

(No Model.)

2 Sheets—Sheet 1.

N. KIRCHNER.
CABLE GRIP.

No. 421,050.

Patented Feb. 11, 1890.

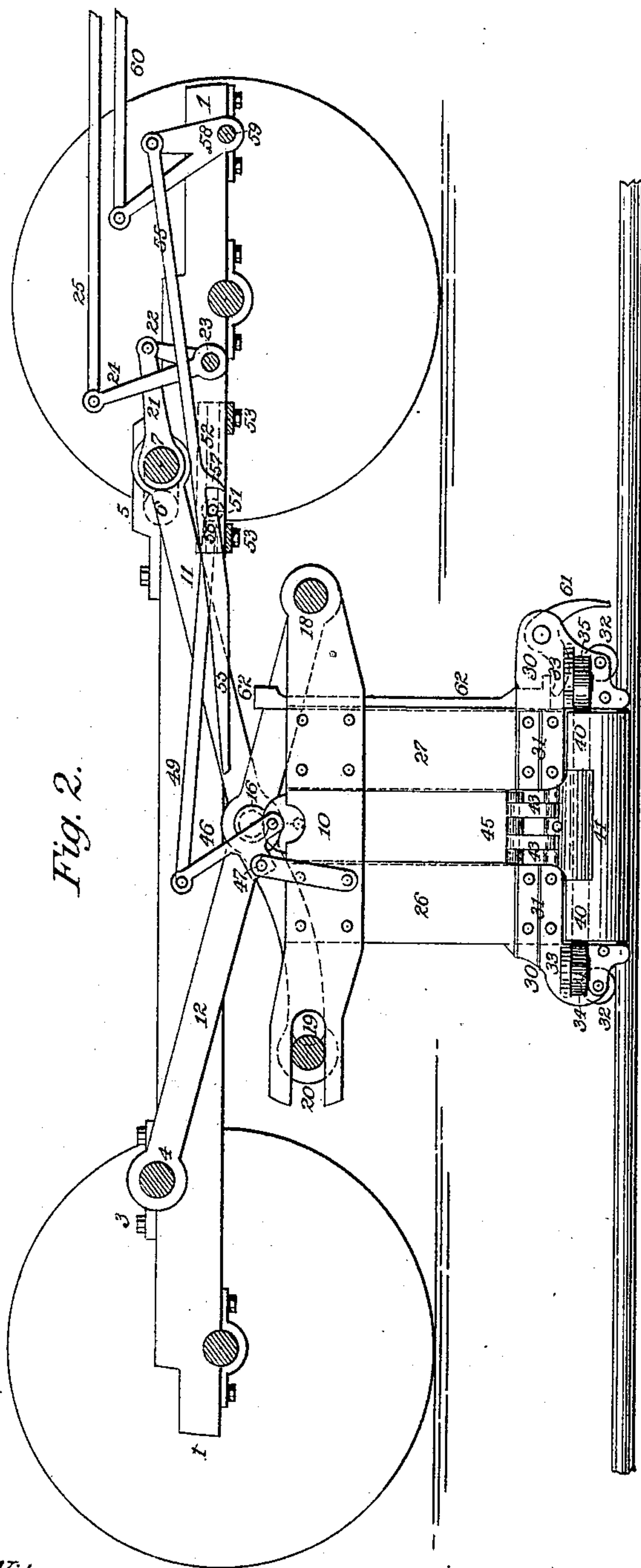


Fig. 2.

