(No Model.) 2 Sheets—Sheet 1.

R. FURGANG.

SAFETY ATTACHMENT FOR ELECTRIC CONDUCTORS.

No. 481,665. Patented Aug. 30, 1892.

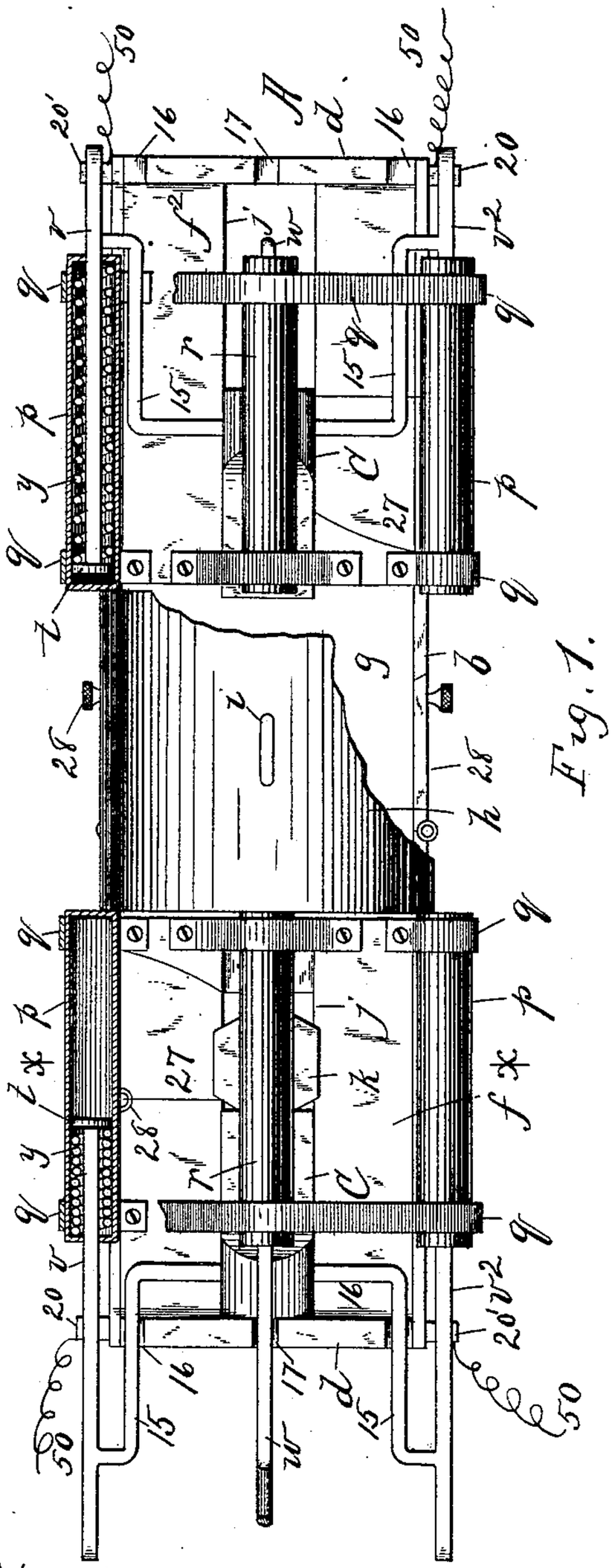

Fig. 1.

