(No Model.) 3 Sheets—Sheet 1.

W. H. SNELSON & G. JUDGE.

GRIP APPARATUS FOR TRACTION CABLES.

No. 329,965. Patented Nov. 10, 1885.

Fig. 1.

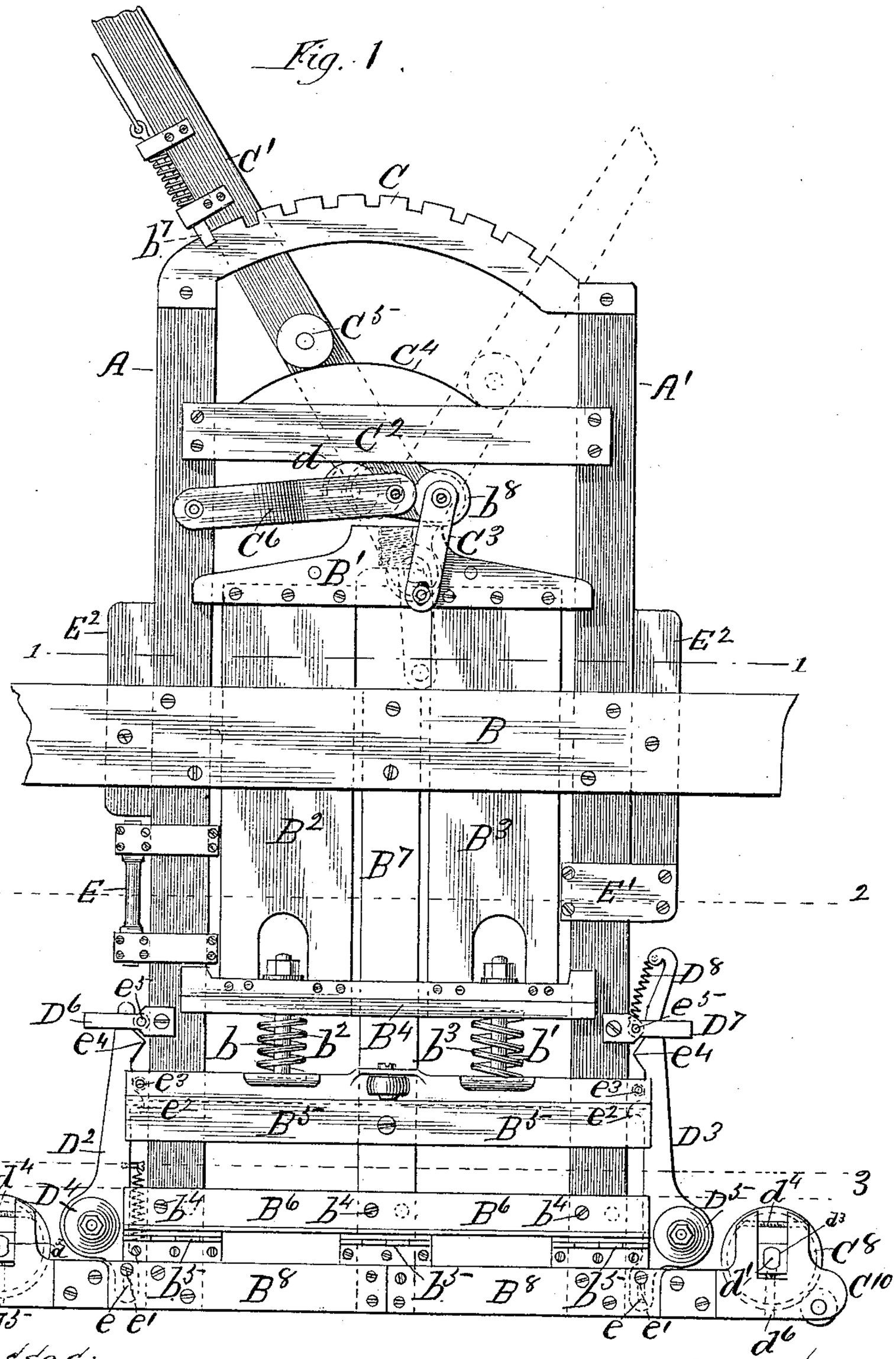

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Fig. 7.