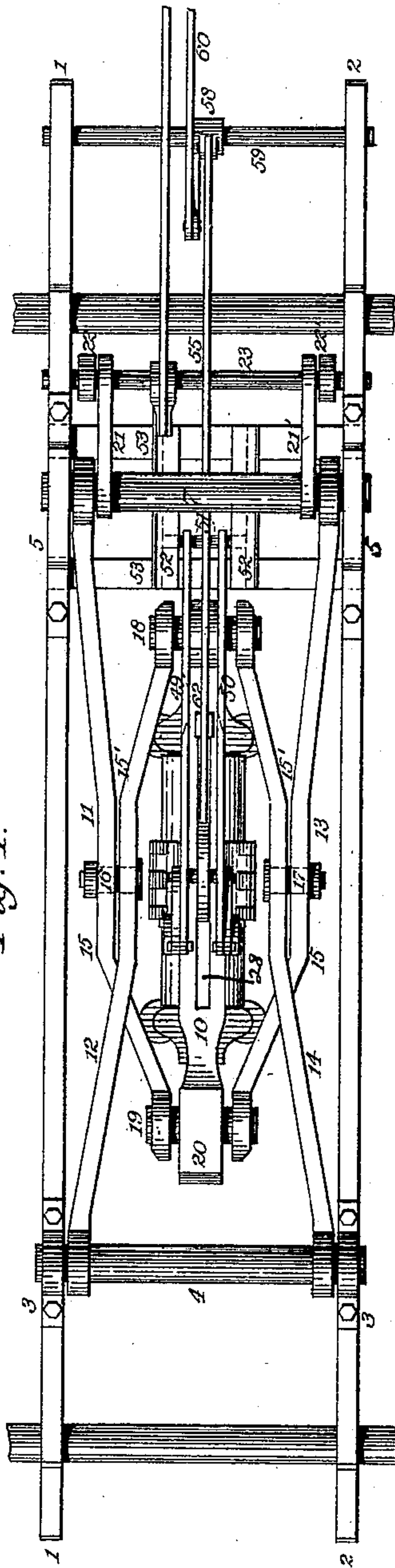


Fig. 1.

Witnesses:

W. O. Belt
H. D. Beruhard

Inventor:
Nicholas Kirchner
By his Attorneys
Edmond Bros.

(No Model.)

2 Sheets—Sheet 2.

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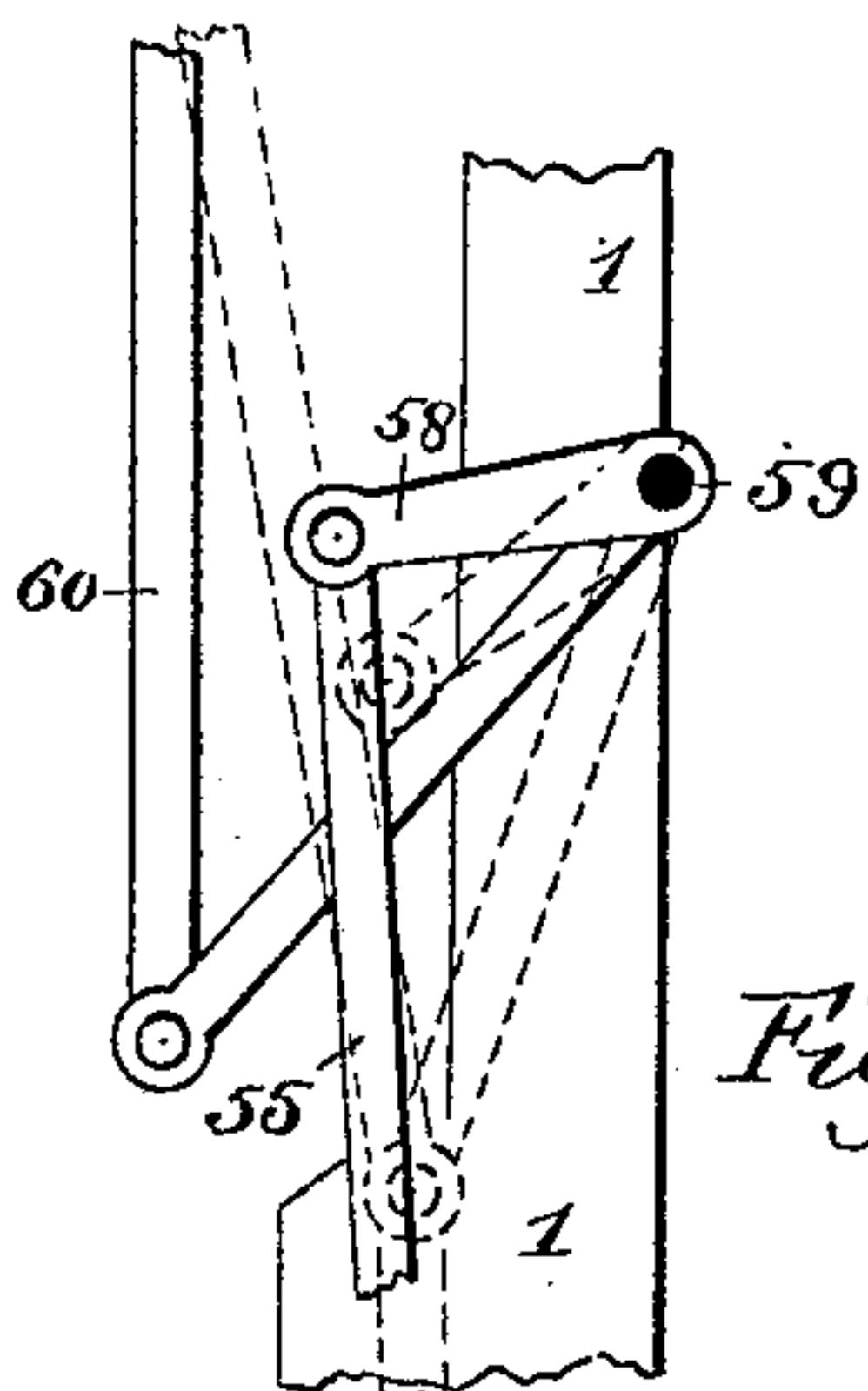


