

(No Model.)

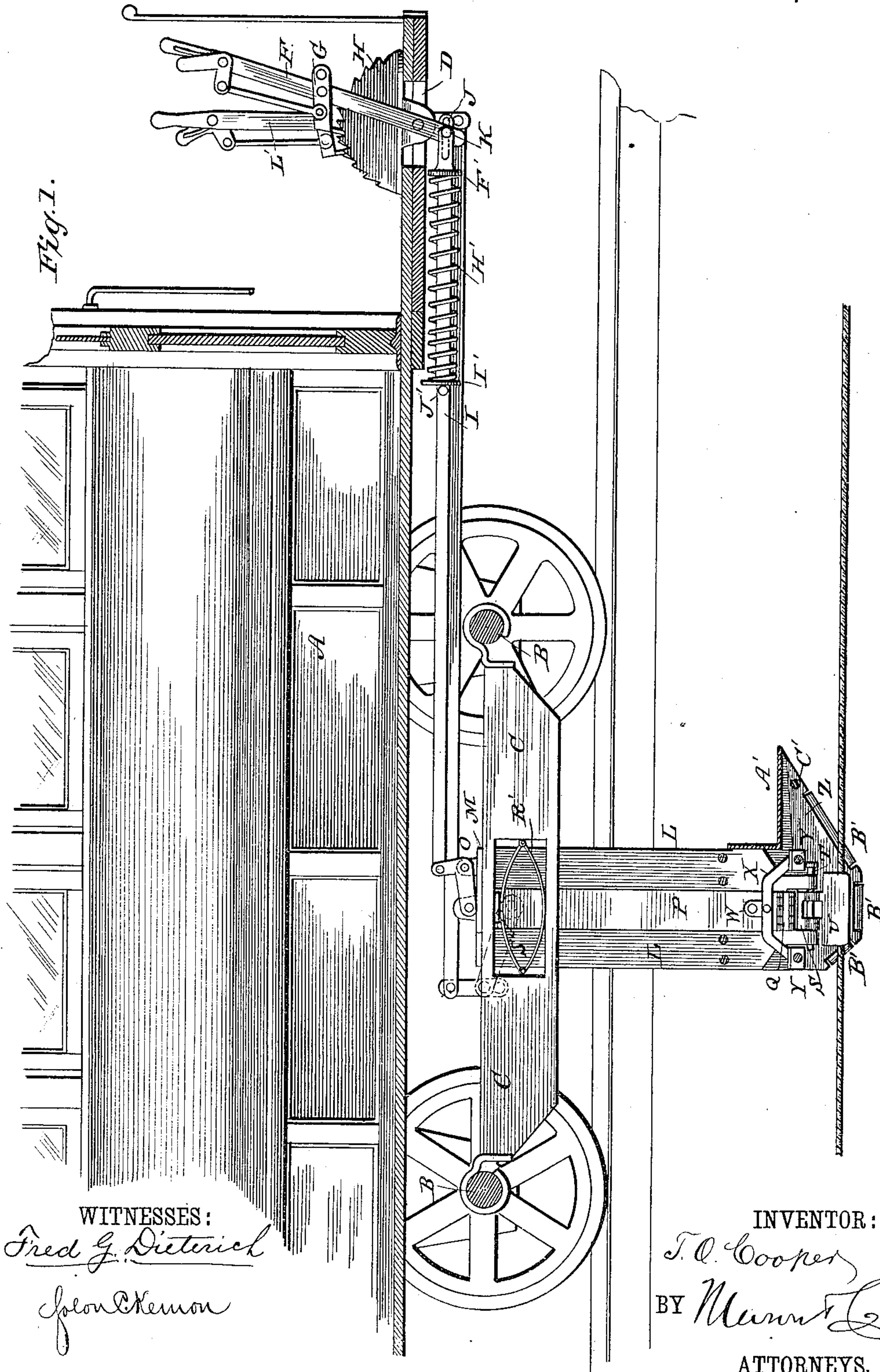
3 Sheets—Sheet 1.

T. O. COOPER.

CABLE GRIP.

No. 350,813.

Patented Oct. 12, 1886.



(No Model.)