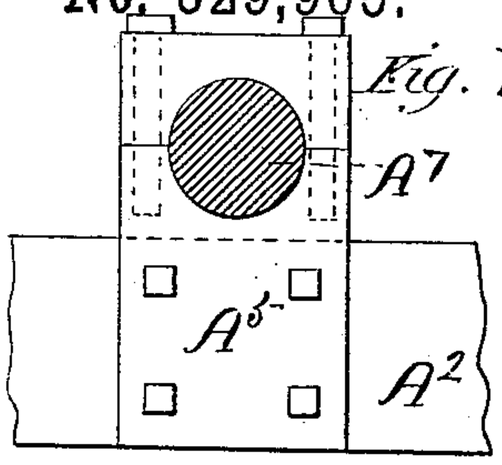


Fig. 3.

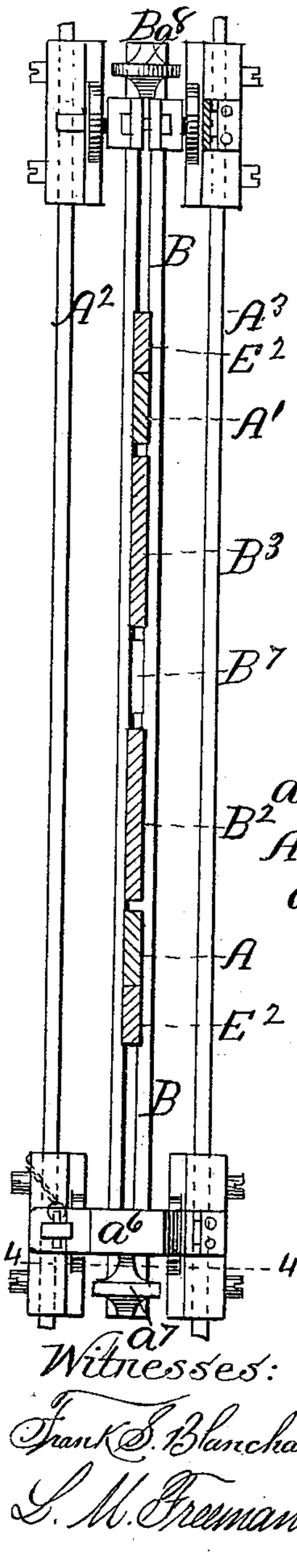


Fig. 2.

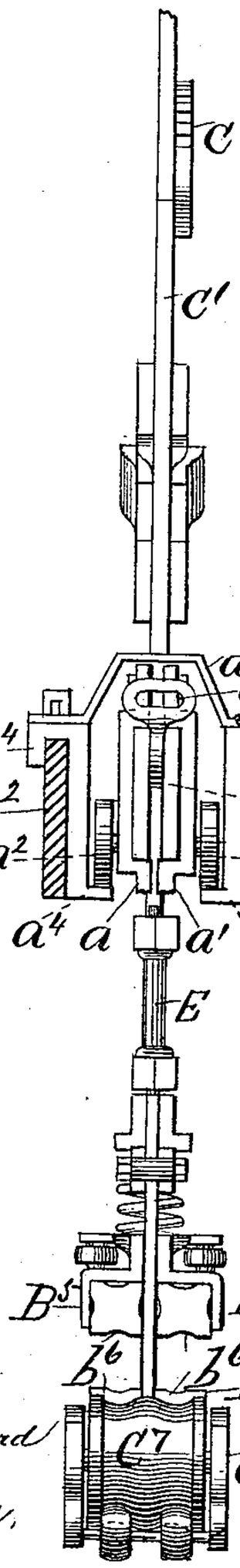


Fig. 5.

