

(No Model.)

2 Sheets—Sheet 1.

S. H. TERRY.
GRIP FOR CABLE ROADS.

No. 353,178.

Patented Nov. 23, 1886.

Fig. 1.

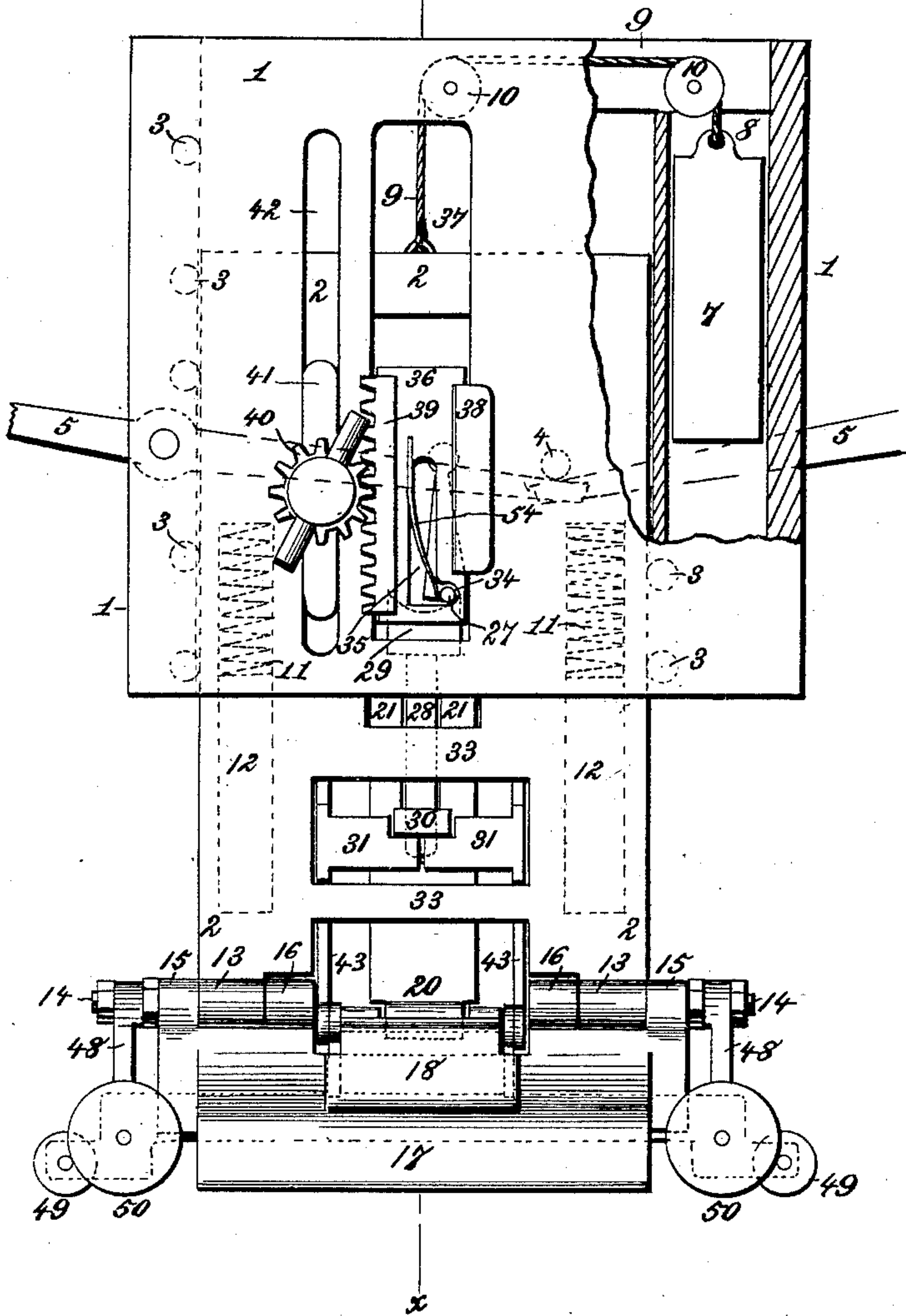


Fig. 2.

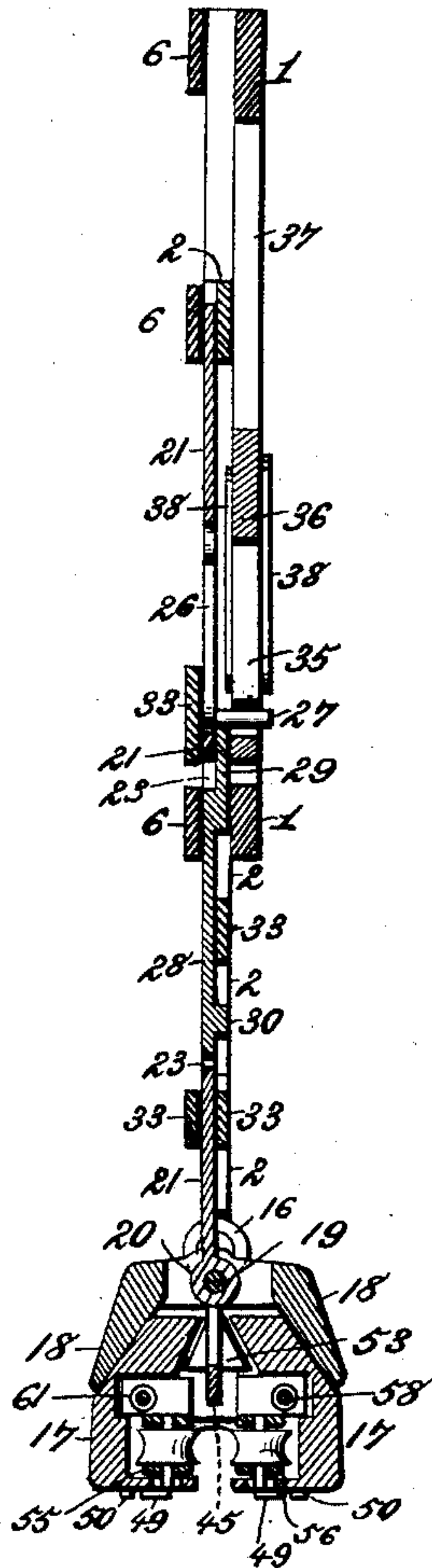


Fig. 3.