Fig. 3.

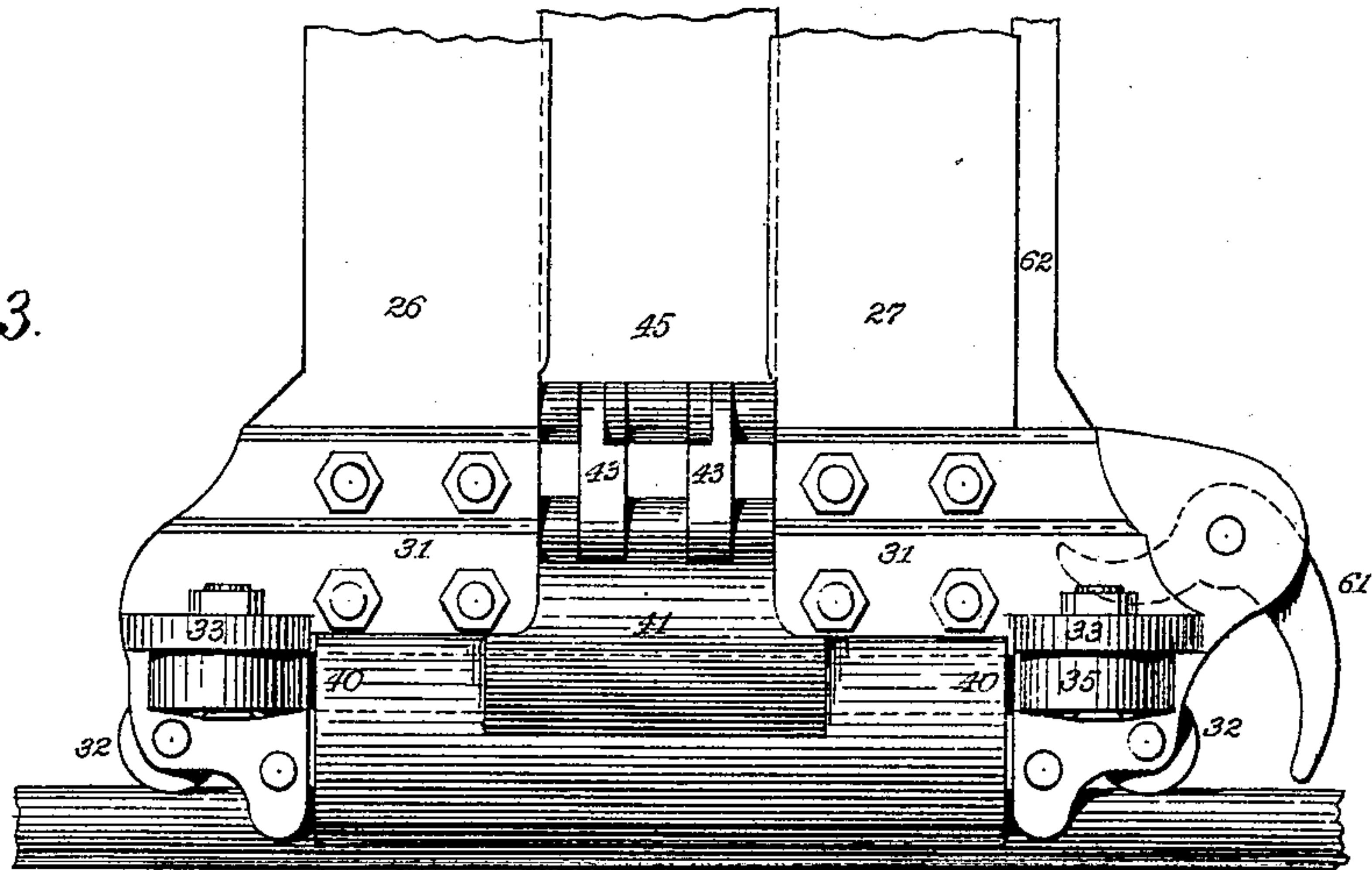
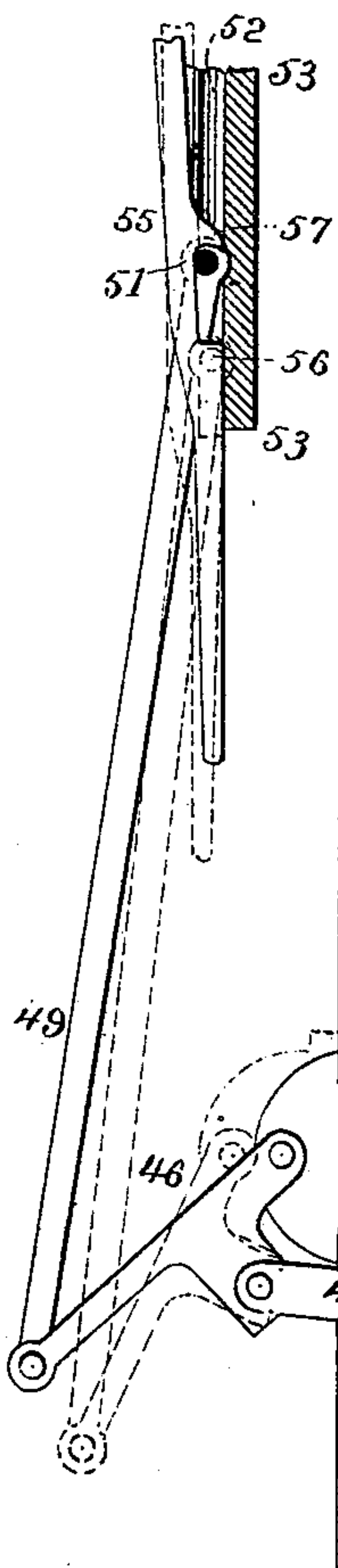