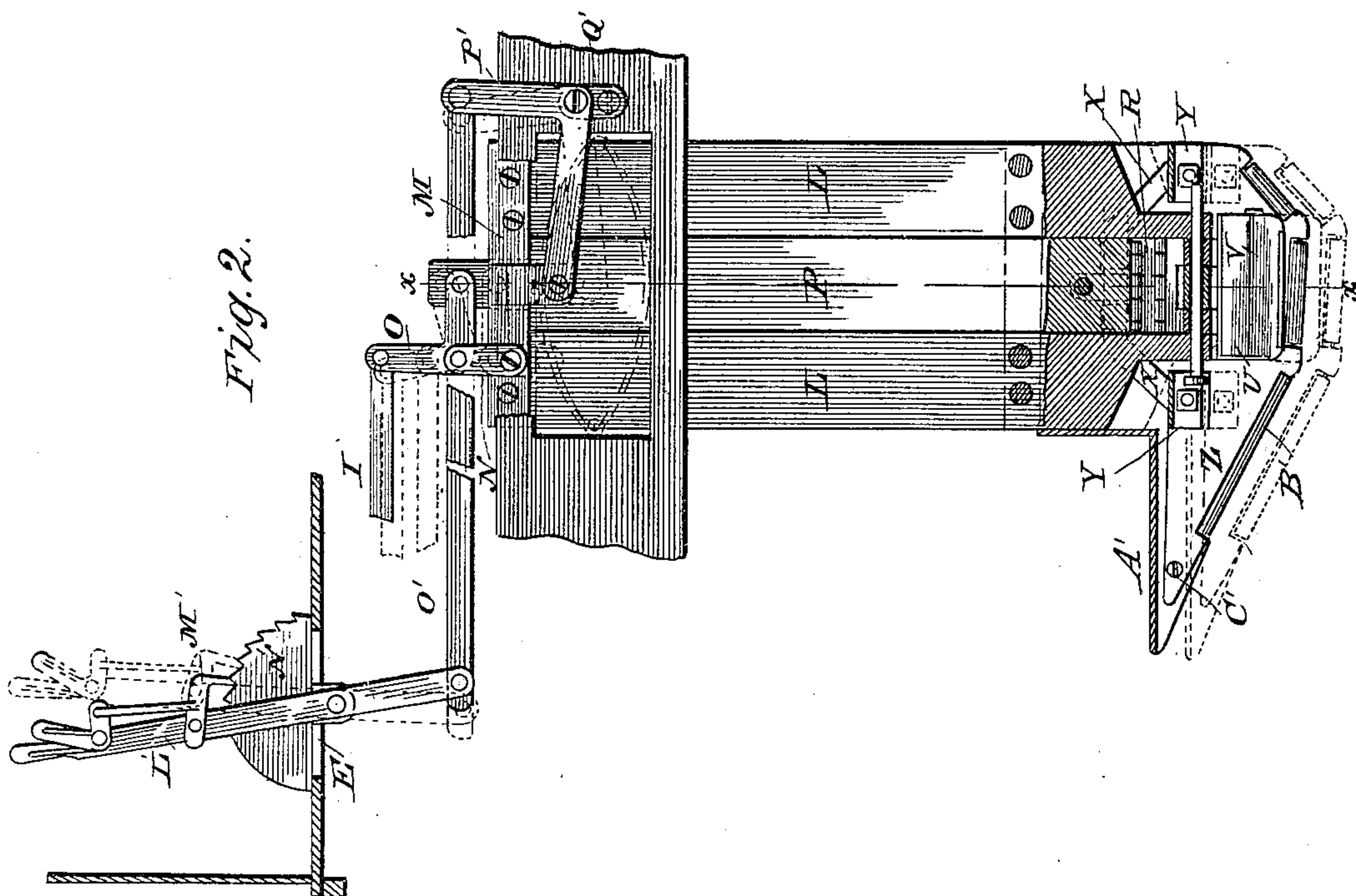
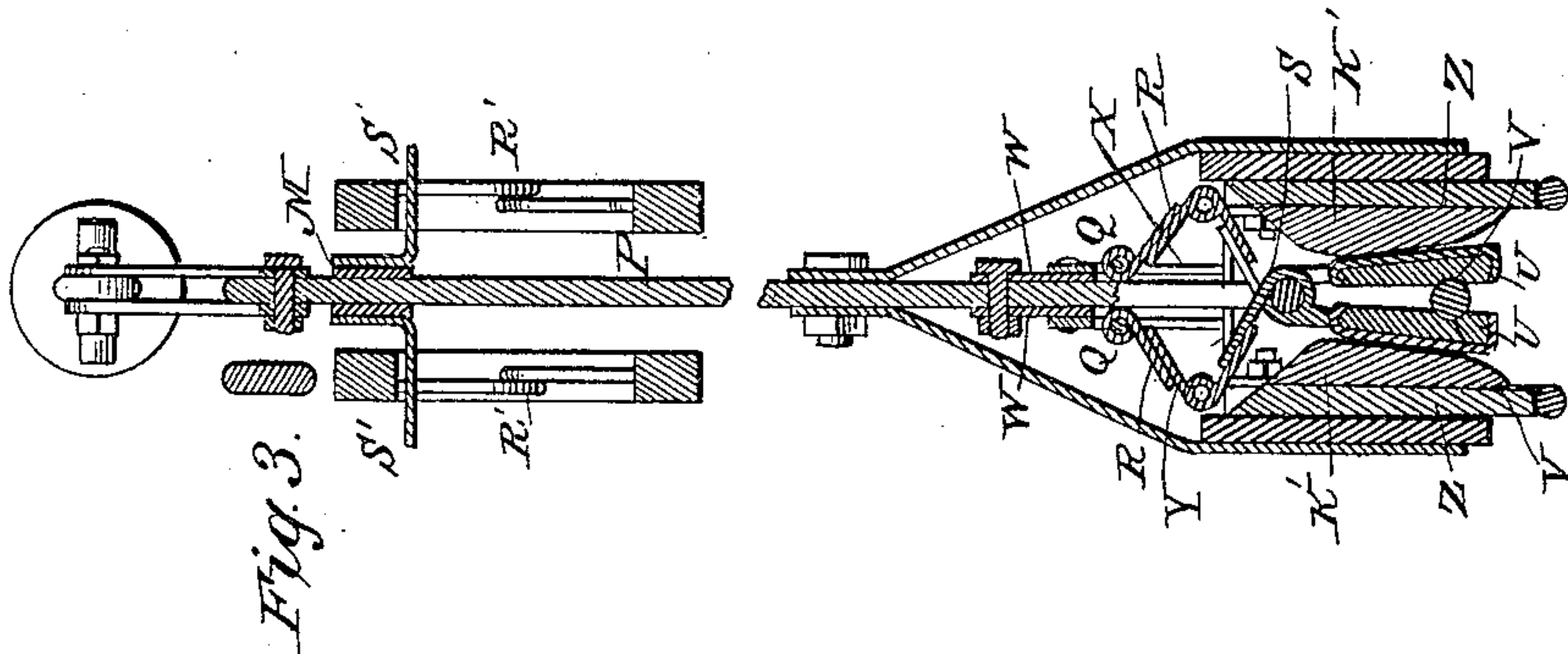
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CABLE GRIP.