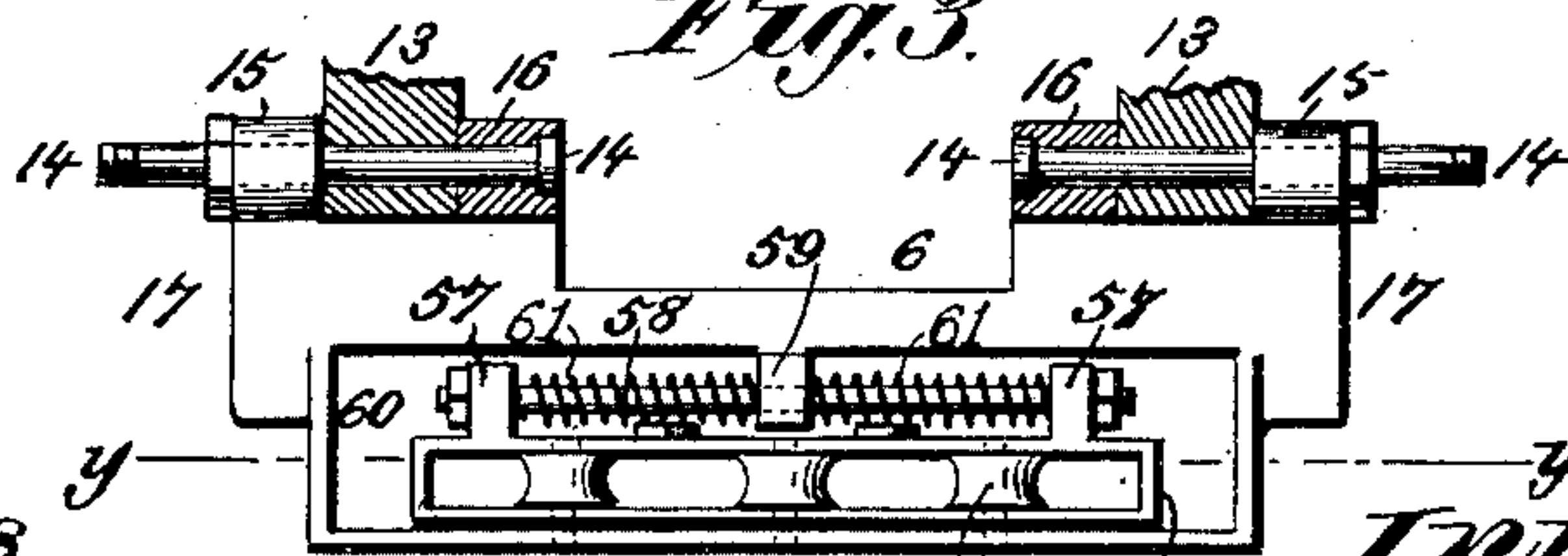
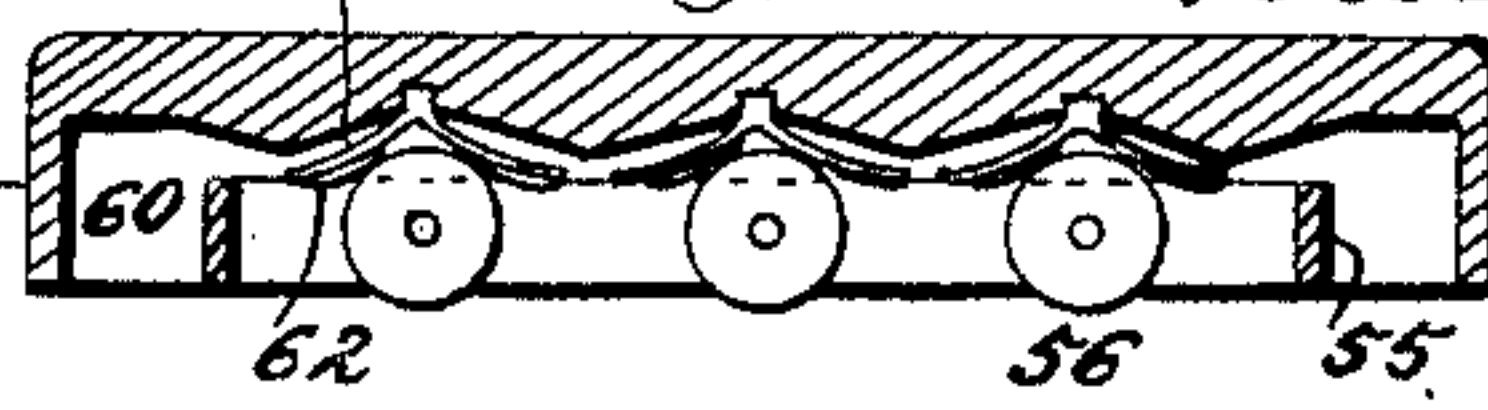


Fig. 4.



Witnesses:
Robert Everett,
J. A. Rutherford

Inventor:
Samuel H. Terry.
By James L. Norris,
Atty.

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2 Sheets—Sheet 2.

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Fig. 5.