Fig. 4.

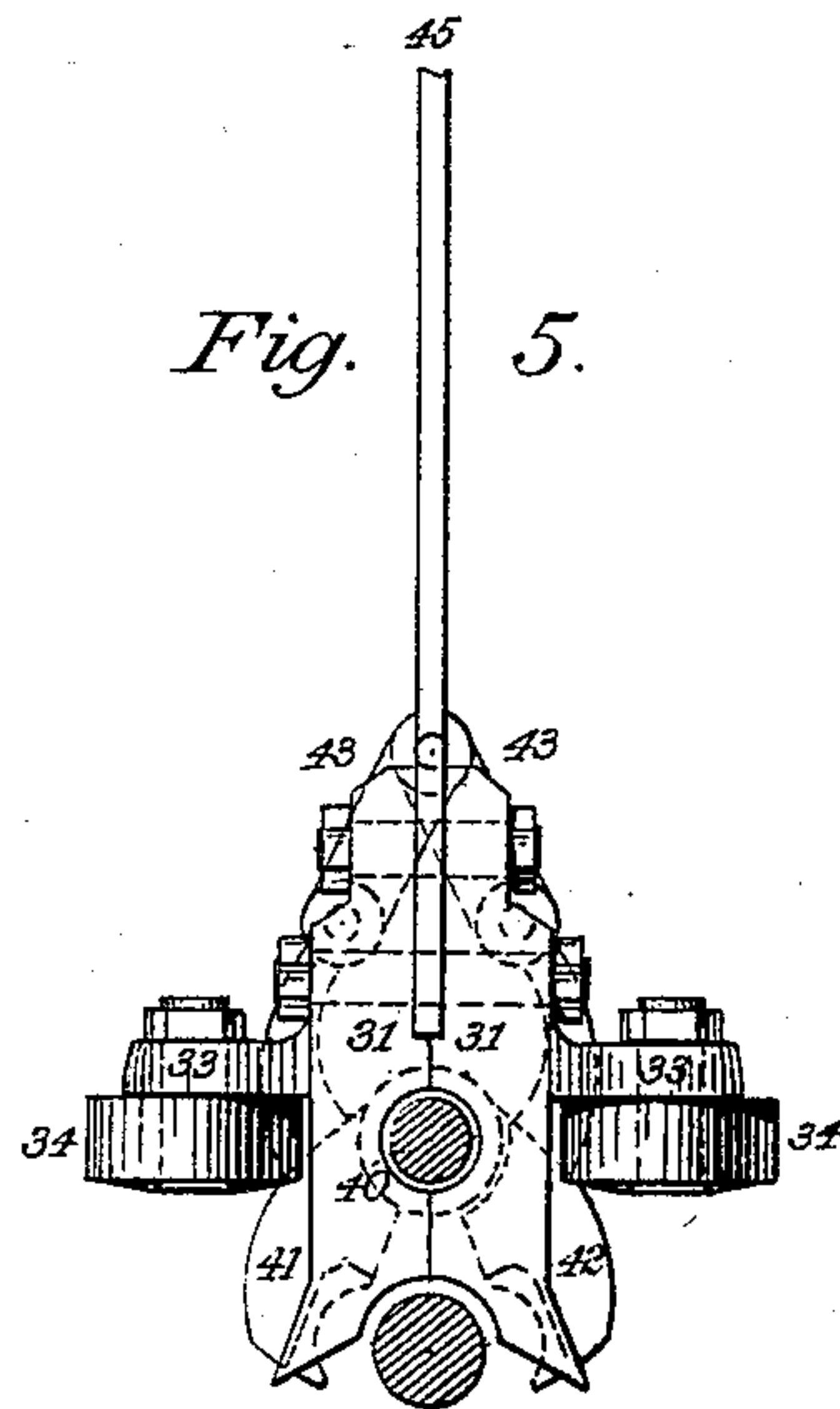


Fig. 5.

Witnesses:

W. O. Belt.
N. J. Peruchard

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UNITED STATES PATENT OFFICE.

NICHOLAS KIRCHNER, OF PHILADELPHIA, PENNSYLVANIA.

CABLE-GRIP.

SPECIFICATION forming part of Letters Patent No. 421,050, dated February 11, 1890.

Application filed November 16, 1889. Serial No. 330,634. (No model.)

To all whom it may concern:

Be it known that I, NICHOLAS KIRCHNER, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Cable-Grips; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in cable-grips, and the object of my invention is to provide improved means for suspending the grip, which will enable the latter to cross a transverse cable without any extra attachment or resorting to the use of horses, as now commonly practiced, which will prevent a sudden jar or shock when the grip engages the cable, which can be operated with ease and is not liable to become deranged by usage, and which will be automatically opened and released from the cable, without notice of the gripman, when a part of the grip strikes a cross-cable or any obstruction in the path of the grip.

With these and other ends in view my invention consists in a peculiar suspending-frame adapted to be operated perpendicularly above the cable, and which carries the gripping mechanism proper. This suspension-frame is made up or composed of two pairs of bars, one of the bars of each pair being supported in a stationary shaft, while the other bar of each pair is secured to a rock-shaft. The bars of each pair cross each other about midway of their length, and are pivoted together, and to the ends of the four arms of said suspension-frame is connected the ends of a horizontal grip-carrying beam, which is mounted at all times in a position parallel with the cable, and is adapted to be raised or lowered vertically with relation to said cable by the suspension-frame. The rock-shaft, to which two bars of the suspension-frame are secured, is linked to another shaft, which carries a rigid operating-arm having an endwise-movable rod pivoted thereto, whereby the gripman is enabled to turn the rock-shafts and elevate or depress the grip-carrying beam, while at the same time