No. 350,813.

Patented Oct. 12, 1886.



WITNESSES:

Fred G. Dieterich
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INVENTOR:

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ATTORNEYS.

(No Model.)

3 Sheets—Sheet 3.

T. O. COOPER.

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Patented Oct. 12, 1886.

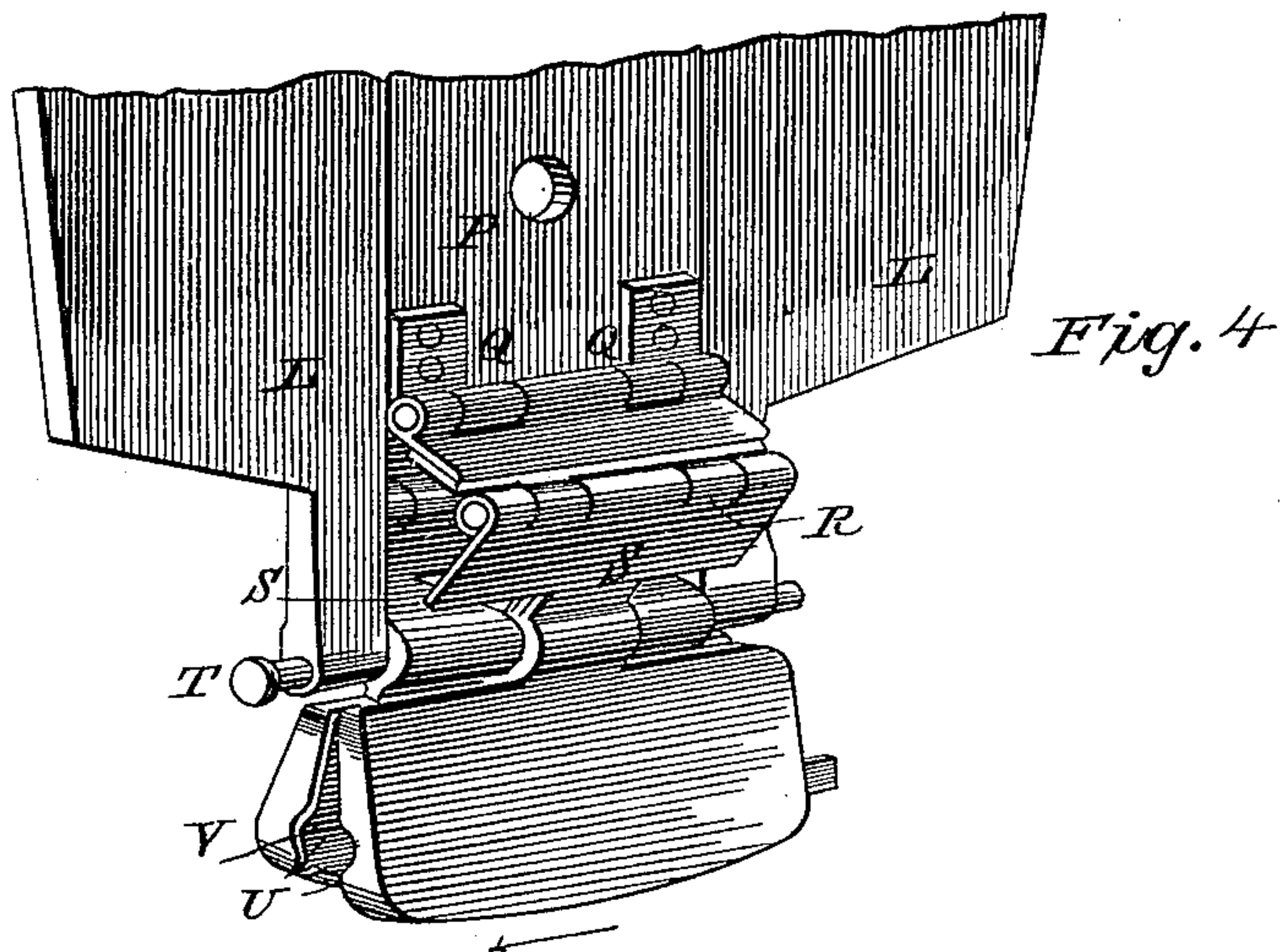


Fig. 4

Fig. 5

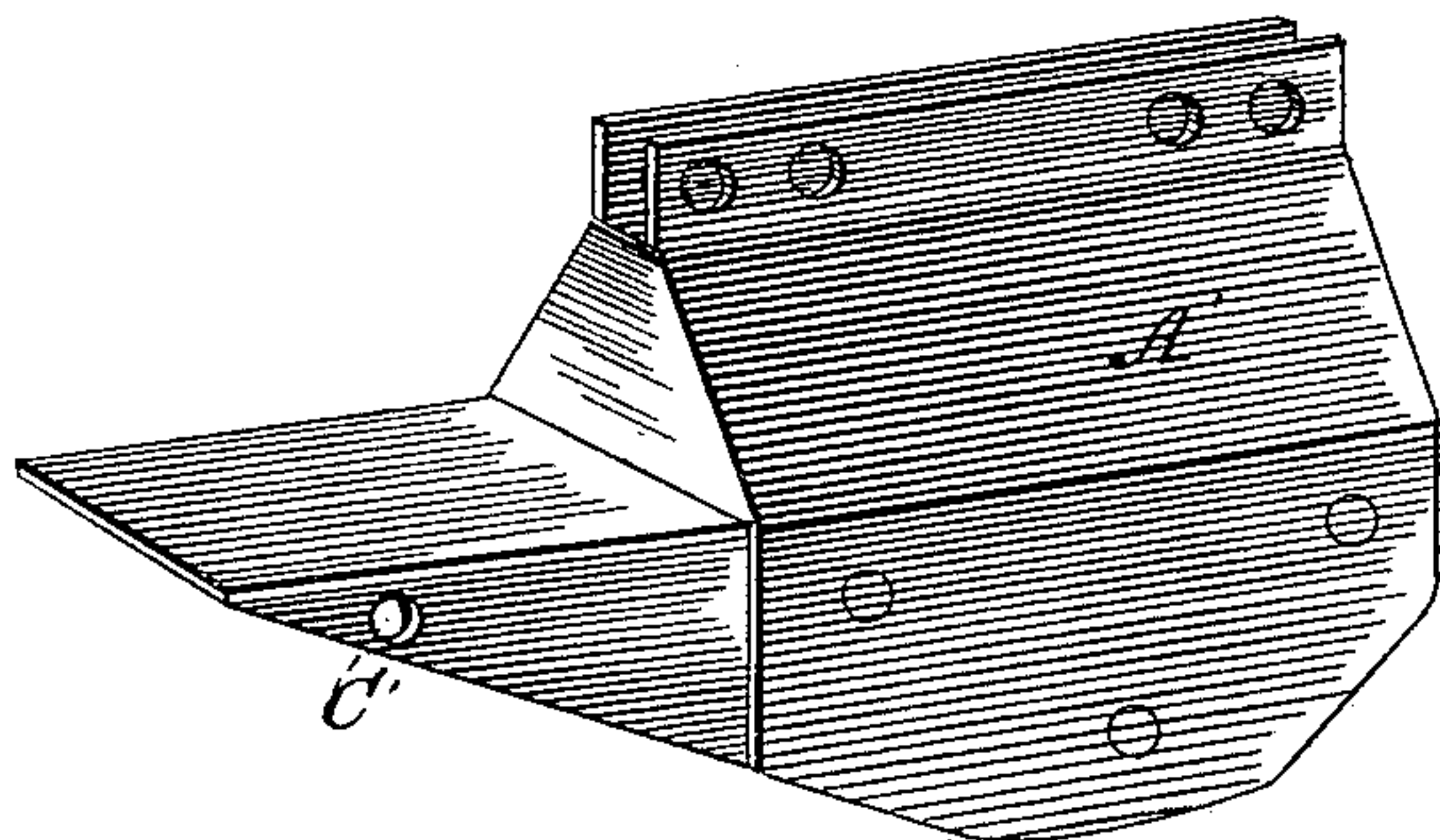


Fig. 6.