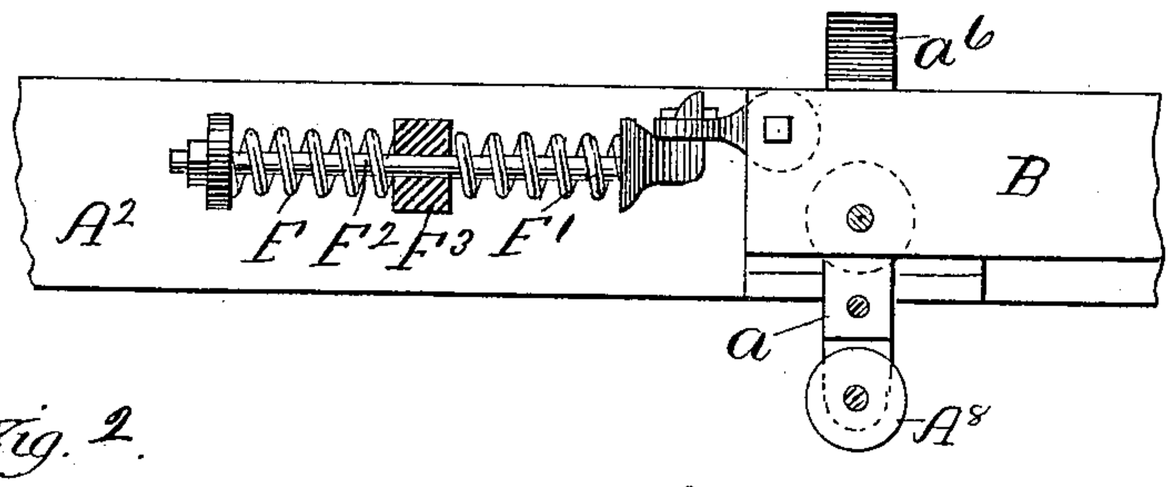


Fig. 6.

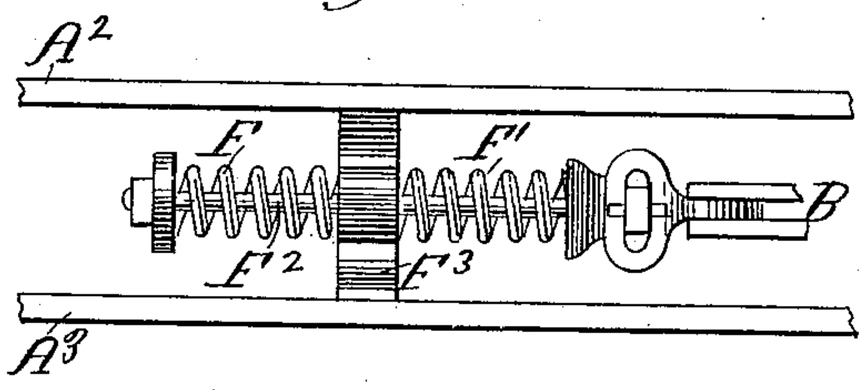


Fig. 8.

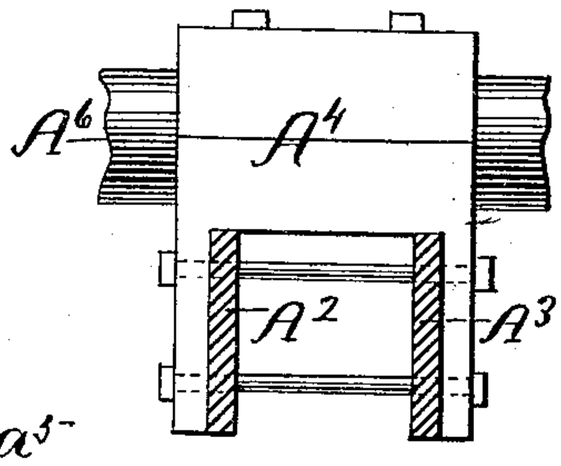


Fig. 9.