the beam is maintained in a horizontal position parallel with the cable or substantially so.

The grip proper consists of a sectional hanger which depends from the grip-carrying beam, and on a pivot bolt or pin in the lower end of the hanger members or sections are pivoted the jaws of the grip, which jaws are adapted to engage the cable and are each coupled to a common vertically-movable stem that operates and is guided between the members of the hanger. To the upper end of the vertically-movable stem of the grip is pivoted lifting devices which are supported on the grip-carrying beam, and to these lifting devices are connected rods which carry at their forward ends a transverse bolt or guide, which slides freely in fixed guides on the fixed supporting-frame of the whole apparatus. With this sliding bolt or guide engages an operating-rod that is connected to one arm of a two-armed lever, the other arm of said lever receiving an endwise-movable rod, which leads to the lever of the gripman, whereby the grip can be opened or closed. This operating-rod is adapted to be automatically disengaged from the sliding bolt or guide when the grip strikes a cross-cable or other obstruction in its path, so that the grip is automatically released from the cable and without attention on the part of the gripman.

I will now describe the mechanism for accomplishing the automatic disengagement of the operating-rod from the sliding bolt, which consists of a trip carried by the grip-hanger at the forward end thereof and a push-rod guided in the hanger adapted to be elevated by the trip and arranged to raise the operating-rod from the sliding bolt or guide to disconnect the rod and guide or bolt and temporarily release the grip from the operating-lever of the gripman, whereby the jaws of the grip are adapted to automatically open and release themselves from the cable.