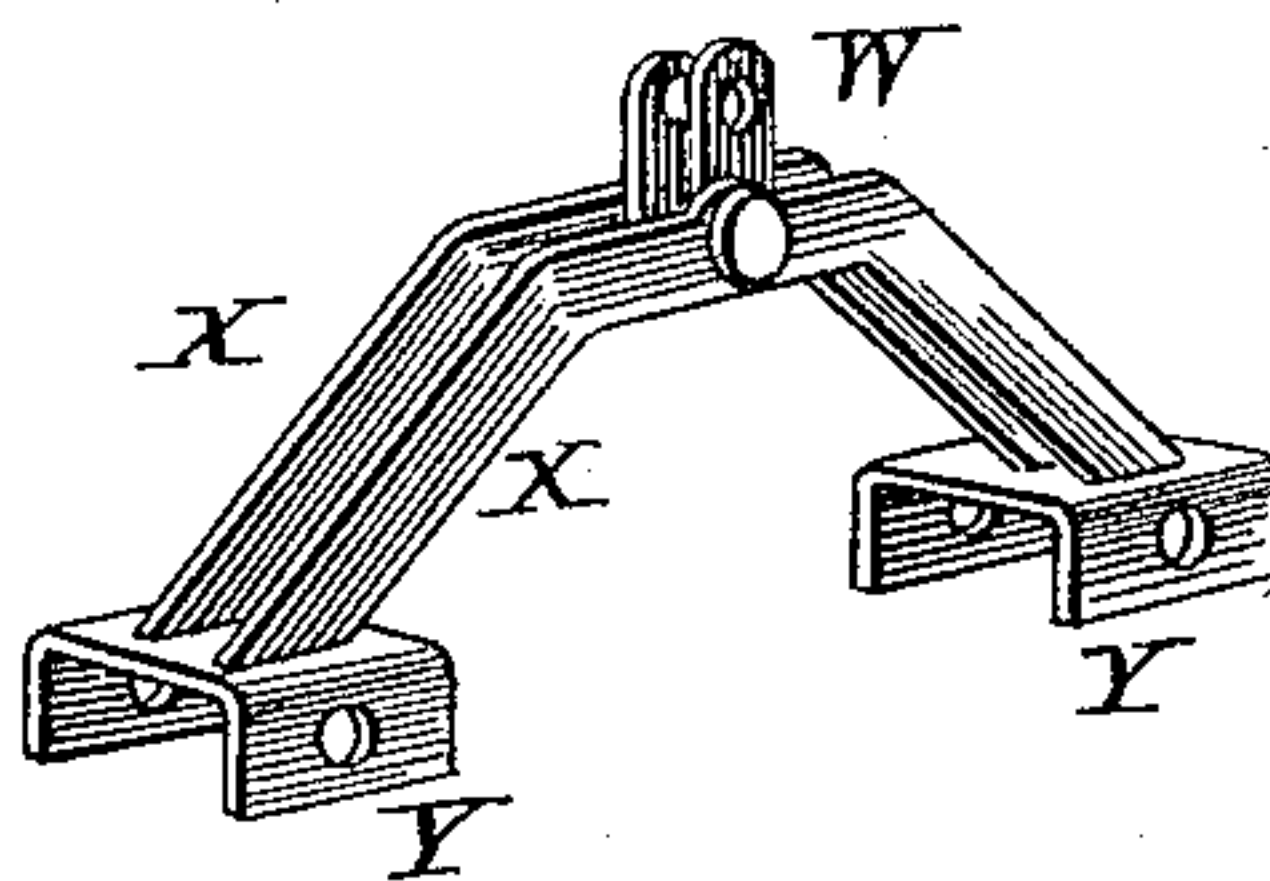


Fig. 7.