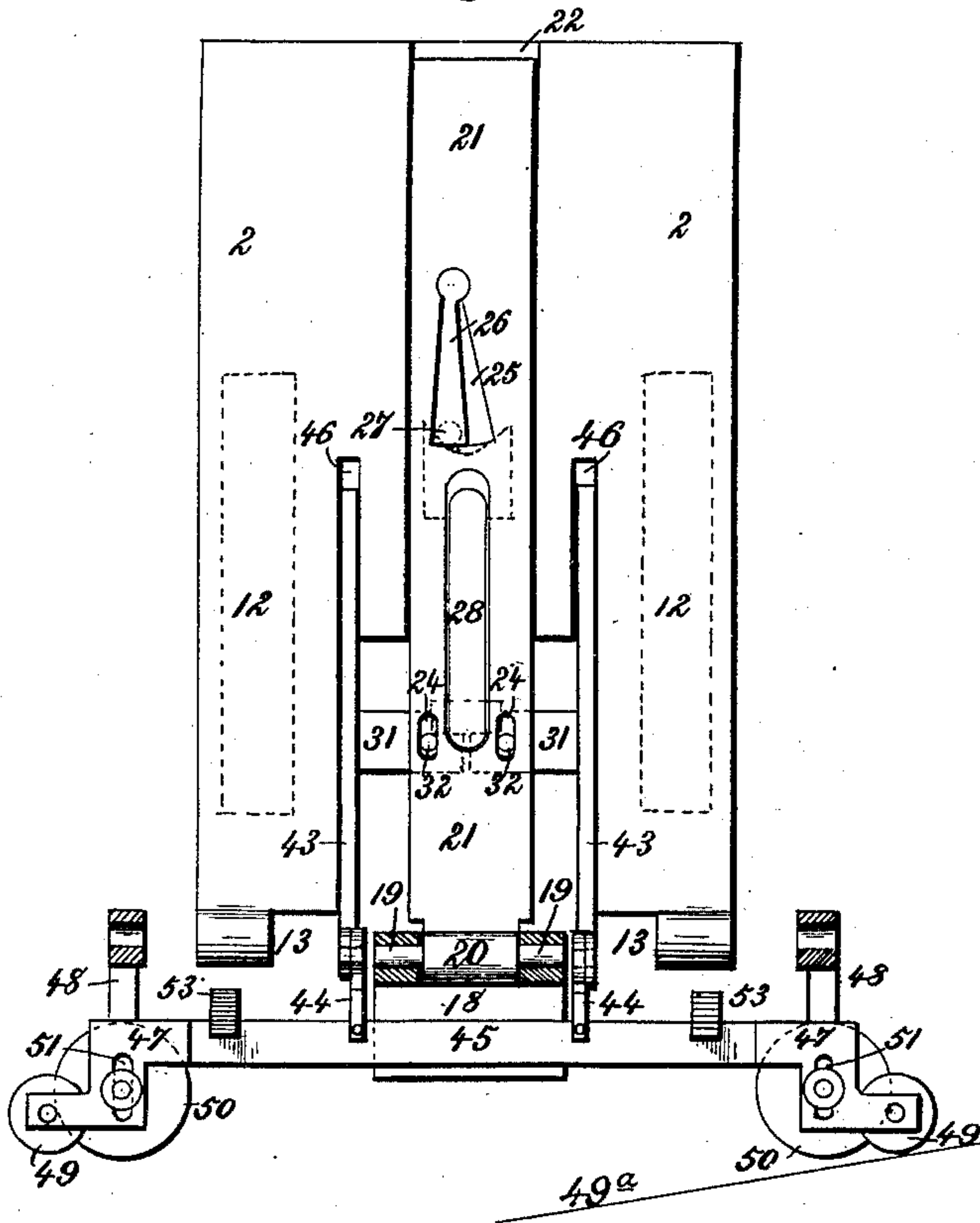


Fig. 7.