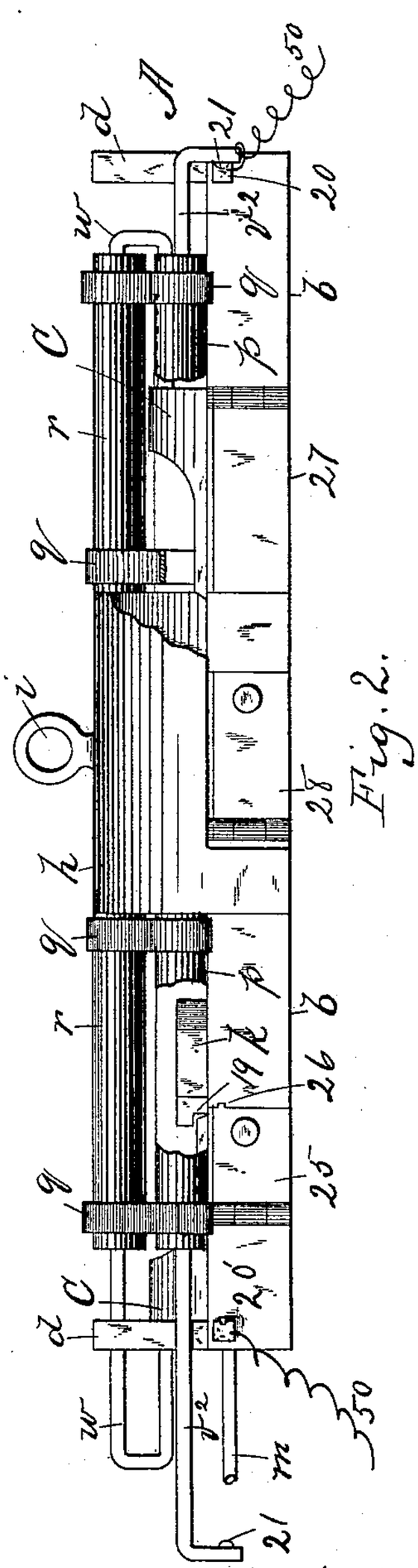

Fig. 2.

WITNESSES

Irving A. Fay.
E. M. Kimball

INVENTOR

Rudolph Furgang,
By C. A. Snow & Co.
Attys

(No Model.) 2 Sheets—Sheet 2.

R. FURGANG.

SAFETY ATTACHMENT FOR ELECTRIC CONDUCTORS.

No. 481,665. Patented Aug. 30, 1892.

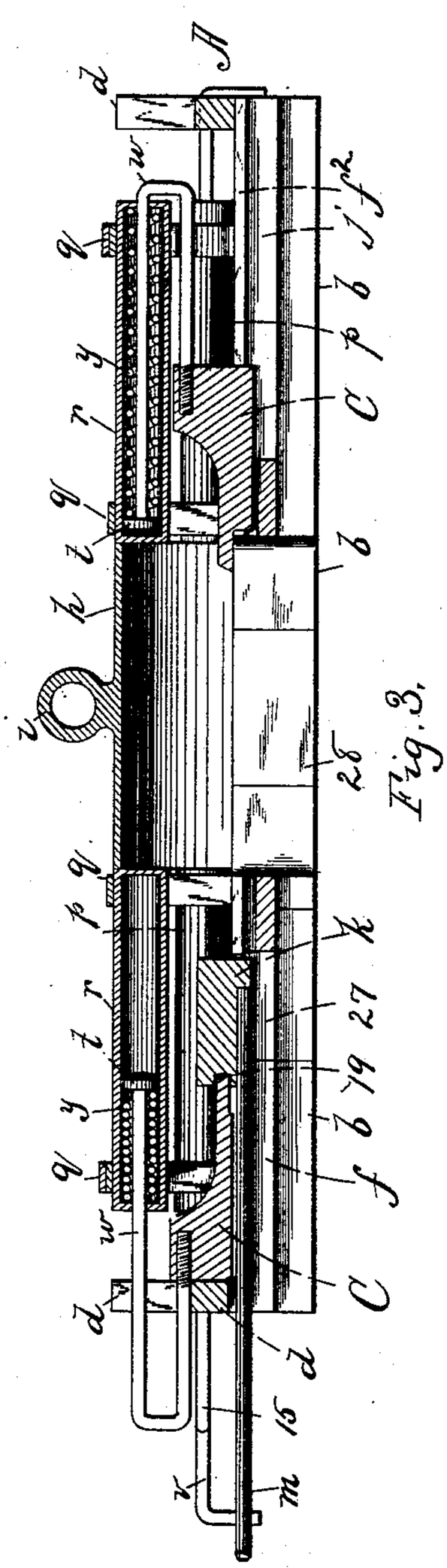

Fig. 3.