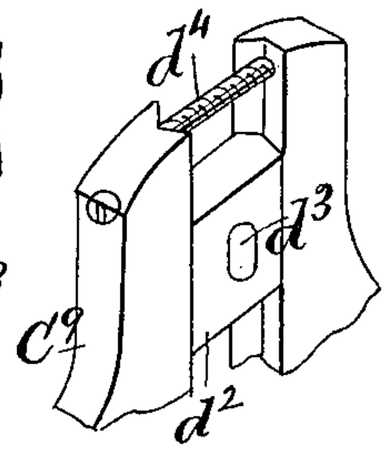
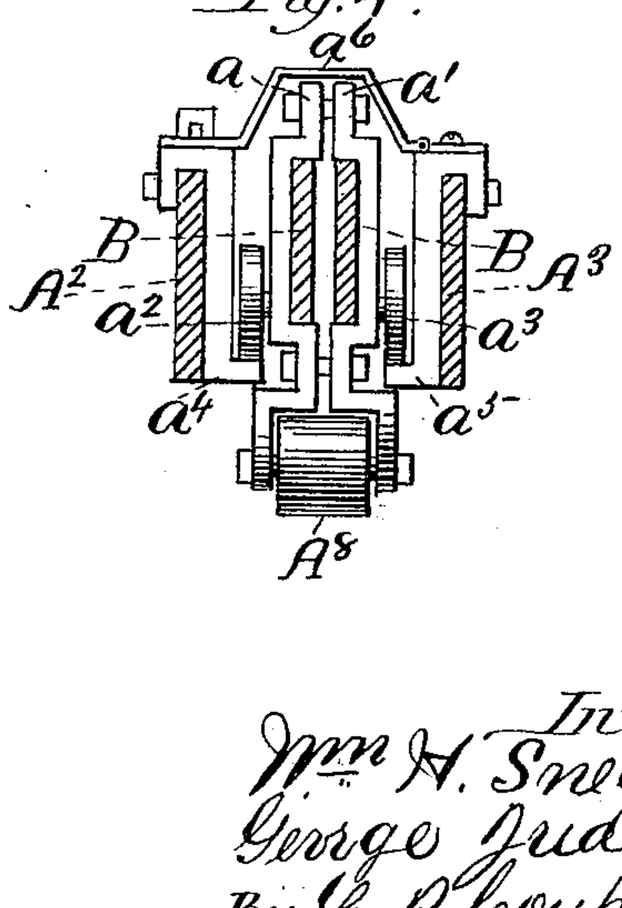


Fig. 4.



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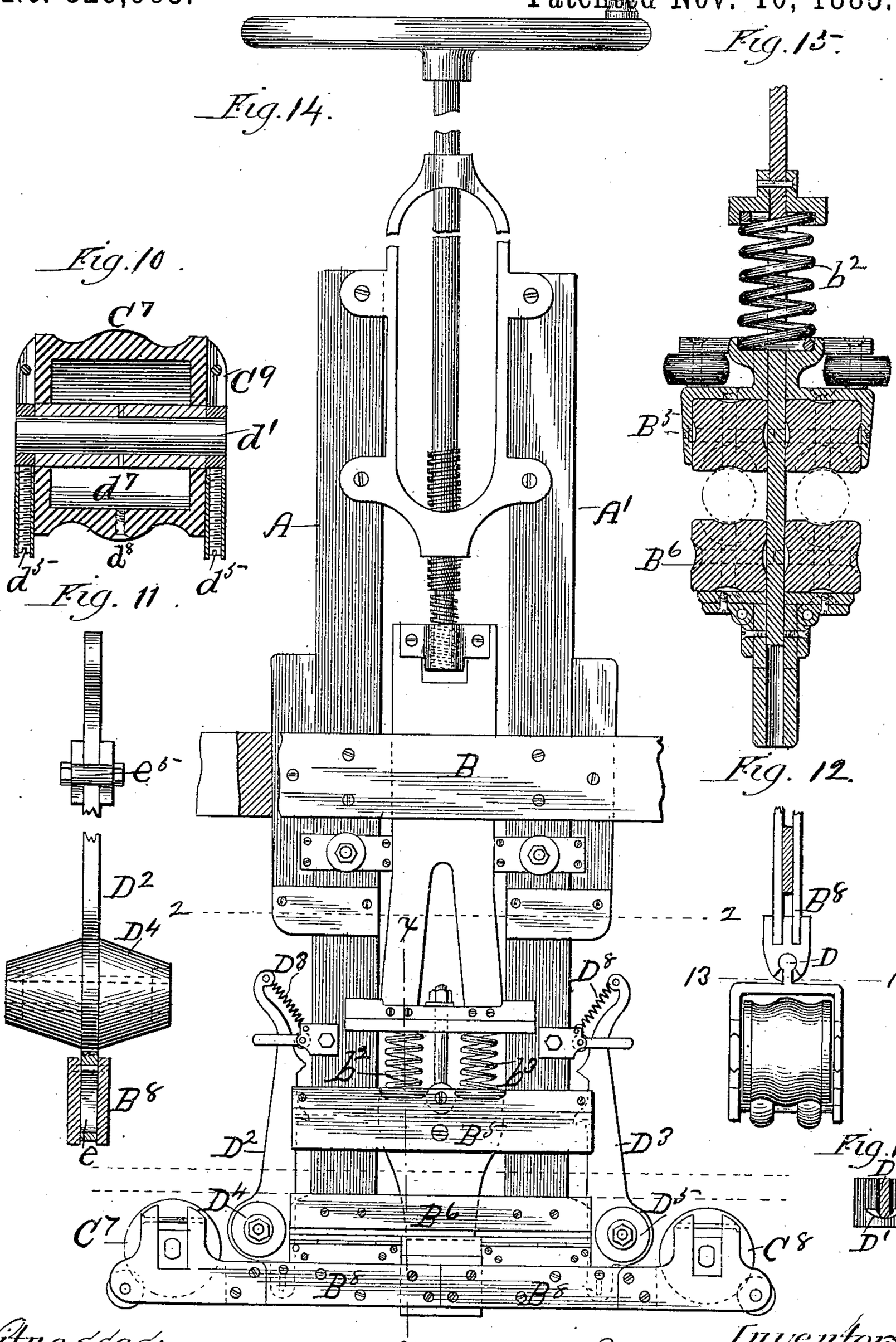