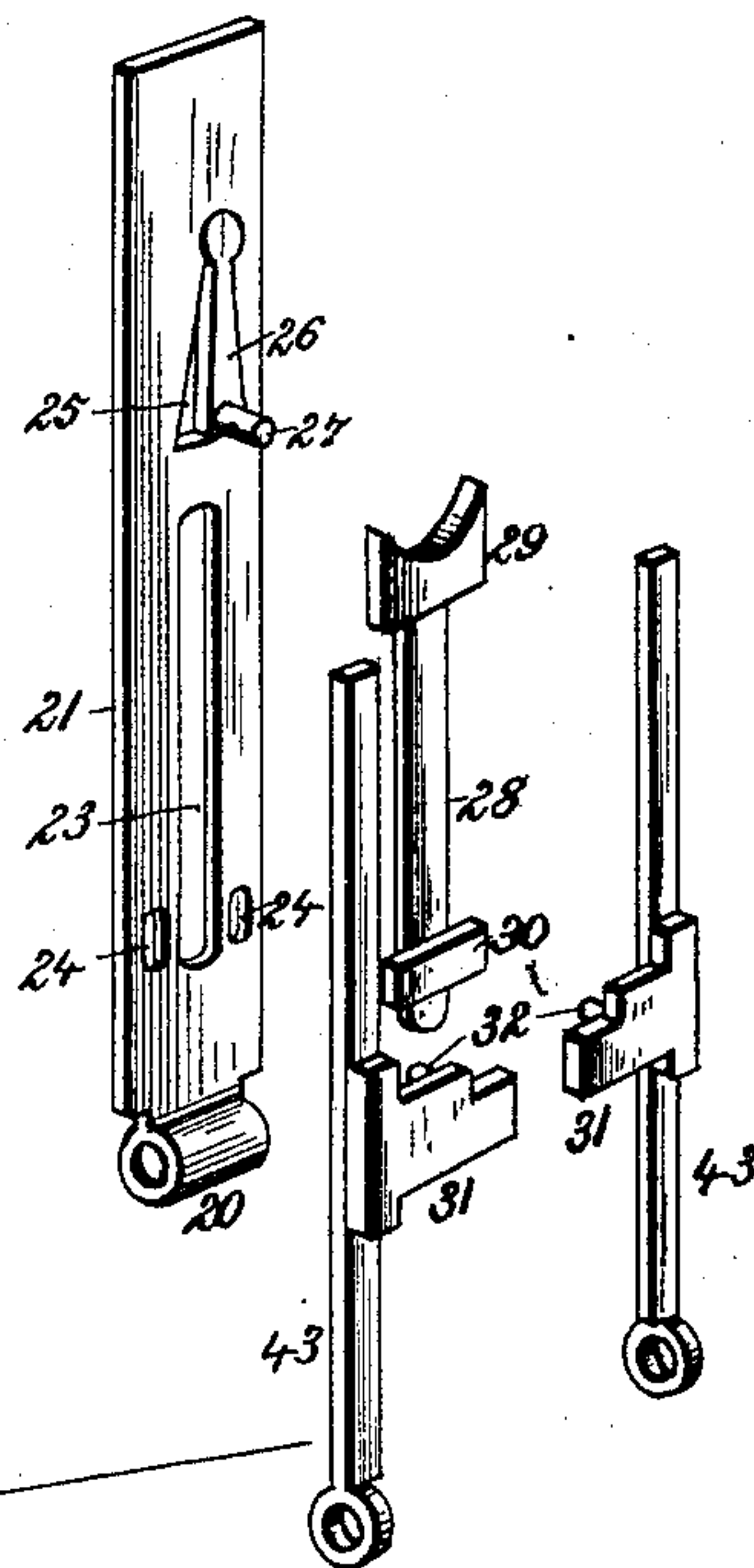


Fig. 6.

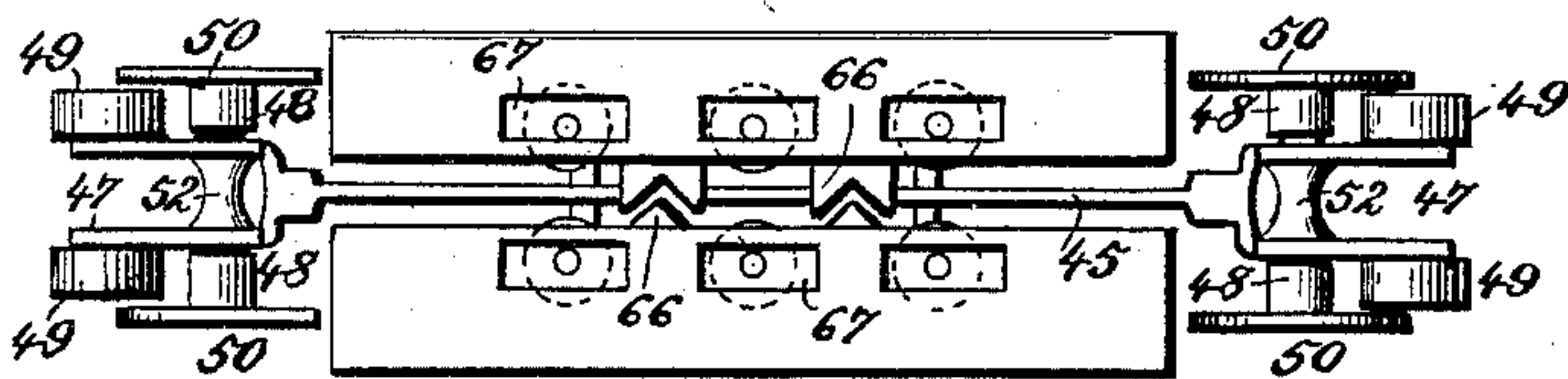


Fig. 8.

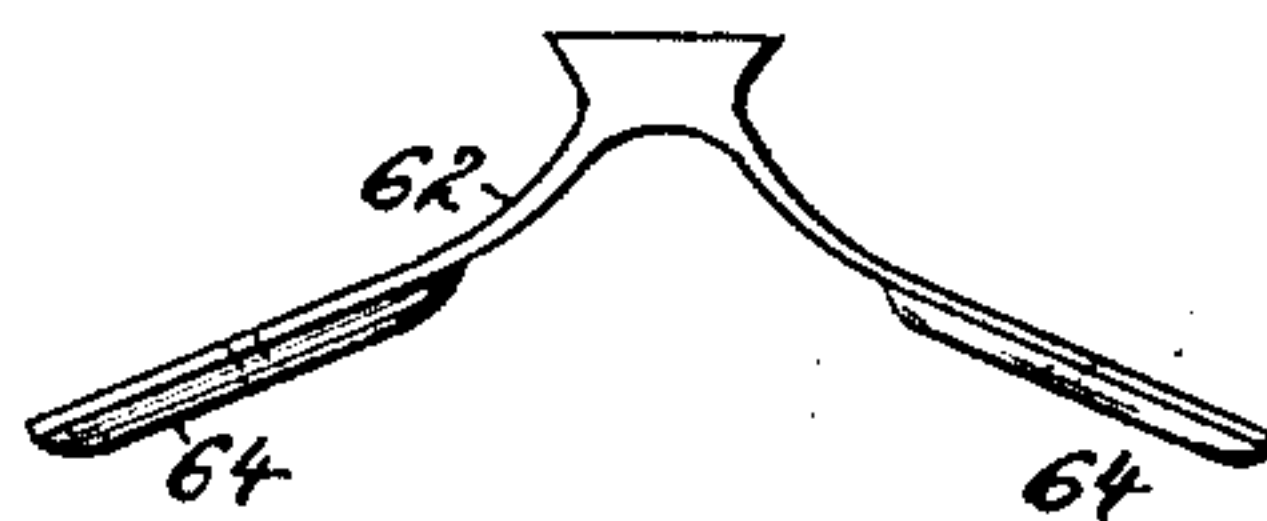
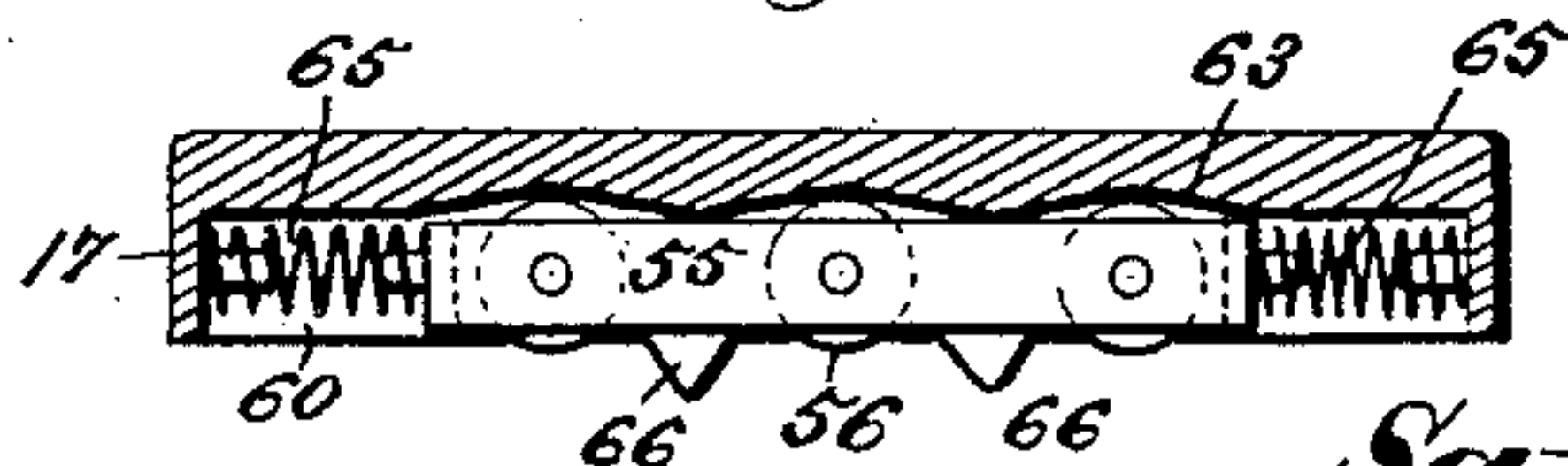