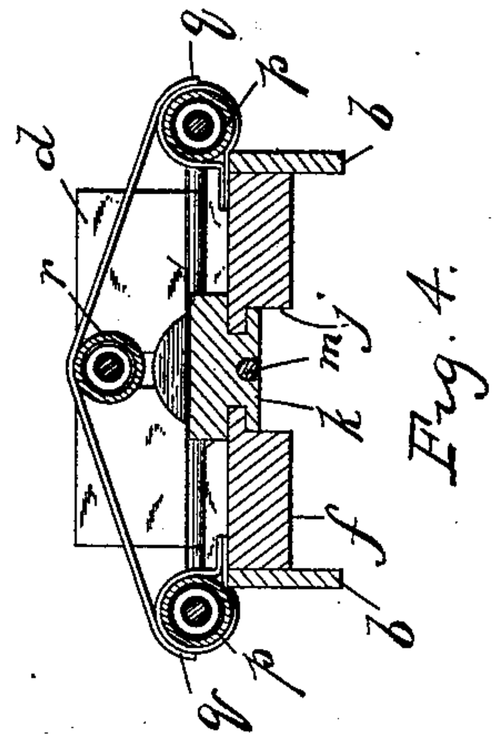

Fig. 4.

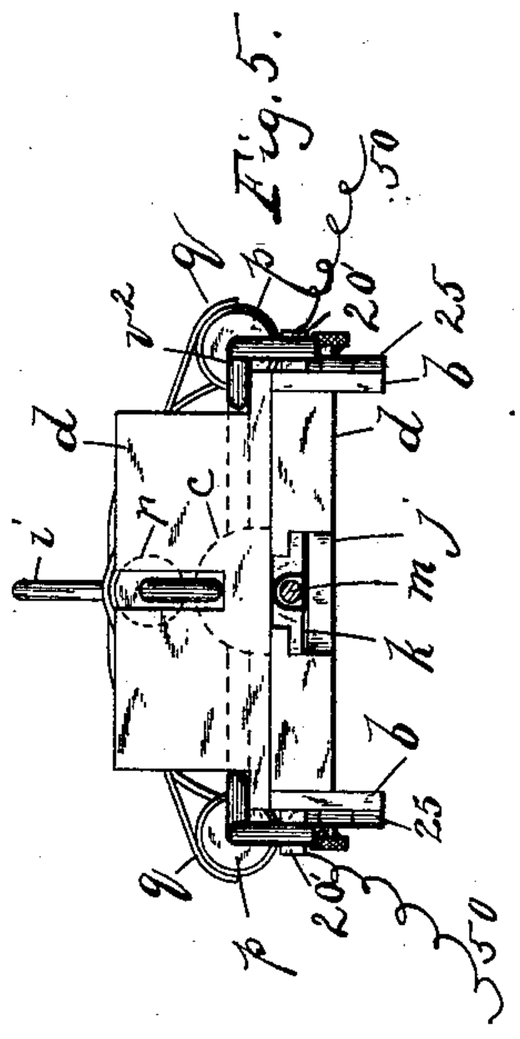

Fig. 5.