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UNITED STATES PATENT OFFICE.

WILLIAM H. SNELSON AND GEORGE JUDGE, OF CHICAGO, ILLINOIS.

GRIP APPARATUS FOR TRACTION-CABLES.

SPECIFICATION forming part of Letters Patent No. 329,965, dated November 10, 1885.

Application filed March 18, 1885. Serial No. 159,261. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM H. SNELSON and GEORGE JUDGE, of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in a Grip Apparatus for Traction-Cables, of which the following is a full, clear, and exact description, that will enable others to make and use the same, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates to improvements in that class of grips used on traction-cables; and it consists of certain novel features in the construction, arrangement, and combination of parts, as will be hereinafter more fully set forth in detail.

Figure 1 is a side elevation of a grip-stand embodying our improved features; Fig. 2, an edge view of the same; Fig. 3, a horizontal section in the plane 1 1, Fig. 1; Fig. 4, a vertical transverse section in the plane 4 4, Fig. 3. Fig. 5 is a side elevation of a concussion spring or springs connected with the grip-beam, one side of the frame, supporting the springs and fastenings, being removed. Fig. 6 is a top view of the springs with both sides of the frame-work in place. Figs. 7 and 8 show an end and side elevation of a hanging box supporting the ends of the grip-beam extension in connection with the car-axles. Figs. 9, 10, 11, 12, and 13 are detached details of construction; Fig. 14, a modification, and Fig. 15, a vertical section of the same in the plane $x\,x$, Fig. 14.

Referring to the drawings, A A′ represent two hanger bars or uprights, which serve to support the several parts of the grip mechanism. The grip-beam B consists of two horizontal parallel bars or plates, separated from each other by a narrow space, as shown in Fig. 3. The ends of the bars forming the grip beam are supported in the angular clamping-plates $a\,a'$, bolted together above and below the beam, as shown in Figs. 2 and 4. These clamping-plates are in turn supported by the rollers $a^2\,a^3$, journaled in the same, which rest and travel on the inwardly-projecting ledge of the angle-plates $a^4\,a^5$. The upper ends of the plates $a^4\,a^5$ are bent over and downward, so as to engage with the upper edge of the horizontal framing-bars $A^2\,A^3$, which are placed outside of and parallel with the grip-beam. The framing or side bars, A^2A^3, extend beyond each end of the grip-beam, where they engage with and are secured to the hanging boxes $A^4\,A^5$, mounted on the front and rear axles, $A^6\,A^7$, of the car, as shown in Figs. 7 and 8. By having the grip mechanism suspended from the axles instead of from the body of the car the grip proper is not affected by the spring action of the latter, and therefore moves along more smoothly and with less strain on the cable.

