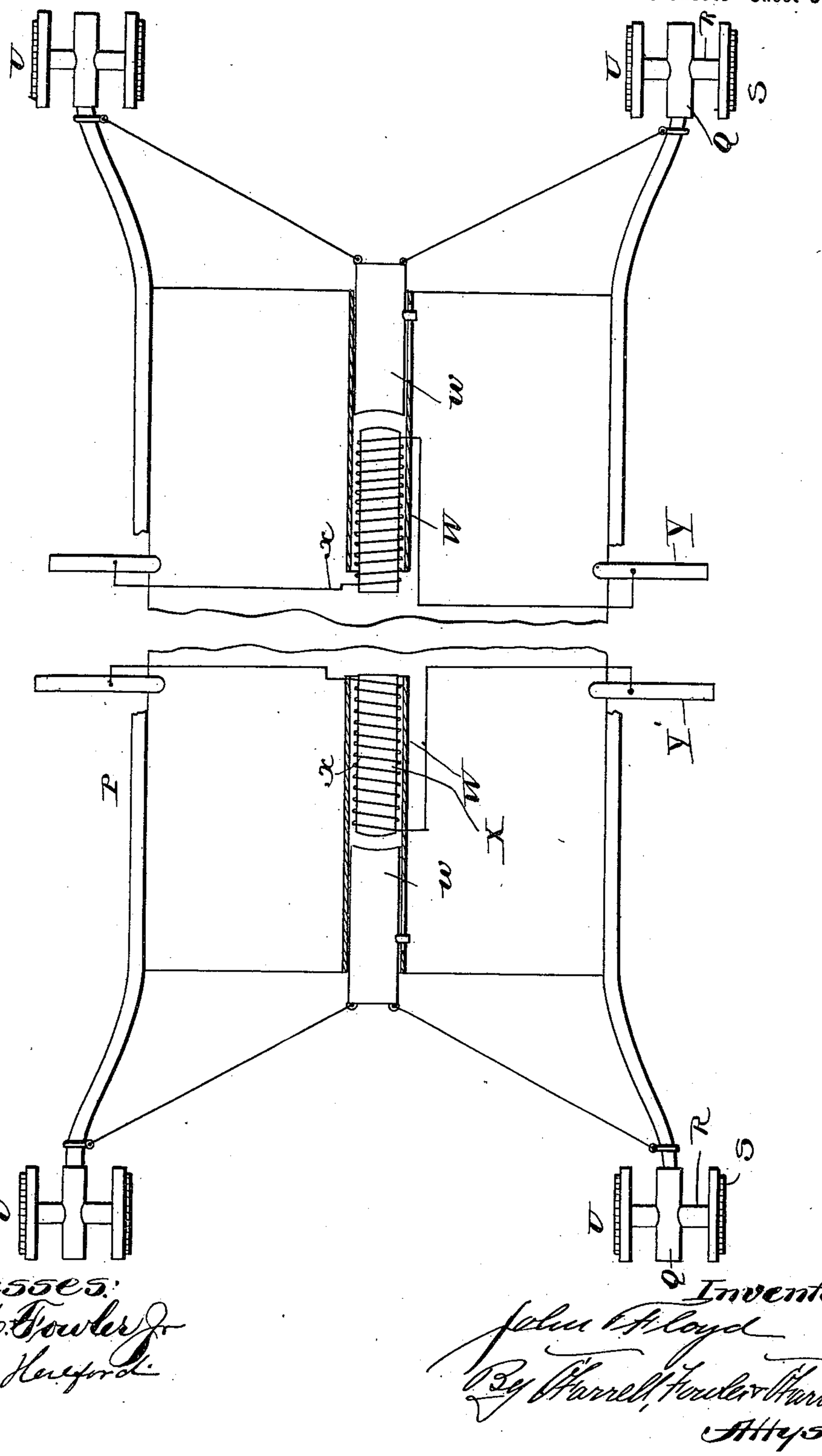
(No Model.) 5 Sheets—Sheet 5.



UNITED STATES PATENT OFFICE.

JOHN FLOYD, OF WASHINGTON, DISTRICT OF COLUMBIA.

TRAVELING CONTACT FOR UNDERGROUND ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 667,079, dated January 29, 1901.

Application filed April 27, 1900. Serial No. 14,538. (No model.)

To all whom it may concern:

Be it known that I, JOHN FLOYD, a citizen of the United States of America, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Traveling Contacts or Plows for Underground Electric Railways, of which the following is a specification.

My invention relates to electric railways, and more particularly to an improved contact or plow designed for use with the underground or conduit systems.

One object of this invention is to provide a plow arranged so as to hold the current when the car is passing over crossings and switches and to afford means whereby the vibration of the plow in passing around a curve is reduced to a minimum.

Another object of this invention is to provide a plow with spring-actuated arms having mounted upon each end thereof reversible contact-blocks with two or more faces and a series of leads adapted to be thrown into and out of connection by sliding contact-blocks, one of which is provided with an automatic current-breaker.