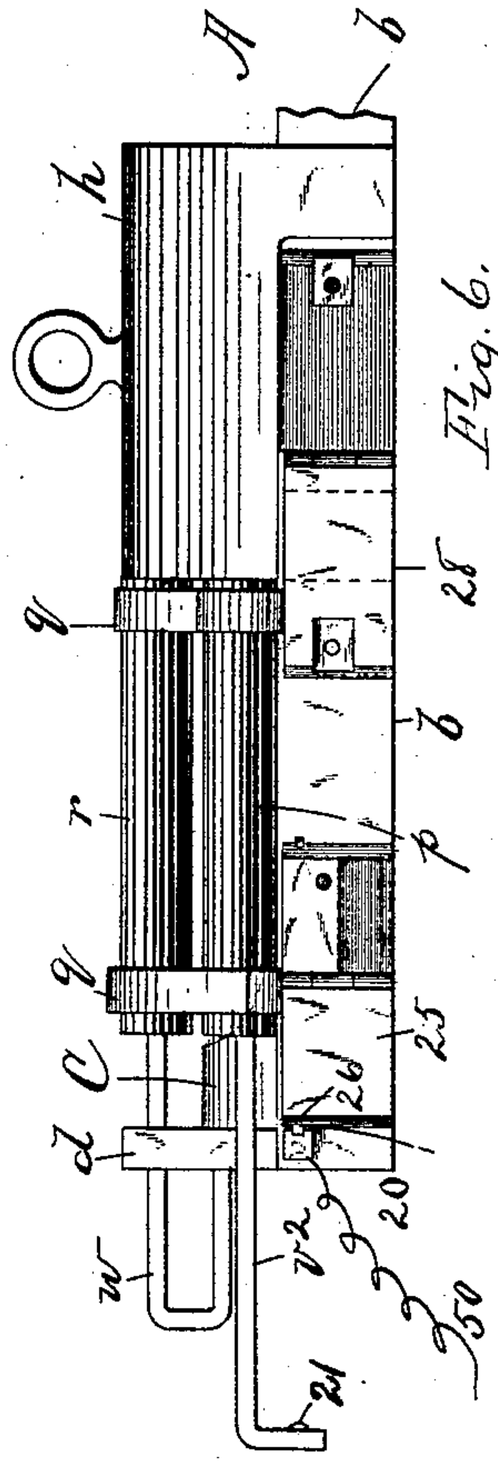

Fig. 6.

WITNESSES

Irving A. Fay.

E. M. Kimball

INVENTOR

Rudolph Furgang,

By C. A. Shawlew

ATTYS

UNITED STATES PATENT OFFICE.

RUDOLPH FURGANG, OF BOSTON, MASSACHUSETTS.

SAFETY ATTACHMENT FOR ELECTRIC CONDUCTORS.

SPECIFICATION forming part of Letters Patent No. 481,665, dated August 30, 1892.

Application filed January 18, 1892. Serial No. 418,398. (No model.)

To all whom it may concern:

Be it known that I, RUDOLPH FURGANG, of Boston, in the county of Suffolk, State of Massachusetts, have invented certain new and useful Improvements in Safety Attachments for Electric Conducting-Wires, of which the following is a description sufficiently full, clear, and exact to enable any person skilled in the art or science to which said invention appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a top plan view of my improved safety attachment, a part of the supporting-arch being represented as broken away; Fig. 2, a side elevation of the same; Fig. 3, a vertical longitudinal section; Fig. 4, a vertical transverse section taken on line $x\,x$ in Fig. 1; Fig. 5, an end elevation looking from the left in Fig. 1, and Fig. 6 a side elevation showing the gates open.

Like letters and numerals of reference indicate corresponding parts in the different figures of the drawings.

My invention relates especially to a device applicable for use on the overhead conducting-wires of electric street-railway systems, whereby when such wire is accidentally broken and falls to the ground said broken section may be disconnected automatically from the remainder of the line-wire; and it consists in certain novel features hereinafter fully set forth and claimed, the object being to produce a simpler, cheaper, and more effective device of this character than is now in ordinary use.

The nature and operation of the improvement will be readily understood by all conversant with such matters from the following explanation.

In the drawings, A represents a rectangular frame of conductive material, the side walls b of which are connected at their ends by cross-bars d, to which metallic plates $f\,f^2$, arranged horizontally, are secured. A space g is left between the inner ends of the plates $f\,f^2$. An arch h connects the side walls b between said plates. Said arch may be constructed of insulating material or insulated in any suitable manner from the side walls b, to which it is attached. Centrally at the top of the arch there is an eye i to receive the ordinary supporting-wire of the trolley-wire, whereby the device is sustained. Each plate $f\,f^2$ is provided with a track or way j, extending centrally from the end bars d to the space g. A block k, grooved to receive the tongue of said ways, is fitted to slide therein. To said blocks the electric conducting-wire m of each section of the line-wire between the adjacent supporting-wires is secured.