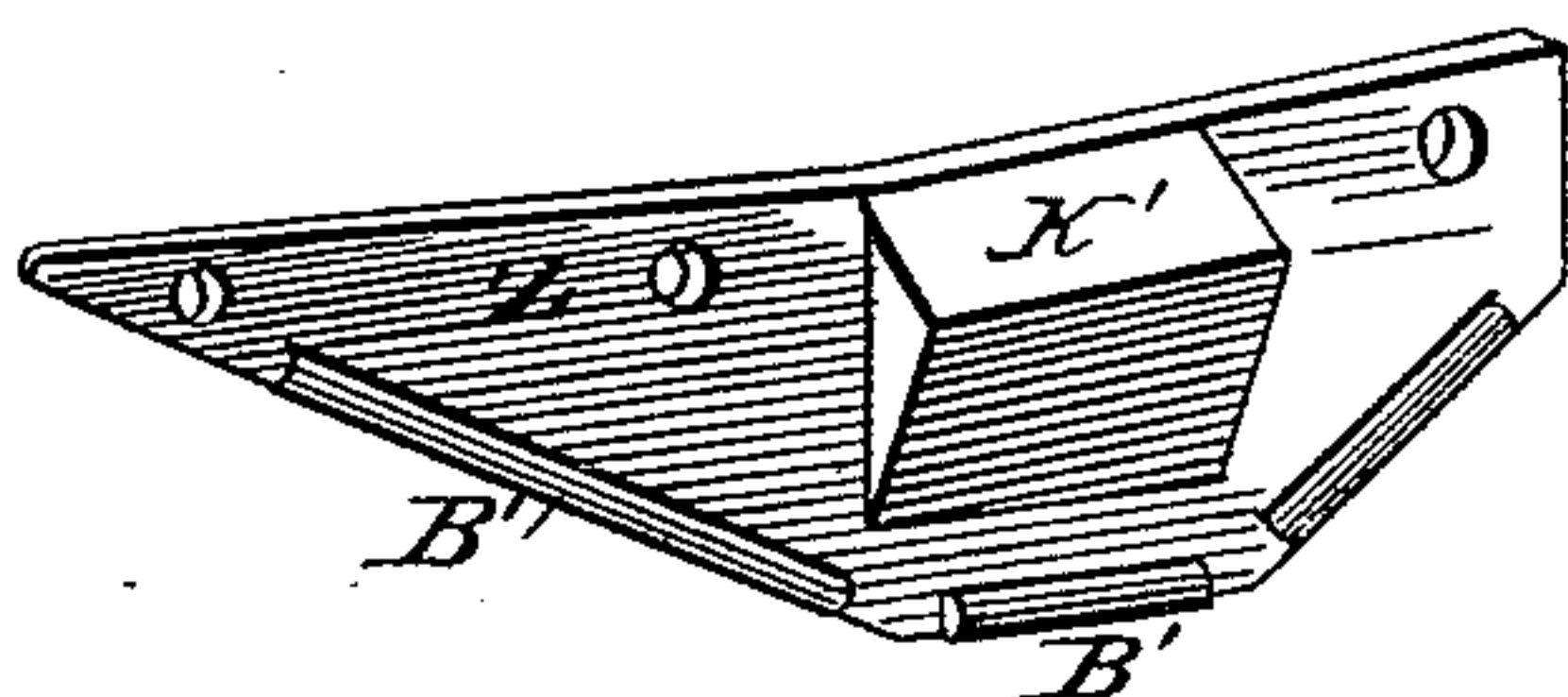
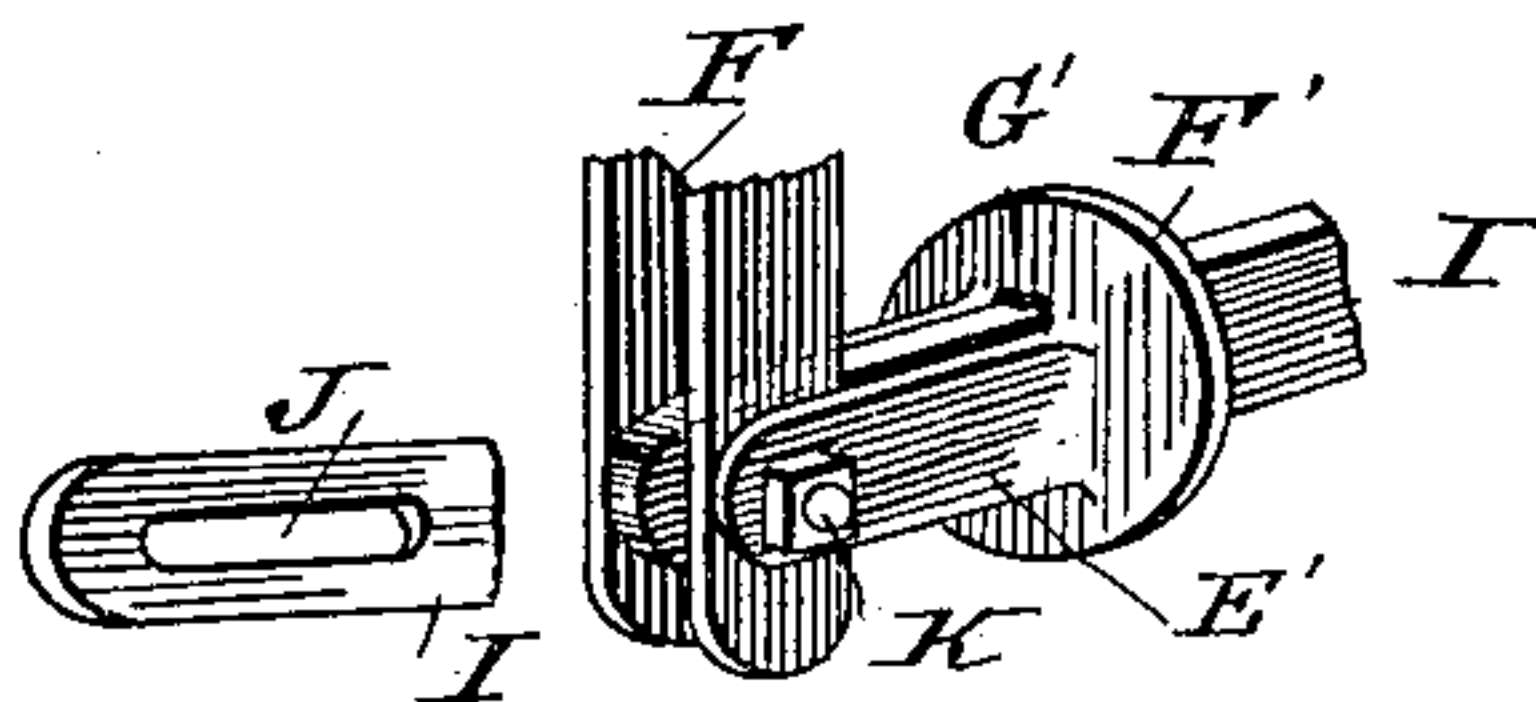