A still further object of this invention is to provide a plow with such connections that it may be easily and quickly attached to or removed from a car and when attached will permit of the oscillation of the car without causing any vibration of the plow.

With these and other objects in view, which will readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts, all of which will hereinafter be more fully described, illustrated, and claimed.

Before giving a detailed description of the several auxiliary features of my invention I desire to here distinctly state and emphasize the fact that although I have shown in the accompanying drawings and described in the specific description which follows certain component and coöperative parts which I deem sufficiently improved and operative to carry out the fundamental principles herein incorporated, however I do not confine myself to the exact details of construction so illustrated and described, since obvious departures may be made without deviating from the inherent and generic features constituting the gist of the device.

In the drawings forming a part of this specification, Figure 1 is a perspective view with the casing removed. Fig. 2 is a side view. Fig. 3 is an end elevation. Fig. 4 is a cross-section. Fig. 5 is a detail view of the slotted bars and contact-buttons. Fig. 6 is a modification of the contact-blocks. Fig. 7 is a bottom plan view.

Referring by letters to the drawings, A A represent oppositely-disposed fiber bars which are adapted to be secured to the bottom of a car. These bars are provided with grooves *a a*, mounted in which is a sliding block B, having in the center thereof a suitable insulation C and contact sides at D and D′, with negative and positive wires *b* and *b′* leading therefrom to the car in motion. Adjustably secured upon each end of the bars A A are plates E E, supporting a longitudinal fiber bar F, provided with a series of negative and positive contacts *c* and *c′*, inserted in its length and connected and positive wires *d* and *d′* to button-contacts *e* and *e′*, mounted in the grooves *a a*.

The plow proper consists of two oppositely-disposed fiber bars G G, secured to perpendicular end pieces H H, connected approximately near their tops by a fiber-bar I. This entire structure is inclosed in a fiber casing J and is provided upon that portion which engages the rail-slot with a steel plate K, having a longitudinal groove *f* therein adapted to carry off the water which comes through the slot in rainy weather. The fiber bars G G are provided with oppositely-disposed grooves *g g*, having contact-buttons *h* and *h′* therein connected to a series of oppositely-disposed negative and positive leads L and L′, which extend upward through the fiber bar I and are provided upon their free ends with slots *i*, adapted to be engaged by the negative and positive contacts *c* and *c′* in the fiber bar F and there held in position by the pins *j j*, which are formed at right angles on the ends of the bar M and are adapted to be passed through the apertures *k k* in the end pieces E E, engaging the slotted arms *l l*, which fit into the recesses *m m* and are provided with coiled springs *n n*, which allow for the oscillation of the car. The arms *l l* are

mounted on axles *o o*, which pass through the apertures *p p* in the end pieces H H and support oppositely-disposed wheels *q q*, which are adapted to engage the rail-slot and to prevent the plow from falling in the conduit should it become detached from the car.

Mounted in the grooves *g g* is a sliding block N, which is provided with a double-pole automatic circuit-breaker O, connected to oppositely-disposed contacts *r* and *s* in the sides of the block. The contact *r* is adapted to engage the contact-buttons *h* and the contact *s* is adapted to engage the contact-buttons *t*, which are connected to the spring-actuated negative and positive conductors P and P′, secured in the sides of the plow opposite the grooves *g g* and covered by any suitable non-conducting material. These spring-actuated arms extend along the sides of the plow, having their free ends projecting in front and to the rear thereof and provided with reversible contact-blocks, which consist of a sleeve or collar Q, having a series of dependent sleeves R, each supporting a casing S.

Mounted in the dependent sleeves and casing are spring-actuated plungers T, supporting contact-blocks U, the object of which is that in case one of the contact-blocks becomes worn or damaged in any way another may be placed in position by revolving the sleeve mounted on the spring-actuated arm and tightening the set-screw in the end thereof.

The sliding blocks B and N are connected by chains *u* and *v* to a shaft V, mounted upon one end of the plow and adapted to project up through the platform of the car, where it may be operated by a detachable handle. The shaft is formed in two parts connected by a male and female joint, so as to allow of the removal of the plow and to leave that portion attached to the car always in position.

It will be readily seen that in case one set of leads should burn out or become damaged in any way another set may be employed by revolving the shaft, which moves the blocks N and B in unison to the desired position for making the proper connections.

Secured to the bottom of the plow, adjacent to each end thereof, are cylindrical tubes W W, having mounted in their opposite ends soft-metal plungers *w w*, which are connected in any suitable manner to the ends of the spring-actuated arms P P′. Each tube is provided with a coil X X, having wires *x x* leading therefrom to the oppositely-disposed arms Y and Y′, secured to the sides of the plow. The arm Y′ is somewhat longer than the arm Y, the object of which will be hereinafter explained.

In the adaptation of my plow I find it necessary to provide the negative and positive rails at each cut-out with raised plates Z, the plates on the approaching side being somewhat lower and closer to the slot than the plate on the opposite side of the cut-out.