My invention further consists in the combination of devices and peculiar construction and arrangement of parts, as will be hereinafter described and claimed.

To enable others to more readily understand my invention, I will now proceed to a detailed description thereof in connection with the accompanying drawings, in which—

Figure 1 is a plan view of my improved cable-grip. Fig. 2 is a side elevation thereof. Fig. 3 is an enlarged detail view of a part of the operating mechanism for opening and closing the grip. Fig. 4 is an enlarged view in side elevation of the lower part of the grip. Fig. 5 is an end elevation of the grip.

Like numerals of reference denote corresponding parts in all the figures of the drawings, referring to which—

1 2 designate horizontal parallel beams, which are suitably supported on the axles of the car to which my improved grip is to be applied. Near one end these beams are provided with stationary bearings 3, in which is journaled a shaft 4, and near their other ends said beams are provided with elongated bearings 5, having longitudinal slots or ways 6, in which are journaled the ends of a rock-shaft 7, which is adapted to slide or move a limited distance in its bearings. To these shafts 4 7 are rigidly secured four bars, which constitute the suspension-frame of the grip mechanism, two of these longitudinal bars being arranged on each side of the grip-beam 10 and which are connected, respectively, to the shafts 4 7 and to each other.

The numerals 11 12 are used to designate the bars on one side of the grip-beam, and the numerals 13 14 the bars on opposite sides of said grip-beam. One end of each bar 12 14 is rigidly secured to the shaft 4, and one end of each bar 11 13 is likewise secured to the rock-shaft 7, and in the free ends of all four of said bars is supported the ends of the grip-carrying beam 10. The bars of each pair 11 and 12 and 13 14, respectively, are inclined downwardly and bent laterally at the points 15 15', so that said bars of each pair cross and lap each other at intermediate points of their length, while the ends thereof are free from each other to adapt the same to be attached to their respective rock-shafts and to support the grip-carrying beam. The bars of each pair are pivotally connected together by bolts 16 17, respectively, at the points where they cross or lap each other, whereby the bars are adapted to be raised or lowered at will and still retain the grip-carrying beam in a horizontal position, substantially parallel with the cable.

In the free adjoining ends of the bars 12 14 is mounted a bolt 18 at one end of the grip-carrying beam 10, and in the other end of the grip-beam is formed a longitudinal slot 20, in which slides a bolt 19, which is secured in the free adjoining ends of the bars 11 13.

To the rock-shaft 7 is secured arms 21 21', which extend forward of said shaft and are pivotally connected at their free ends to arms 22 22', which are rigidly secured to another shaft 23, that is journaled in fixed bearing on the beams 1 2, whereby the stationary and sliding rock-shafts 7 23 are linked or connected together for simultaneous operation. From the stationary rock-shaft 23 extends an arm 24, to the free end of which is connected

an endwise-movable rod 25, that leads to the lever (not shown) to be operated by the grip-man for raising or lowering the suspension-frame and determining the position of the grip relative to the cable when crossing a transverse cable-line.

By connecting one end of the grip-carrying beam to the slotted or bifurcated bars 11 13 of the suspension-frame and mounting the rock-shaft 7 of said frame so that the shaft is capable of a limited sliding play, the suspension-frame is adapted to give or yield slightly when the grip engages the cable, and thus obviate shock or jar to the car in starting the latter, which is one of the objections urged against the grips as ordinarily constructed and used.

From the grip-carrying beam 10, which is arranged in the longitudinal center of the car and immediately over the cable, depends the grip mechanism, which consists, essentially, of the hanger and the grip proper. The hanger consists of two parts or members 26 27, which are spaced apart a suitable distance to receive the vertically-movable grip-operating stem which projects through a central slot 28 in the grip-carrying beam 10 and is guided between the members or sections of the hanger. The upper part of the members or sections of the grip-hanger are rigidly secured to the grip-carrying beam, and at the lower end of each member of the grip-hanger is provided a foot 30, the feet of both members or sections 26 27 of the hanger being arranged in line with each other and on substantially the same horizontal plane. Each foot is divided longitudinally, being formed by plates 31, which are united laterally together by through-bolts, as shown, and at the ends of the hanger, in the longitudinal center thereof, are mounted vertical friction-rollers 32, which are fitted in recesses formed in the foot-plates and journaled on suitable pins or shafts secured in said plates. On the lateral or side faces of the foot of the hanger are formed lugs or shoulders 33, and in these lugs are journaled horizontal friction-rollers 34 35, which are adapted, when the grip rounds a curve, to bear against a beam or guide which is fixed in the conduit at one or both sides thereof at the curve or other suitable point.