Fig. 8.



WITNESSES:

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UNITED STATES PATENT OFFICE.

THOMAS OLIVER COOPER, OF WILMINGTON, DELAWARE.

CABLE-GRIP.

SPECIFICATION forming part of Letters Patent No. 350,813, dated October 12, 1886.

Application filed April 23, 1886. Serial No. 199,962. (No model.)

To all whom it may concern:

Be it known that I, THOMAS OLIVER COOPER, of Wilmington, in the county of New Castle and State of Delaware, have invented certain new and useful Improvements in Cable-Grips for Railways, of which the following is a description.

My invention consists in the improved construction, arrangement, and combination of parts of a cable-grip for that class of street-cars which receive their motion from an endless moving cable, as will be hereinafter fully described, and pointed out in the claims.

Referring to the accompanying drawings, Figure 1 is a perspective view of my improved cable-grip, showing the same secured in operative position upon a street-car of the usual construction, parts of the casing which inclose the clamping-jaws being shown broken away to better illustrate the construction and arrangement of the several parts. Fig. 2 is a longitudinal vertical central sectional view of the same. Fig. 3 is a vertical cross-sectional view taken on the plane indicated by line *x x*, Fig. 2 of the drawings. Fig. 4 is a perspective detail view of the clamping-jaws. Fig. 5 is a similar view of the movable frame which incloses the said jaws; and Figs. 6 and 7 are detail views, the nature of which will be hereinafter described. Fig. 8 is a perspective view of the parts at the forward end of pitman I.

The same letters of reference indicate corresponding parts in all the figures.

Referring to the several parts by letter, A represents a street-car of ordinary construction, the axles B B of which support the ends of a central supporting and guide frame, C. In the floor of the car, at one end thereof, are formed two longitudinal slots, D and E, and through one of these slots D extends a handle-lever, F, which is pivoted beneath the floor of the car, and the upper portion of which is provided with the spring-actuated catch G, adapted to engage with the teeth of a segmental rack, H, secured at the side of the slot D, and thus secure the said lever in its adjusted position. In the lower bifurcated end of this lever F is pivotally secured the forward end of a pitman, I, the said forward end of this pitman being formed with the longitudinal slot J, through which the pivot-bolt K of the lever F extends.