It will be readily seen that in passing over a cut-out the arms Y and Y′ will be brought in contact with the raised plates, whereby a current will pass through the coil, thus magnetizing the plunger sufficiently to draw in the forward spring-actuated arms, so as to let the contact-blocks pass freely into the slot, where they are released, and the rear spring-actuated arms manipulated in like manner by the arms Y′ engaging the rail-plates on the opposite of the cut-out.

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

1. The combination with a traveling contact or current-collector, of reversible contact-blocks mounted on spring-actuated arms, a series of positive and negative independent leads and two independent couplings, one of which is provided with an automatic circuit-breaker, substantially as shown and described.

2. The combination with a frame, of the traveling contact, a series of independent positive and negative leads mounted in fiber bars, of two independent couplings one of which is provided with an automatic circuit-breaker, and means for adjusting the couplings substantially as shown and described.

3. The combination with the frame of the traveling contact, of two longitudinal oppositely-disposed groove-bars, having contact-buttons therein connected by wires to contacts in a third longitudinal bar, of a coupling sliding in the said grooves, the said coupling having contact-faces and wires leading therefrom to the car-motor, a series of independent leads adapted to be connected to the contacts in the third-mentioned bar, and of a sliding coupling between the said leads having an automatic circuit-breaker adapted to connect the said leads with the contact-block, substantially as shown and described.

4. The combination with the frame of the traveling contact, of oppositely-disposed longitudinal grooved bars having contact-buttons mounted therein connected to spring-actuated arms supporting reversible contact-blocks and to a series of leads mounted in the bars, the said leads being slotted at their free ends, of a sliding coupling mounted in the said grooved bars the said coupling having an automatic circuit-breaker adapted to connect the contact-buttons of the leads with the contact-buttons of the spring-actuated arms, of the slotted ends of the leads engaging the contacts in a longitudinal bar, having wires leading therefrom to button-contacts in oppositely-disposed grooved bars, having a sliding coupling mounted therein and wires leading therefrom to the car-motor, substantially as shown and described.

5. The combination with a traveling contact or current-collector, a frame adapted to be secured to the bottom of a car, and detachably connected to a second frame, the first-mentioned frame consisting of oppositely-disposed grooved bars, having contact-buttons arranged within the grooves and con-

nected by wires to contacts in a third bar secured to the oppositely-disposed bars by adjustable end plates, and of a sliding coupling or contact mounted in the grooves having wires leading therefrom to the car-motor, of the second-mentioned frame having oppositely-disposed grooved bars secured between two end pieces held together at the top by a third bar, of a series of independent negative and positive leads mounted in the bars of the second-mentioned frame, of the said leads connected to the contacts in the third bar of the first-mentioned frame, of a series of contact-buttons mounted in the grooved bars of the second-mentioned frame and connected to the leads and to spring-actuated arms carrying contact-blocks, substantially as shown and described.

6. The combination with a traveling contact, a frame comprising two parts held together by spring-actuated arms, of the arms being mounted on an axle provided with oppositely-disposed wheels adapted to support the second part, of the first part comprising oppositely-disposed grooved bars having contact-buttons within the grooves and wires leading from the contact-buttons to contacts in a third bar, of the third bar connected to the oppositely-disposed bars by adjustable plates, of the second part comprising oppositely-disposed grooved bars secured between end pieces connected at the top by a third bar, of a series of leads mounted in the second-mentioned bars, of spring-actuated arms supporting reversible contact-blocks, of contact-buttons within the grooved bars connected to the leads and to the spring-actuated arms, of sliding couplings mounted in the grooved bars of the upper and lower frame, of the coupling in the lower frame having an automatic circuit-breaker adapted to connect the leads and the spring-actuated arms, of the coupling in the upper frame having contact-faces and wires leading therefrom to the car-motor, and means for adjusting the couplings, substantially as shown and described.

7. In a traveling contact or current-collector for underground electric-railway systems, a contact-block, comprising a sleeve or collar having a series of dependent sleeves mounted thereon each supporting a casing, of a spring-actuated plunger mounted in the said dependent sleeves, the said plungers supporting contact-blocks within the said casings, substantially as shown and described.

8. In a traveling contact or current-collector for underground electric-railway systems, of spring-actuated arms carrying two sets of contact-blocks of the contact-blocks being adjustably mounted upon each end of the said spring-actuated arms, of each contact-block comprising a sleeve, having a series of dependent sleeves mounted thereon and provided at their free ends with a casing, of a spring-actuated plunger mounted in the said dependent sleeves, supporting contact-blocks within the casing, substantially as shown and described.

9. In a traveling contact or current-collector for underground electric-railway systems, of oppositely-disposed spring-actuated arms mounted upon a plow-frame, of the said arms supporting two sets of contact-blocks, of tubes mounted between the spring-actuated arms on the bottom of the frame, the said tubes inclosing coils having wires leading therefrom to arms on the sides of the frame, and of soft-metal plungers mounted in the opposite ends of the tubes and connected to the ends of the spring-actuated arms, substantially as shown and described.

In testimony whereof I hereto affix my signature in the presence of two witnesses.

JOHN FLOYD.

Witnesses:
PATRICK H. O'FARRELL,
HENRY W. REED.