Fig. 9.



Witnesses,
Robert Emmett.

J. A. Rutherford

Inventor,
Samuel H. Terry.
By James L. Norris,
Atty.

UNITED STATES PATENT OFFICE.

SAMUEL H. TERRY, OF FULTON, MISSOURI.

GRIP FOR CABLE ROADS.

SPECIFICATION forming part of Letters Patent No. 353,178, dated November 23, 1886.

Application filed September 15, 1886. Serial No. 213,611. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL H. TERRY, a citizen of the United States, residing at Fulton, in the county of Callaway and State of Missouri, have invented new and useful Improvements in Grips for Cable Roads, of which the following is a specification.

The object of my invention is to provide an improved cable-gripping mechanism so constructed and arranged as to be capable of readily accommodating itself to the rise and fall of the moving car-body without bearing with any great weight on the cable, and adapted, also, to swing from side to side with the varying line of the cable in turning curves without subjecting the cable to strain or wear.

My invention has also for its object to provide an improved and reliable means of automatically releasing the grip jaws from the cable at a cable-crossing or other point of obstruction without interfering with the mechanism by which the grip can be controlled by the car-attendant.

The invention consists in certain peculiarities in the construction of the cable-gripping jaws and their accompaniments, and also in the mechanism whereby said jaws are operated, either automatically or at the will of the attendant on the car-platform, all of which will be hereinafter particularly set forth.

In the annexed drawings, illustrating the invention, Figure 1 is a side elevation, partly in section, of a cable-gripping mechanism embodying my improvements. Fig. 2 is a vertical section of the same on the line $x x$ of Fig. 1. Fig. 3 is an inner side view of one of the hinged gripping-jaws, showing in section its connection with the opposite hinged jaw and with the jaw-carrying plate. Fig. 4 is a horizontal section of one of the gripping-jaws on the line $y y$ of Fig. 3. Fig. 5 is a side elevation of the jaw-carrying plate and connections, partly in section, the gripping-jaws being removed. Fig. 6 is a bottom plan view of the gripping-jaws and connections. Fig. 7 illustrates certain details in perspective. Fig. 8 is a view of a spring-bearing for the gripping-rollers. Fig. 9 is a horizontal section of one of the gripping-jaws, illustrating a modification in the arrangement of the springs for centering the carrying-frame of the gripping-rollers.

Referring to the drawings, the numeral 1 designates a stationary vertical plate, which is secured to the car-frame in any suitable or well-known manner, and recessed to receive the vertically-sliding plate 2, that supports the cable-gripping devices. This sliding plate 2 is made to move smoothly in the stationary plate by means of anti-friction rollers 3, (shown by dotted lines, Fig. 1,) which are supported in the stationary plate. To one side of the sliding plate 2 is attached a pin or lug, 4, for engagement with treadles 5, by which the sliding plate can be raised when desired. The sliding plate 2 is held from lateral displacement by means of guides 6 on one side of the stationary plate 1, the lower guide being made to serve also as a stop to prevent the sliding plate from dropping so far as to become disconnected from the stationary plate.

In order to sustain a portion of the weight of the sliding plate 2, and thereby relieve the cable from excessive strain, a weight, 7, can be arranged in a recess, 8, of the stationary plate, and be connected with the upper end of the sliding plate by means of a cord or chain, 9, passed over pulleys 10, journaled in the upper part of the stationary plate. A like result can be attained by substituting springs 11 for the weight above described, said springs being arranged in corresponding recesses, 12, formed in the plates 1 and 2, as shown by dotted lines, Fig. 1, and supported at their lower ends by the stationary plate in such a manner that at their upper ends they will engage the upper walls of the recesses formed in the sliding plate, and thereby sustain a portion of its weight. By either of these arrangements, comprising one or more springs or weights, as preferred, the strain of the gripping devices on the cable can be reduced to a minimum.