L L indicate two vertical parallel flat bars, the upper ends of which are rigidly connected by the cross-pieces M M, and between these cross-pieces and the parallel side bars, L, works the central vertical metallic bar, P, which carries at its lower end the clamping-jaws. To these cross-pieces M are pivotally secured the lower ends of two parallel flat links, N, between the upper ends of which is pivoted the central elbow of a bell-crank lever, O, the upper end of which is pivoted to the rear end of the pitman I, while the rear lower end of the bell-crank is pivoted to the upper end of the central operating-bar, P, and it will be seen that by pivotally connecting the bell-crank lever to the cross-pieces M through the pivoted links N when the pitman I is drawn forward by the lever F to raise the central bar, P, the upper ends of the said links will swing rearwardly, as shown in dotted lines in Fig. 2 of the drawings, so that the bar P will always be drawn upward in a perfectly vertical line, and will thus be prevented from binding against the side of the forward side bar L, which would be liable to occur were it not for the play of the links.

To each side of the lower end of the operating-bar P are bolted the hinges Q, to which are hinged the hinge-plates R, the lower portions or sides of which are in turn hinged to the upper ends of the angle-frame, which carries the clamping-jaws. These angle-frames S, which are hinged together centrally, have their upper portions bent nearly at right angles to their lower portions, the bolt T, which hinges them together centrally, having its ends journaled in the lower ends of the two parallel side pieces, L L, as shown, while the lower portions of the clamping-frames are recessed on their inner faces to receive the clamping-blocks U U, which are formed of soft metal to prevent them from cutting and wearing the cable, and have formed on their outer operative faces the longitudinal registering-grooves V V, in which the cable fits when the clamping-jaws are closed thereon. These soft-metal clamping-blocks may be readily removed when they have become worn and inoperative by straightening out the flange at one end of the recess in which they are seated, when they can be slid out and replaced by new blocks, while, if desired, the flange at the rear end of the said

recesses may be dispensed with entirely, as the strain on the clamping-blocks from the cable is always in a forward direction.

From the foregoing it will be seen that by pulling the bar of pitman I forward by means of the lever F the central bar, P, will, through the bell-crank O, be elevated, thereby opening the clamping-jaws to enable them to receive the cable, while by reversing the movement of the hand-lever F the clamping-jaws will close firmly upon the cable, which will then draw the car forward in the usual manner.

It will be seen, that by arranging the above mechanism as set forth, when it is desired to release the cable from the clamping-jaws, which is a matter of great importance, when, for example, approaching an obstruction on the track, the bar of pitman I is drawn in the direction of its length instead of forcing it backward, which arrangement effectually prevents all danger of the said pitman becoming bent and inoperative, which might otherwise occur at the very moment when it is most desirable to release the cable.

Near the lower end of the central bar, P, are pivotally secured by their upper ends two flat links, W W, one on each side of the said bar, and to the lower ends of these pivoted links are centrally pivoted the upper curved pieces X of a frame, Y, to which are bolted the side pieces, Z Z, the lower edges of which incline upward toward each end of the said side pieces, and the forward extended ends of these side pieces are pivoted at *c'* to the forward ends of a rigid cap-piece, A', which is in turn rigidly secured to the two parallel side bars, L L, and the entire top of this cap enclosed, as shown, so as to effectually shield the clamping-jaws and their surrounding mechanism, including the frame Y, from any dirt, &c., which might fall from above as the car moves along through the slot in which the vertical bars of the grip slide.

The object and operation of the frame Y and side pieces, Z Z, are as follows: The lower edges of the side pieces extend down below the clamping-jaws for some distance, and have journaled in their bottom and forward and rear inclined edges the rollers B'. When the clamping-jaws have closed upon the cable and the car is being carried forward rapidly by the cable and comes to another similar cable traveling at right angles to the first, the forward projecting end of the cap-piece A' and the side pieces, Z Z, will pass over the cable running at right angles to the same, and the second cable, sliding down the inclined lower edges of the forward portion of the cap-piece, will come in contact with the lower edges of the side pieces, Z Z, which normally extend below the lower edges of the cap-piece, as shown in Figs. 1 and 2, and the pressure of this cable against the lower edges of the said pieces Z will force these side pieces up, swinging them on their forward pivotal points C', and thus through the frame Y au-

tomatically raising the vertical bar P, and thereby opening the clamping-jaws and releasing the first cable with which the car is traveling. As the second cable slides along the lower edges of the side pieces, Z, the rollers B', across which it is traveling at right angles, serve to reduce friction to the minimum, and as this cable rises up the inclined rear sides of the pieces Z and passes clear of the same the side pieces, descending, will allow the central bar, P, to be forced down for the purpose of closing the clamping-jaws on the cable again, in order that the car may resume its motion.