40 designates a longitudinal pivot bolt or shaft which is supported in the depending foot of the hanger in a recess therein, and on this shaft or bolt is pivoted the jaws 41 42 of the grip, which jaws are arranged or located in the longitudinal recess in said grip. To the jaws of the grip, above the fulcrum thereof, are connected links 43, which links are preferably in the form of broad flat plates, as shown, and which converge to a common point, where both jaws are pivotally connected to the lower extremity of a vertically-movable grip-stem 45, which stem is guided between the members or sections of the hanger and extends through the slot formed

in the grip-carrying beam. I will now proceed to describe the mechanism by which this grip-stem is operated vertically to open and close the jaws of the grip. To opposite faces 5 of the grip-stem, at the upper extremity thereof, are pivoted levers 46, which extend above the grip-beam and are fulcrumed thereon by means of links 47, which links are pivoted to the beam and to lateral shoulders 10 at an intermediate point of the length of the levers, as shown. To the upper free ends of the lifting-levers 46 are connected endwise-movable operating-rods 49 50, and in the forward ends of these rods is secured a sliding 15 guide or bolt 51, that extends transversely through the rods and is limited and guided in grooves or ways formed in parallel guides 52, which are secured to horizontal bars 53 on the stationary beams 1 2. This sliding 20 guide or bolt and the rods 49 50 are adapted to be moved back and forth to operate the lifting device for the grip-stem by means of an operating-rod 55, which is provided at a point intermediate of its length with shoulders 56 57, that are adapted to engage the 25 sliding bolt or guide 51, to move the latter in the direction that said operating-rod is adjusted. The forward end of the operating-rod is pivoted to one of the arms of a double-armed lever 58, which is fulcrumed on a bar 30 59 of the beams 1 2, and the other arm of said lever is connected to a rod 60, which leads to a lever (not shown) to be operated by the gripman for opening or closing the jaws. It will 35 be observed that when the lever 58 is thrown forward by the rod 60 it will draw the rod 55 in the same direction and pull the rear shoulder thereon against the sliding bolt or guide 51, thus moving the lifting-levers 46 forward 40 and depressing the grip-stem, which operates to close the jaws of the grip and causes them to engage the cable. A reverse movement of the lever 58 operates to move the parts in the reverse direction and elevate the grip-stem to 45 open the jaws and release the cable, the parts being held firmly in place by the gripman's lever and the forward shoulder of the rod 55 bearing against the sliding bolt or guide.

In the lower forward end of the foot of the 50 grip-hanger I arrange a trip 61, which is adapted to be moved by an obstruction in the path of the grip and to operate the rod 55 to temporarily break the connection between the grip-stem and the lever 58, whereby the grip- 55 jaws are released from the pull of the gripman's lever and the intermediate connecting parts and is adapted to release itself automatically from the cable. This trip 61 preferably consists of a two-armed lever, which is 60 pivoted at a point intermediate of its length or at the juncture of its arms, and one end projects forward beyond the grip and terminates close to the cable, and the other arm is arranged beneath a push-rod 62, which is ar- 65 ranged and held in a vertical position by suitable guides on the front end of the grip-hanger. This push-rod is free to slide verti-

cally in its guides, and the upper end thereof is arranged immediately below the rear extremity of the operating-rod 55. This trip 70 mechanism is normally inactive—that is, when the conduit is clear of obstruction; but when the grip approaches a cross-cable or any other obstruction in its path in the conduit the trip is actuated to elevate the push-rod, which rod 75 impinges against and lifts the operating-rod 55, to disengage the latter from the slide-bolt or guide and thus break the connection between the gripman's lever and the grip until the trip clears the obstruction, when the trip 80 and rod drop by gravity to their normal positions and the lever can be operated by the gripman to close the jaws of the grip on the cable.

The operation and advantages of my inven- 85 tion will be readily understood and appreciated by those skilled in the art from the foregoing description, taken in connection with the accompanying drawings.

I am aware that changes and alterations in 90 the form and proportion of parts and details of construction can be made without departing from the spirit or sacrificing the advantages of my invention, and I would therefore have it understood that I hold myself at lib- 95 erty to make such changes and alterations as fairly fall within the scope of my invention.