The lower end of the sliding plate 2 is formed with perforated lugs or eyes 13 for passage of the hinge-pins 14, on which the eyes 15 16 of the swinging gripping-jaws 17 are journaled. The gripping-jaws 17 are closed securely by means of an external saddle, 18, Figs. 1, 2, and 5, that is journaled or hinged by means of a pin, 19, to a perforated lug or eye, 20, at the lower end of a vertically-sliding bar, 21, which moves in a recess, 22, formed on one side of the sliding plate 2. This vertically-sliding bar 21 is formed with a longitudinal

slot, 23, Fig. 7, having on each side of its lower end an elongated perforation, 24, and above the slot 23 is a triangular opening, 25, in which is pivoted a pendulum or vibratory arm, 26, carrying at its lower end a horizontally-projecting lug or locking-pin, 27. In the slot 23 is arranged a slide, 28, having a cam, 29, attached to its upper end and a cross-head, 30, near its lower end. The cam 29 is formed with a concaved upper edge, whereby it is adapted to disengage the locking-pin 27 from its receiving-notch, as hereinafter explained, and the cross-head 30 engages a pair of rabbeted lugs or arms, 31, which carry horizontally-projecting pins 32, that engage the elongated perforations 24 in the sliding bar 21, for a purpose hereinafter described.

By reference to Fig. 2 it will be seen that the cam 29 and cross-head 30 both project from the slide 28 on the same side of the slot 23; and it will also be seen that the vertically-sliding bar 21 and slide 28 are held within the slotted or recessed sliding plate 2 by means of guides 33, formed on or attached to said plates. The locking-pin 27 on the vibratory arm 26 is adapted to engage a notch, 34, at the lower end of a slot, 35, formed in a block, 36, which is arranged to slide vertically in a slot or opening, 37, in the stationary plate 1, that supports the gripping mechanism. This sliding block 36 is provided with suitable guides, 38, and carries a rack, 39, which engages a pinion, 40, journaled to a block, 41, that is fixed to the sliding plate 2 and adapted to move in a slot or recess, 42, in the stationary plate.

The rabbeted lugs or arms 31, above referred to, are attached to or formed on a pair of vertical rods or bars, 43, which are provided at their lower ends with jointed extensions 44, that are connected to a horizontal bar, 45, extending longitudinally between the hinged gripping-jaws. At the upper ends these vertical rods or bars 43 move in guide slots or recesses 46, formed in the sliding plate 2.

To each end of the horizontal bar 45 is secured a bracket, 47, with which is loosely connected a bifurcated hanger, 48, the upper end of which is journaled on one of the pins 14, by which the gripping-jaws 17 are hinged to the lower end of the sliding plate 2. At the outer ends of these brackets 47 are journaled rollers 49, one on each side of the cable-passage, and at the inner ends of the brackets are larger rollers 50, attached to connecting-shafts that are journaled in the bifurcated hangers 48, and pass loosely through vertically-elongated slots 51, formed in said brackets. On each of these connecting-shafts is a grooved roller, 52, that lies above the cable.

The horizontal bar 45 carries on its upper edge two or more wedge-shaped lugs or cams, 53, which are adapted to bear against the inner beveled surfaces of the hinged gripping-jaws 17 when the bar 45 is raised, and thereby press the jaws open and disengage them from the cable after the saddle 18 has been raised

from contact with the outer surfaces of said jaws.

The gripping-jaws can be opened at the will of the attendant, while the locking-pin 27 engages the notch 34, by rotating the pinion 40 in the proper direction to raise the block 36, thereby lifting the bar 21, saddle 18, and cam-bar 45. The opening of the gripping-jaws will be effected automatically whenever the rollers 49 come in contact with the ordinary bridges or inclined ways, as indicated by the line 49^a, that are usually placed in the cable-tunnel at cable-crossings, or elsewhere, as required.

From the foregoing description, in connection with the accompanying drawings, it will be apparent that as the rollers 49 at either end of the grip come in contact with the bridges at a cable-crossing said rollers will be elevated sufficiently to carry one end of the horizontal bar 45 slightly upward, thereby raising the vertical bar 43 at that end of the grip and causing its rabbeted lug 31 to bear against the under side of the cross-head 30. This cross-head 30 carries upward the slide 28 and attached cam 29 a sufficient distance to cause the concavity of the cam to force the locking-pin 27 out of the notch 34 against the slight pressure of a spring, 54, which normally serves to hold said pin in its receiving-notch. After the locking-pin 27 becomes disengaged from the notch 34 the continued upward movement of the rabbeted lug 31 brings its attached pin 32 into contact with the upper end of the elongated perforation 24, in which it is engaged, and thereby commences to move the sliding bar 21 and attached saddle 18 upward, so as to disengage the latter from the gripping-jaws and permit them to open and release the cable under the continued upward movement of the bar 45 and attached wedge-shaped lugs 53 within said jaws. As the saddle 18 and sliding bar 21 rise under the action of the lugs 31 and attached pins 32, the disengaged locking-pin 27 will move upward in the slot 35 of the block 36 without affecting the rack-and-pinion gearing connected with said block, and the car with the opened gripping-jaws will move forward by its momentum until the cable is again gripped, or until the brakes are applied, should it be desired to bring the car to a stop. It will be observed that this automatic action of the bar 45 in unlocking and opening the gripping-jaws, and of the saddle 18 in rising to permit the opening of said jaws, is entirely independent of the car attendant or driver and requires no attention on his part. In passing over a bridge at a cable-crossing the upward movement of the contacting rollers 49 raises that end of the bracket sufficiently to automatically actuate the unlocking mechanism of the grip without affecting the hangers 48 until the lower ends of the slots 51 come in contact with the shafts of the rollers 50, by which time the unlocking of the grip has been effected, so that the upward movement of the hangers 48

will elevate the plate 2 and open grip-jaws 17 in season to avoid contact with the crossing cable, and the anti-friction rollers 50 will carry the grip over the bridge without any liability of injury to the cables or gripping mechanism.