In order to permit of the bar P being forced up automatically, as described, and to lower the same when the cable running at right angles has passed from beneath the side pieces, Z, without having to move the hand-lever F, the following mechanism is employed: As already described, the forward end of the rod or pitman I is formed with a longitudinal slot, J, through which the pivot-bolt K of the lever F passes. This pivot-bolt also passes through the ends of two short arms, E' E', which carry at their rear ends a disk, F', having a central opening, G', through which the rod I passes, and around the forward and central portion of the rod or pitman I is coiled a spring, H', which bears with its forward end against the disk F' and with its rear end against a similar disk, I', held in position by a transverse pin, J'. Now, it will be seen that when the bar P is automatically raised by the cable passing beneath the lower edges of the side pieces, Z, as described, its slotted end will slide on the pivot-bolt K, thereby compressing the spring H', which will serve to automatically force down the bar P when the cable has passed from beneath the side pieces, Z, as will be readily understood, thus rendering the release and grasping of the cable when a cross-cable is met automatic. It will be seen that when the side pieces, Z, are swung upward on their forward pivotal point by the cable passing beneath them the pivoted links W W, pivoted at both ends, as described, will operate in the same manner as the links N to prevent the bar P from being drawn forward at its lower end to bind, the said links thus serving to cause the bar P to move always in a perfectly vertical line. The inner sides of the pieces Z Z are provided with the inclined bearing-blocks or seats, K', against which the clamping-jaws bear when they have closed on the cable, and, as the sides of the cap-piece A' are in contact with the side pieces, Z, it will be seen that from one side of the cap-piece to the other is rendered perfectly solid or compactly filled by the clamping-jaws, side pieces, and cap-piece fitting closely against one another, as clearly shown in the sectional view, Fig. 3, of the drawings.

In order to open the jaws to drop the cable at will, it will be seen that when bar P is raised through the pitman I said bar P first

lifts the side pieces through the connecting-frame Y and immediately afterward opens the jaws.

The rollers which support the cable are usually about forty feet apart, and the cable "sags" to a certain extent between these rollers, and in order to lower the clamping-jaws so that they may seize upon the cable at a point where it has sagged so as to be below its normal level I employ the following mechanism. Through the slot E in the floor of the car, previously mentioned, extends a pivoted lever, L', having on its upper portion a spring-catch, M', adapted to engage with the teeth of a segmental rack, N', (see Fig. 2,) secured at the side of the said slot, by which arrangement the lever is secured in its adjusted position. To the lower end of this lever is pivoted the forward end of a pitman, O', which is pivotally connected at its rear end to upper end of a bell-crank, P', which is centrally pivoted to the upper end of a link, Q', pivoted at its lower end to the side of the frame C, and the lower forward end of this bell-crank is pivotally connected to the cross-pieces M M at the upper ends of the parallel side bars, L L. It will now be seen that when the cable has sagged below the level of the clamping-jaws by drawing back the lever L' the vertical bars L, L, and P, which carry the clamping-jaws, will be lowered, as shown in dotted lines in Fig. 2 of the drawings, until the clamping-jaws reach the cable, when, by means of the lever F, the jaws are closed upon the cable, and by releasing hold of the lever L' the bars L L and P will be automatically raised by the elliptical springs R' R', seated in the recesses in the frame C, and bearing with their upper edges against the extensions S' of the cross-pieces M M. The link Q', to which the bell-crank P' is centrally pivoted, serves to prevent the bars L L P from being drawn out of a vertical line when being raised or lowered, thereby preventing them from "binding," as will be readily understood.

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

1. The combination of the parallel vertical bars connected at their upper ends by the cross-pieces, the central bar sliding between the said bars, the operating-lever connected by the pitman and bell crank with the upper end of the said central bar, the curved clamping-frames having the clamping-jaws at their lower ends and hinged together by the bolt or rod passing through the lower ends of the parallel side bars, and the hinge-plates connecting the upper ends of the clamping frames with the lower end of the central sliding bar, as and for the purpose set forth.

2. The combination of the parallel vertical bars connected at their upper ends by the cross-

pieces, the central bar sliding between the said bars, the pivoted hand-lever having means for securing it in its adjusted position, and having the transverse pivot-bolt in its lower bifurcated end, the bell-crank pivoted in the upper ends of the pivoted links, and pivoted at its rear lower end to the upper end of the central bar and at its upper end to the rear end of the pitman, the pitman pivoted at its rear end to the upper arm of the said bell-crank, and having at its forward end the longitudinal slot sliding on the pivot-bolt in the lower end of the hand-lever, the coiled spring encircling the pitman between a stop-disk near its rear end and the forward disk secured to the lower end of the hand-lever, the curved clamping-frames having the clamping-jaws at their lower ends and hinged together by the rod passing through the lower ends of the parallel side bars, the hinge plates connecting the upper ends of the clamping-frames with the lower end of the central sliding bar, the frame pivotally connected by the pivoted links to the lower portion of the said central bar, the side pieces secured to the said frame and having journaled in their lower curved edges the anti-friction rollers and pivoted at their forward extended ends in a cap-piece rigidly secured to the two parallel side bars, the lower edges of the side pieces extending normally down below the sides of this cap-piece, all constructed, combined, and arranged to operate in the manner and for the purpose herein shown and described.

3. The combination, with the clamping jaws, of the side pieces having the seats formed on their inner sides, against which the said jaws rest when in their closed position, substantially as set forth.

4. The combination, with the clamping-frames and the frame having the side pieces, of the cap having the inclosed upper sides and rigidly secured to the parallel side bars, as and for the purpose shown and described.

5. The combination, with the three parallel bars supporting and operating the clamping jaws, of the pivoted bell-crank connected through the pivoted link with the guide-frame, and pivotally connected at its forward lower end to the cross-pieces connecting the upper ends of the parallel side bars, the pivoted hand-lever having the spring-catch engaging with the inclined teeth of a segmental rack, and the pitman pivotally connecting the lower end of this lever with the upper end of the said bell-crank, and the elliptical springs arranged as described, as and for the purpose shown and described.

THOS. O. COOPER.

Witnesses:

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CHAS. A. PETTIT.