At opposite sides of each plate $f\,f^2$ horizontally-arranged cylinders p are secured by straps q, said cylinders projecting beyond the side walls b. Centrally from each way j a similar cylinder r is mounted and secured in said straps. In each cylinder $p\,r$ a piston t is mounted, the rods $v\,v^2\,w$ of which project through the outer end of said cylinders. Coiled springs y are disposed within the cylinders around said rods and act expansively to force said piston. These piston-rods are insulated by winding or in any other suitable manner from their cylinders. The rods $v\,v^2$ are connected by an angle-rod 15, which slides in slots 16 in the end bars d of the frame. The piston-rod w is hook-shaped (see Fig. 3) and slides in a slot 17. The outer ends of said rods w are screw-threaded, and a shoe C, fitted to slide in each of the ways j, is turned onto said threaded end. The toes of said shoes project into grooves 19 in the blocks k. The tension of the wires m on the blocks k force said shoes outward against the end walls d of the frame, compressing the springs y in the outer ends of the cylinders, as shown in the left-hand portion of Fig. 3. Studs 20 and 20′ project laterally from each end of the end walls and are insulated from the frame. Said studs may be connected by a supplemental wire with the ground. Each piston-rod $v\,v^2$ has its outer end turned downward and provided with a boss 21, adapted to engage in a suitable indentation in the studs 20′, when the tension of the trolley-wire against the shoe C is released, as hereinafter described. Adjacent each stud 20′ a hinged gate 25 is interposed in the side wall. Said gate is provided with a boss 26, adapted to engage in a socket in the adjacent stud 20′ when the gate is thrown open, as shown in Fig. 6. Each plate $f\,f^2$ is provided with a horizontal swinging block 27, hinged to said plates, said block opening through the side wall and permitting

the wire blocks *k* to be removed from the ways *j*. In each side wall *b* at the space *g* a hinged gate 28 is interposed, whereby the current passing through said side walls may be broken when said gates are open.

In the use of my improvement the frame A is mounted by the eye *i* at each cross or supporting wire of the system. Each section of conducting-wire *m* between two adjacent supporting or cross wires has its ends secured, respectively, to blocks *k* of adjacent frames. The strain of the wire *m* on said blocks forces the shoes C outward into engagement with the cross-bars *d*. The piston-rods *v* v^2 *w* are drawn outward by the shoe and the springs *y* compressed, as shown in the portion at the left in Figs. 1 and 3. The current passes over the said wire through the plate *f*, through the side walls of the frame A, through the plate f^2 and block *k*, out the other end of the attachment, and on over the line. Should a wire break, releasing the tension on the block *k*, the springs *y* in the cylinders immediately force the piston inward, driving the shoe C against said block, which passes out of the inner end of the ways *j* and falls through the opening *g* to the ground, disconnecting said wire entirely from the attachment, the parts assuming the position shown at the right of Figs. 1 and 3. Bosses 21 on the piston-rods *v* v^2 are driven into engagement with the stud 20 on the end bars *d* of the frame. The current from the ordinary feed-wires, which would naturally heat the safety attachment, passes over the wire connecting said studs with the ground.

In repairing the overhead wires to cut the current off the operator opens the gate 28 in the side walls *b* by throwing the gate 25 open until it engages the adjacent stud 20. The current at that end of the attachment may be short-circuited to the ground. The blocks *k* may be readily inserted in the ways by throwing the swinging blocks 27 open, the tension of the conducting-wire on said block returning the parts to their normal position and compressing the springs in the cylinders.

By employing three springs *y*, arranged as described, great power is applied to the shoe and the blocks forced from the attachment thereby before much of the wire *m* can be consumed by contact with the ground when broken. Moreover, the life of the springs is greatly increased by housing them in cylinders in the manner described, the action of temperature having very little effect on them. As the trolley-wheel passing in contact with the line-wire *m* reaches the block *k*, it contacts with the blocks *f* f^2, and is guided by the edges of the side walls *b* of the frame, (see Figs. 4 and 5,) which are pendent below said plates.

Having thus explained my invention, what I claim is—

1. In a device of the character described, a frame of conducting material provided with a slideway open at an end, in combination with a block fitted to slide in said ways and to which the conducting-wire may be attached, a series of cylinders on said frame, spring-pushed pistons in said cylinders, and a shoe connected to the rods of said pistons, arranged to operate substantially as described.

2. The frame A, in combination with the sliding block *k*, attached to the conducting-wire, the cylinders *r p*, provided with spring-pushed pistons *t*, and the shoes C, connected with the rods of said pistons and normally in engagement with said block, substantially as described.

3. The frame A and insulated supporting-arch *h*, in combination with the wire-blocks *k*, fitted to slide in said frame, the cylinders *p r*, and spring-pushed pistons *t*, and the shoes C, connected with said pistons and adapted to project said blocks from the frame when the tension on said blocks is released, substantially as described.

RUDOLPH FURGANG.

Witnesses:
K. DURFEE,
O. M. SHAW.