In order to grip or release the traveling cable at will, the car-attendant can actuate the gripping mechanism either through a hand-wheel on the shaft of the pinion 40 or through the ordinary hand-wheel shaft at either end of the car, said hand-wheel shaft being connected with the shaft of the pinion 40 in any suitable manner—such as by means of rods or chains—and also, if desired, with the brake mechanism.

It will be seen that in actuating the grip through the pinion 40 the engagement of the latter with the rack 39 will enable the sliding block 36 to be raised or lowered, as desired. The notch 34 of this sliding block 36 being engaged with the pin 27, carried by the sliding bar 21, it is obvious that said bar and attached saddle 18 will likewise be moved up or down, according to the direction in which the pinion 40 is turned, and the engagement of the sliding bar 21 with the pins 32, carried by the lugs 31 on the vertical bars 43, will move the horizontal grip-opening bar 45 in like manner. In this method of operating the grip the spring 54 retains the pin 27 in the notch 34, to form a connection between the bar 21 and block 36, until such time as the automatic opening and elevation of the gripping-jaws is required to avoid contact with a crossing cable or other obstruction. When the pin 27 has been carried upward in the slot 35 past the spring 54 in the automatic unlocking and upward movement of the grip, the subsequent lowering of the sliding bar 21 will carry said pin down past the spring and into its normal position in the notch 34, thereby securely locking the gripping-jaws in contact with the cable.

By means of the treadles 5 the sliding plate 2 and attached gripping-jaws 17 can be raised whenever desired. This vertically-sliding plate 2 and its connections are all so arranged that the car-body, supported on springs, as usual, can rise and fall freely without disturbing the engagement of the gripping-jaws and cable, and without "kinking" or straining the latter, as is liable to occur with a fixed gripping device. The arrangement of the weight or weights 7 or the spring or springs 11, for sustaining or carrying the plate 2 and attachments, serves to relieve the cable of the greater part of the weight of the gripping devices, and thereby avoids the usual liability of cutting or breaking the cable from excessive strain.

The flexible connection of the gripping-jaws 17 with the lower end of the sliding plate 2 by means of the hinge-pins 14, and the corresponding connection of the saddle 18 with the sliding bar 21 and of the jointed bars 43 and 44, enable the gripping-jaws to be swung inward by contact with the usual inclined guide

in turning a curve, so as to accommodate itself to the varying line of travel of the cable.

The internal faces of the gripping-jaws 17 are recessed, as shown in Figs. 2, 3, 4, and 9, to receive an oblong longitudinally-sliding frame, 55, in which are journaled the grooved gripping-rollers 56. On the upper surface of the sliding frame 55 are lugs or eyes 57, for engagement with a longitudinal bolt or rod, 58, by which the sliding frame 55 is suspended from a lug, 59, in the central upper portion of the recess 60, that is formed in the gripping-jaw.

The supporting rod or bolt 58 is surrounded by a spring, 61, that tends to maintain the frame 55 and attached rollers 56 in a central position within the recessed gripping-jaw. The gripping-rollers 56 project on each side of their supporting-frames 55, as shown in Figs. 4 and 9, and on their inner sides may contact with V-shaped springs 62, set in concave depressions 63, formed in the inner side walls of the gripping-jaws, said springs being formed of flat steel leaves and provided with rounded iron bearing-surfaces 64 at their ends, as shown in Fig. 8.

If desired, the spring 62 may be dispensed with and the rollers 56 made to contact directly with the depressions 63, which form a series of corrugations or double inclines, as shown in Fig. 9. It is also obvious that instead of suspending the sliding roller-carrying frame 55, as shown in Fig. 3, with a spring, 61, above said frame, it may be arranged with a spring, 65, at each end, as shown in Fig. 9. The upper opposing edges of the roller-carrying frames 55 are provided with interlocking teeth 66, as shown in Fig. 6.

It will be seen that the pivots or journals of the horizontal gripping-rollers 56 project down through slots 67 in the bottoms of the gripping-jaws 17, so as to assist in holding the roller-carrying frames 55 within the jaws without interfering with the longitudinal play of the rollers 56 in riding on the springs 62, or on the double inclines formed by the depressions 63 in the act of gripping the cable. By means of the interlocking teeth 66 both roller-carrying frames are made to move together, so as to prevent kinking or twisting the cable in the act of engaging therewith. It will be observed, also, that the transverse grooved rollers 52, journaled in the brackets 47 at each end of the gripping-jaws and above the cable, are so arranged as to bear on the cable in such a manner as to prevent the up and down bending thereof, that is so liable to impair its integrity when engaged with gripping devices of ordinary construction.

What I claim as my invention is—

1. The combination, with a fixed gripper-supporting plate, of a vertically-sliding plate, a grip composed of two hinged jaws carried at the lower end of said sliding plate, a horizontal cam-bar suspended between said jaws and adapted to open the same, jointed bars or rods attached to said cam-bar, a vertically-sliding

bar having a saddle pivoted to its lower end and adapted to clasp the grip-jaws, said saddle-carrying bar being connected with the jointed bars that are attached to the cam-bar, a rack-carrying slide-block connected with the saddle-carrying bar, and a pinion for actuating said rack to open or close the gripping-jaws, substantially as described.