The grip apparatus proper is removably secured in position relative to the side bars, $A^2\,A^3$, by means of the latch a^6, hinged at one end to the top of one of the plates secured to the framing or side bars, $A^2\,A^3$, and from thence extending over and being secured to the companion plate by the usual staple and pin, as shown in Figs. 2, 3, and 4, the latch being broken away in the upper end of Fig. 3. By throwing these latches back the grip-stand may be conveniently removed from the supporting side bars.

The parts above described are in duplicate, so that a description of one serves for both ends of the grip-beam and supporting-frame. These features are not embodied in Fig. 1, as the ends of the grip-beam are broken away, and the framing-bar on that side is also removed to give a side view of a portion of the grip-beam.

The clamping-plates $a\,a'$ project downward just below the lower line of the framing-bars, and terminate in the angular ends shown in Fig. 4, between which is journaled the roller A^8. This roller provides means whereby the grip stand may be propelled along on the street-surface when removed from the car, or run along on the slot-irons, with the lower part of the grip down in the cable-channel. The lower angular ends of these clamping-plates are broken away in Fig. 2; but the position of the roller may be easily located.

The broken line 2 2, Fig. 1, indicates the street-level or cable-slot line. The double broken line 3 3 indicates the line and relative position of the traction-cable.

The handles $a^7\,a^8$ provide means whereby the grip apparatus may be conveniently raised

up or lifted out of position when it is desired to remove the same from the car.

The ends of the cross-head B′ (shown in Fig. 1) are mortised, so as to engage with the edges of the uprights A A′, which serve as guides for the vertical movement of said cross-head. The upper ends of the vertical depressing-plates B^2 B^3 are secured in the cross-head B′, while the lower ends are secured in the spring presser-bar B^4. These vertical plates pass down between the bars forming the grip-beam, as shown in Fig. 3. The lower central part of the plates B^2 B^3 is cut out, as shown in Fig. 1, for the purpose of giving access to the bolts *b b′* in adjusting the tension on the springs b^2 b^3, coiled around said bolts.

The vertical bolts *b b′* connect the presser-bar B^4 with the upper or movable grip-jaw, B^5, and cause a simultaneous movement of these parts. The upper ends of the springs b^2 b^3 have a bearing in the under side of the presser-bar B^4, while the lower ends bear on the upper side of the movable grip-jaw, thus making the latter a yielding jaw instead of a rigid one, and thereby permitting the cable to relieve itself in case of any undue strain, thus averting accidents that are now of such frequent occurrence on account of both jaws being rigid.

B^6 represents the under or stationary grip-jaw, secured to the lower part of the uprights A A′ by means of three screws, b^4, and also by means of the three hinges b^5. The number of screws used is just enough to retain the lower jaws in position against all ordinary pressure; but in case of any unusual strain on the cable the screws will give way, and the lower jaw will drop down and hang by its hinges and let the cable drop out. The hinged jaw is also prevented from dropping down into the cable-channel and being lost. Both the upper and lower jaws are made double, and project out on each side from the center line, as shown in Fig. 2. The friction-bars b^6, adapted to have a wearing contact with the cable, are square in cross-section, and are capable of being adjusted so as to bring each side of the square into position as they become worn. By this construction and arrangement it will be seen that there is but little danger of breaking the cable, as the jaws are adapted to yield both in an upward and downward direction.

B^7 represents a middle or third hanger-bar, the upper end of which stops off in the grip-beam B, while the lower end is secured to the base-plate B^8. This third hanger greatly strengthens the device, and serves the purpose of supporting the grip mechanism and preventing the same from dropping down and catching on the cable-sheaves in case either one of the outside hangers or uprights is accidentally broken. Were it not for this third hanger, if one of the outside hangers should break, the grip would drop down on that side and catch onto the cable-sheave, and thereby cause a serious delay by entirely disabling the grip mechanism.