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

1. In a cable-grip substantially as described, 100 a suspension-frame consisting of bars which are pivotally supported at their ends and pivoted together at points intermediate of their length, and a grip-carrying beam arranged 105 between the bars and connected thereto, whereby the suspension-frame is adapted to hold the grip-carrying beam in a horizontal position and enable said beam to be adjusted vertically, substantially as described. 110

2. In a cable-grip substantially as described, 115 the combination of the rock-shafts, the bars carried by said rock-shafts and pivotally connected together, and a grip-carrying beam supported by the bars, as and for the purpose described.

3. In a cable-grip substantially as described, 120 the combination of a grip-carrying beam, the rock-shafts, and the supporting-bars arranged in pairs on opposite sides of said beam, the bars of each pair being secured respectively to the rock-shafts and pivoted together at a point intermediate of their length, for the purpose described.

4. In a cable-grip substantially as described, 125 the combination of the rock-shafts, the bars arranged in pairs, as described, the two bars of each pair being secured at one end to the rock-shaft and pivoted to each other at a point intermediate of their length, and a grip- 130 carrying beam supported in the free ends of all the bars which constitute the suspension-frame, as and for the purpose described.

5. In a cable-grip substantially as described,

the combination of the rock-shafts, the bars secured to the rock-shafts and pivotally connected in pairs, as described, and a grip-carrying beam pivoted to the free ends of the bars, the bars constituting a suspension-frame which is constructed to slightly yield or give when the grip engages the cable, as and for the purpose described.

6. In a cable-grip substantially as described, the combination of a stationary rock-shaft, another rock-shaft mounted to slide a limited distance in its bearings, the bars secured to said rock-shafts and pivotally connected, as described, and a grip-carrying beam pivoted to the free ends of said bars, as and for the purpose described.

7. In a cable-grip substantially as described, the combination of the rock-shafts, the bars secured to said rock-shafts and pivotally connected in pairs, as described, the free end of one bar of each pair of bars being bifurcated or slotted, and a grip-carrying beam pivoted at one end in the free ends of two bars and having a slot at its opposite end, which slot receives a shaft or pin which is secured in the ends of the remaining bars, as and for the purpose described.

8. In a cable-grip substantially as described, the combination of the stationary rock-shaft, a sliding rock-shaft, the bars secured to said rock-shafts and pivotally connected in pairs, as described, a grip-carrying beam pivoted in the free ends of said bars, another rock-shaft 23, linked to the sliding rock-shaft, and an endwise-movable rod pivoted to an arm of the rock-shaft 23, substantially as described.

9. In a cable-grip substantially as described, the combination, with a grip-hanger and the vertically-movable stem of a grip, of the endwise-movable rods connected to the grip-stem to adjust the latter and secured to a common sliding guide, and an operating-rod connected to the sliding guide, for the purpose described, substantially as set forth.

10. In a cable-grip substantially as described, the combination, with a grip-hanger, a carrying-beam therefor, and a grip having the ver-

tically-movable stem, of the levers fulcrumed on the carrying-beam and connected to the grip-stem, the endwise-movable rod pivoted to the lifting-levers and connected to a common sliding guide, and an operating-rod also connected to said sliding guide, substantially as described.

11. In a cable-grip substantially as described, the combination, with a grip-stem, of the lifting devices connected thereto, the endwise-movable rods connected to the lifting devices, a sliding guide or bolt secured to said rods, the fixed guides or ways for the sliding guide, and an operating-rod connected to said sliding guide, substantially as described.

12. In a cable-grip substantially as described, the combination, with a grip-stem, a lever, as 58, and connecting-rods intermediate of said lever and the grip-stem, of a vertically-movable trip, carried by a grip-hanger to be operated by an obstruction in the path of the grip and adapted to temporarily disengage the operating-rod between the lever 58 and the grip-stem, as and for the purpose specified.

13. In a cable-grip substantially as described, the combination, with a grip-stem and the rods connected thereto and to each other, as described, of a trip carried by the grip-hanger, and a push-rod operated by the trip and adapted to temporarily break the connection between the rods which operate the grip-stem, substantially as described.

14. In a cable-grip substantially as described, the combination, with a grip-stem, of the levers connected thereto, the rods having the sliding guide, the operating-rod detachably connected to said guide, a trip, and a push-rod operated by the trip and arranged to lift the operating-rod and thereby disconnect the latter from the sliding guide, substantially as described.

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

NICHOLAS KIRCHNER.

Witnesses:

FRANK WUNDSLEBEN,
CHARLES SCHWARZ.