2. The combination, with a fixed gripper-supporting plate and a vertically-sliding plate carrying two hinged gripping-jaws, of a horizontal cam-bar suspended between the gripping-jaws and having at each end a roller-carrying bracket, a vertically-sliding bar provided with slots and perforations, a saddle pivoted to the lower end of said bar and adapted to clasp the gripping-jaws, jointed rods attached to the horizontal cam-bar and provided with rabbeted lugs having pins to engage elongated perforations in the vertically-sliding saddle bar, a swinging arm pivoted in said bar and carrying a locking-pin, a slide arranged in a slot in the saddle-carrying bar, and having at its lower end a cross-head to engage the rabbeted lugs and at its upper end a cam to disengage the locking-pin, and a slotted block supported in the stationary plate of the gripper and provided with a notch to receive said locking-pin, whereby the gripping-jaws are automatically opened and released from the cable by the contact of the rollers in the brackets at the ends of the horizontal cam-bar with guides placed in the cable-way at a crossing or elsewhere, substantially as described.

3. The combination, with a grip comprising two hinged jaws, of an external saddle, a sliding bar carrying the saddle, a sliding plate, means for lowering the bar and saddle, and a horizontal cam-bar between the jaws, connected with the sliding bar and provided with rollers to come in contact with a guide in the cable-way, substantially as described.

4. The combination, with a stationary gripper-supporting plate and a vertically-sliding plate carrying the cable-gripping jaws, of treadles engaging a pin or lug on said sliding plate to raise or lower the said plate and attached gripping-jaws, substantially as described.

5. The combination, with the hinged gripping-jaws, of a horizontal cam-bar suspended between said jaws and adapted to be actuated to open the same, and a horizontal grooved roller carried in a bracket at each end of said bar and adapted to bear on the cable, substantially as described.

6. The combination, with the hinged and internally-recessed gripping-jaws, of a longitudinally-sliding frame placed in each of said jaws, gripping-rollers journaled in said frames, and springs for centering the roller-carrying frames, substantially as described.

7. The combination, with the hinged and internally-recessed gripping-jaws provided with a series of depressions or double-inclined planes, of a longitudinally-sliding frame placed

in each of said jaws, gripping-rollers journaled in said frames and adapted to ride on the double-inclined planes to grip the cable, and springs to center said frames, substantially as described.

8. The combination, with the hinged and recessed gripping-jaws having a series of internal depressions and springs set in said depressions, of a longitudinally-sliding frame placed in each of said jaws, gripping-rollers journaled in said frames, and springs to center the roller-carrying frames, substantially as described.

9. The combination, with the hinged and recessed gripping-jaws, of the horizontally-sliding roller-carrying frames placed in said jaws and provided with interlocking teeth, and springs for centering said frames, substantially as described.

10. The combination, with the recessed and slotted hinged gripping-jaws, of longitudinally-sliding frames placed in said jaws, gripping-rollers journaled in said frames, with their pivots or journals extended down into the slots in the bottom of the jaws, and springs to center said sliding frames, substantially as described.

11. The combination of the stationary plate 1, the vertically-sliding plate 2, the hinged gripping-jaws 17, cam-bar 45, jointed rods 43 44, the saddle 18, sliding bar 21, having slot 23, perforations 24, and triangular opening 25, the arm 26, pivoted in said opening and carrying a locking-pin, 27, the lugs 31, attached to the rods 43 and having pins 32, engaging the perforations 24, the slide 28, having a cam, 29, and cross-head 30, the block 36, having slot 35, notch 34, and rack 39, and the pinion 40, substantially as described.

12. The combination of the stationary plate 1, the vertically-sliding plate 2, the hinged gripping-jaws 17, the cam-bar 45, having end brackets, 47, carrying rollers 49, the hangers 48, carrying rollers 50, the jointed bars or rods 43 44, rabbeted lugs 31, having pins 32, the saddle 18, vertically-sliding bar 21, provided with slot 23, perforations 24, and pivoted arm 26, carrying a locking-pin, 27, the slide 28, having cam 29 and cross-head 30, and the block 36, having slot 35 and notch 34, for receiving the locking-pin, substantially as described.

13. The combination, with the vertically-sliding plate 2 and the gripping-jaws 17, hinged to the lower end of said plate, of a vertically-sliding bar, 21, a saddle, 18, pivoted to the lower end of said bar and adapted to clasp the gripping-jaws, means for locking said bar 21 in a lowered position, a horizontal cam-bar, 45, suspended between the gripping-jaws and having end brackets, 47, carrying rollers 49, and means for connecting said cam-bar with the saddle-carrying bar and its locking mechanism, substantially as described.

14. The combination, with the sliding plate 2, having eyes 13, of the gripping-jaws 17, provided with eyes 15 16, the hinge-pins 14, the hangers 48, suspended from said hinge-pins

and carrying rollers 50, the cam-bar 45, provided with end brackets, 47, having a loose connection with the shafts of the rollers 50, the rollers 49, carried by said brackets, the saddle 18, sliding bar 21, means for locking said bar 21 in a lowered position, and means for connecting the cam-bar 45 with the locking mechanism of the saddle-carrying bar 21, substantially as described.

10 15. The combination of the hinged gripping-jaws 17, the vertically-movable bar 21, carrying a saddle, 18, adapted to clasp said jaws, the horizontal bar 45, suspended between said jaws and provided with wedge-shaped lugs or
15 cams 53, the brackets 47, attached to the ends of said cam-bar and carrying rollers 49, means for locking the saddle-carrying bar in a lowered position, and means for connecting the
20 saddle-carrying bar, substantially as described.

16. The combination, with the hinged gripping-jaws 17, having recesses 60 and slots 67, of the longitudinally-sliding frames 55, placed in said jaws and provided with interlocking teeth 66, the gripping-rollers 56, journaled in said frames, with their pivots extending into the slots 67, and springs for centering said frames, substantially as described.

17. The combination, with the hinged gripping-jaws 17, having recesses 60 and springs 30 62, of the longitudinally-sliding frames 55, having interlocking teeth 66, the gripping-rollers 56, journaled in said frames, and the spring 58, substantially as described.

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

SAMUEL H. TERRY.

Witnesses:

JAMES L. NORRIS,
J. A. RUTHERFORD,