The notched quadrant-guard C is mounted on the upper ends of the hanger bars or uprights A A′, the operating-lever C′ being locked in the different positions it is capable of being adjusted to by means of the usual spring-latch, b^7, engaging with the notches in the quadrant.

The lower end of the operating-lever C′ is slightly curved and provided with the toe-roller b^8, which has a rolling bearing on the top of the cross-head B′. The heel-roller *d* is also attached to the lever C′, and has a rolling frictional contact with the under side of the horizontal bar C^2, which arrangement forms a depressing-cam, and has the effect of forcing down the cross-head B′ and the upper grip-jaw, by means of the intermediate connections already described, when the lever C′ is moved from its normal position shown toward its opposite position, as indicated by the dotted lines. One end of the lifting-link C^3 is pivoted to the cross-head B′, while the opposite or upper end is pivoted to the toe-roller b^8 and the lower end of the operating-lever. The upper side of the horizontal bar C^2 is provided with the cam-surface C^4, on which the roller C^5, pivoted to the operating-lever, rides. By means of this cam-surface, the lifting-link C^3, and the intermediate parts, the upper grip-jaw is raised from contact with the cable. C^6 represents a fulcrum-link, the outer end of which is pivoted to the hanger A, while the inner end is pivoted to the lower part of the operating-lever, as shown in Fig. 1. This fulcrum-link serves the purpose of retaining the lower end of the operating-lever in its proper central position. At each of the lower ends are placed the cable-carrying drums C^7 C^8, supported in the brackets C^9 C^{10}, attached to the ends of the base-plate B^8. One of these drums and its parts will now be described, they being duplicates.

The drum C^7 is mounted loosely on the shaft *d′*, the drum rotating and the shaft remaining stationary, and is provided with the flattened ends inserted in the vertically-adjustable journal-block, d^2, provided with the elongated aperture d^3. One side of one of the brackets, C^9, is shown in Fig. 9. The bolt d^4 prevents the journal block or blocks d^2 from being forced out at the top. The bearing-blocks have beveled ends and fit into V-grooves, as shown in Fig. 9. These blocks, together with the cable-drums and shafts carrying the same, are raised upward to bring the same in proper position relative to the cable by means of screws d^5 d^6, as indicated by dotted lines in Fig. 1, and shown in Fig. 10, which is a vertical longitudinal section of one of the drums and its parts, showing the oil-pocket d^7 with oil-holes leading to the drum-shaft. Oil is supplied to pocket by removing the screw d^8. By this means the drums are kept in a state of constant lubrication.

Fig. 12 is a top view of one of the drums,

showing the pivotal bearing D cut away on each side, so as to allow the drums to have a slightly lateral movement when the cable leads around curves.

Fig. 13 is an end view and partial section in the line 13 13, Fig. 12, and shows the rising plane D′ on each side of the pivotal center, so that the cable-drums will gravitate back to their central position when relieved from a side strain.

D^2 D^3 represent tripping-levers arranged back of the cable-drums, the functions of which are to throw out or release the cable from the grip-jaws. The lower ends of the tripping-levers extend down between the base-plates, and are provided with the elongated slots *e*, as indicated by the dotted lines in Fig. 1, and shown in Fig. 11. In the slot *e* is inserted the screw *e′*, which determines the upward limit or travel of the tripping-levers. Fig. 1 shows them in their normal or lowest position. In the lower part of these tripping-levers are journaled the conical pulleys D^4 D^5. The inner edges of these levers are provided with the hooks e^2, rounded on the upper side, as shown by dotted lines in Fig. 1. Above these hooks are the small rollers e^3, pivoted in the upper grip-jaw.

e^4 is a beveled lug, which is adapted to have frictional contact with the rollers e^5, pivoted in the arms D^6 D^7, which also serve to confine the upper ends of the trip-levers within the required limit. The spring D^8 returns the upper ends of the trip-levers to their inward and normal position, as shown.

When it is desired to throw the cable, the operating-lever should be moved far enough to bring the upper grip-jaw down until the hooks e^2 engage with the upper side of the rollers e^3, and then the operating-lever should be moved in the opposite direction to raise the upper grip-jaw, which has the effect, also, of imparting a vertical movement to the tripping-levers and bringing the conical pulleys D^4 D^5 against the under side of the cable and throwing the same out of the grip, while at the same time the beveled lugs e^4 strike against the rollers e^5, which has the effect of pushing the tripping-levers back far enough to release the hooks e^2, when the tripping-levers drop down to a normal position and leave the line of the grip-jaws clear to receive the cable.

E is a vertical roller, having suitable journal-bearings, and is designed to lessen the friction on the grip from the slot-irons. E′ is a friction-plate for the same purpose. E^2 are keys for tightening up the hangers and parts.

The concussion-springs F F′ are attached to one end of the grip-beam, as shown in Figs. 5 and 6. These springs are placed between the framing-bars A^2 A^3, and are coiled around the rod or bar F^2 and separated by the bearing-block F^3, and serve the purpose of relieving the grip mechanism from all strains and shocks. By this arrangement the movement of the grip-stand in one direction will compress one of the springs, and in the opposite direction the other.

Fig. 14 shows a right and left screw-threaded shaft for operating the grip mechanism, instead of the lever and connecting mechanism shown in Fig. 1. But one connecting-plate is used, and the width of the grip is less and more compact, being more especially intended for use on the front end of a car where there is not sufficient room to operate a lever-connection.

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

1. In a cable-grip, the combination, with the grip-beam B, of the angular clamping-plates *a a′*, the rollers a^2 a^3, the angle-plates a^4 a^5, and the framing-bars A^2 A^3, substantially as described.

2. In a cable-grip, the combination, with the framing-bars A^2 A^3, of the grip-beam B and the latch a^6, substantially as set forth.

3. In a cable-grip, the combination, with the angular clamping-plates *a a′*, of the roller A^8, substantially as set forth.

4. In a cable-grip, the combination, with the presser-bar B^4, of the bolts *b b′*, the springs b^2 b^3, and the upper or movable grip-jaw B^5, substantially as set forth.

5. In a cable-grip, the combination, with the upper movable jaw, B^5, of the vertically-yielding springs b^2 b^3, substantially as and for the purpose set forth.

6. In a cable-grip, the combination, with the hanger bars or uprights A A′, of the base-plate B^8 and the lower grip-jaw, B^6, hinged to said base-plate, substantially as and for the purpose set forth.

7. In a cable-grip, the combination, with the grip-beam B, of the centrally-arranged hanger-bar B^7 and the base-plate B^8, substantially as set forth.

8. In a cable-grip, the combination, with the operating-lever C′, of the toe-roller b^8, the cross-head B′, the heel-roller *d*, the bar C^2, and the means described for compressing the upper grip-jaw, substantially as set forth.

9. In a cable-grip, the combination, with the operating-lever C′, of the roller C^5, the cam-surface C^4, the lifting-link C^3, the cross-head B′, the upper grip-jaw, B^5, and the intermediate means whereby said jaw may be raised from contact with the cable, as set forth.

10. In a cable-grip, the combination, with the upright or hanger A and the operating-lever C′, of the fulcrum-link C^6, substantially as set forth.

11. In a cable-grip, the combination, with the cable-drum C^7, of the vertically adjustable journal-block d^2, the adjusting-screws d^5, and the bracket described for supporting said drum or drums, as set forth.

12. In a cable-grip, the combination, with the drum C^7, provided with the pivotal bear-

ing D, the brackets supporting said drum or drums, and the base-plate B^8, substantially as set forth.

13. In a cable-grip, the combination, with the base-plate B^8, of a tripping lever or levers provided in the lower end with the slot *e*, the stop-screw *e'*, the conical pulleys D^4 D^5, the hooks e^2, the rollers e^3, the beveled lug e^4, the rollers e^5, the spring D^8, and the supporting arm or arms, substantially as and for the purpose set forth.

14. In a cable-grip, the combination, with the grip-beam B, of the concussion-springs F F', the rod or bar F^2, the bearing-block F^3, and the framing-bars A^2 A^3, substantially as and for the purpose set forth.

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