(No Model.)

3 Sheets—Sheet 1.

G. A. POLHEMEUS.

ROLLER CABLE GRIP.

No. 353,809. Patented Dec. 7, 1886.

Fig. 1.

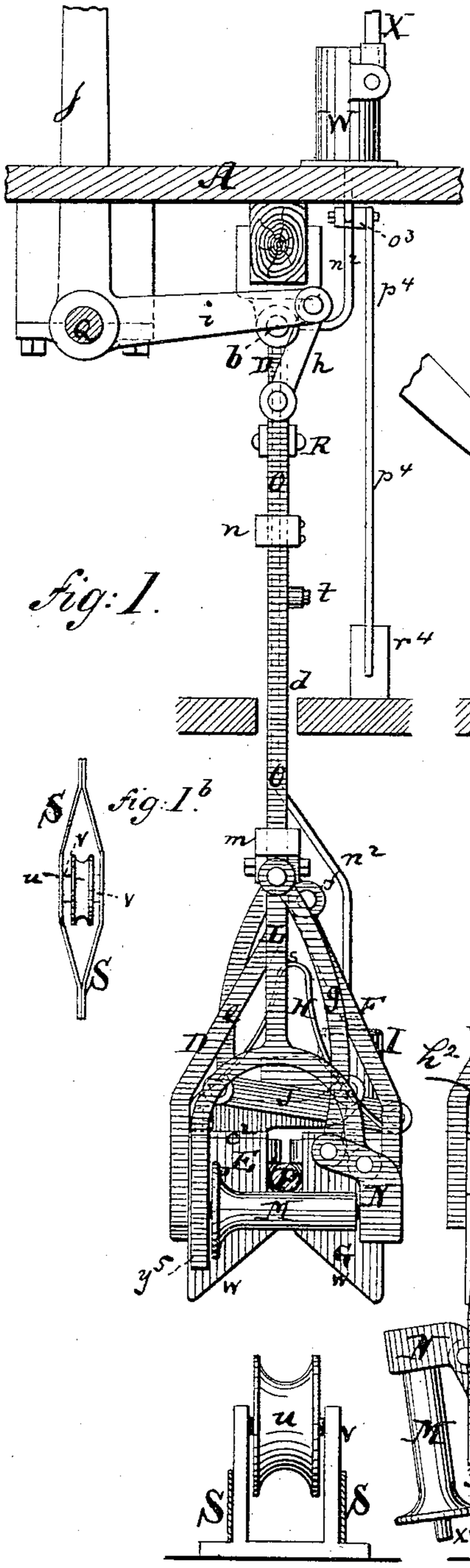


Fig. 3.

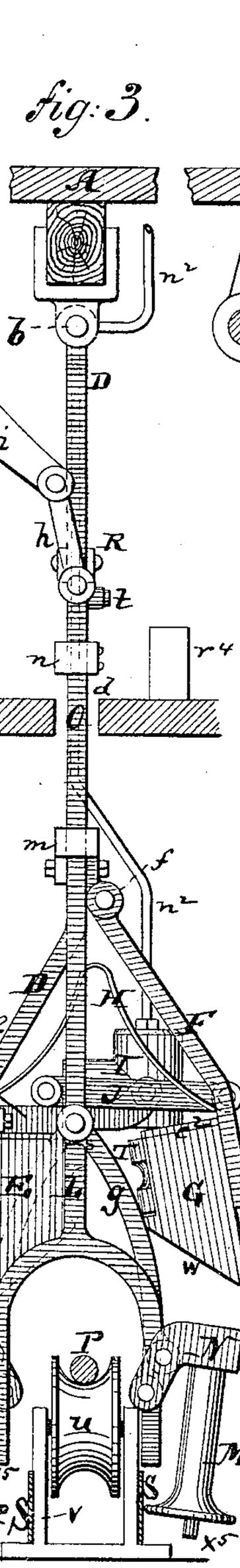


Fig. 2.

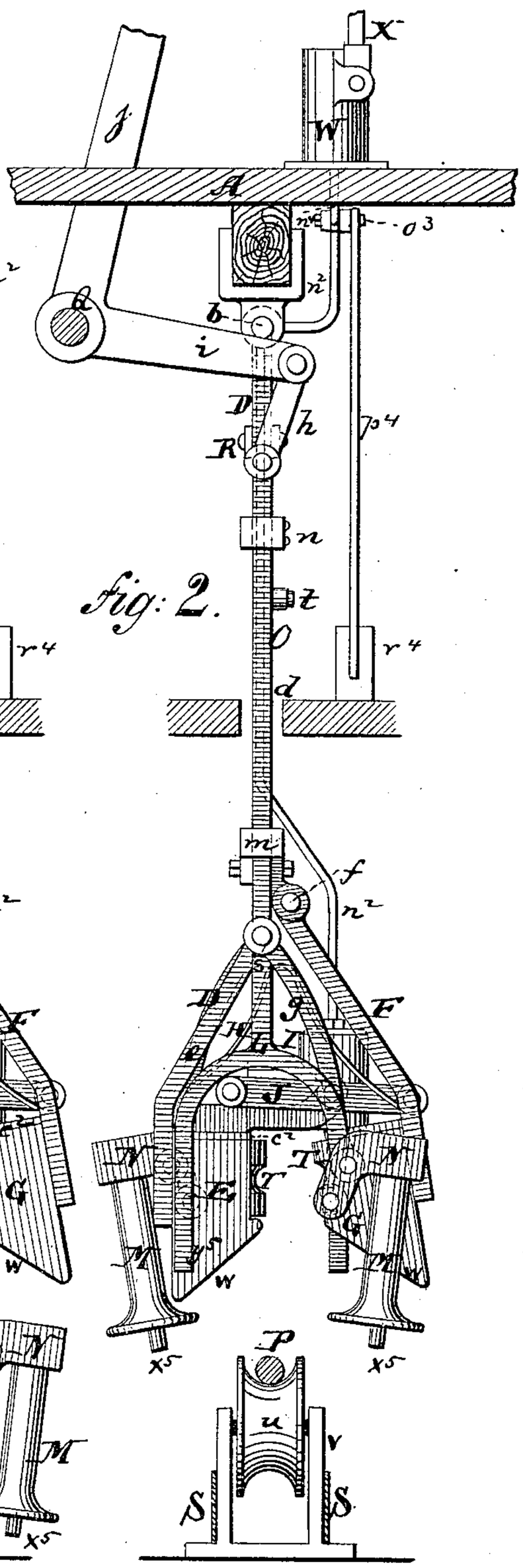
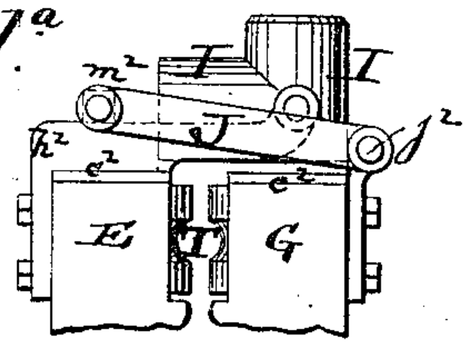


Fig. 1b.

Fig. 1a.



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(No Model.)

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Fig: 4.

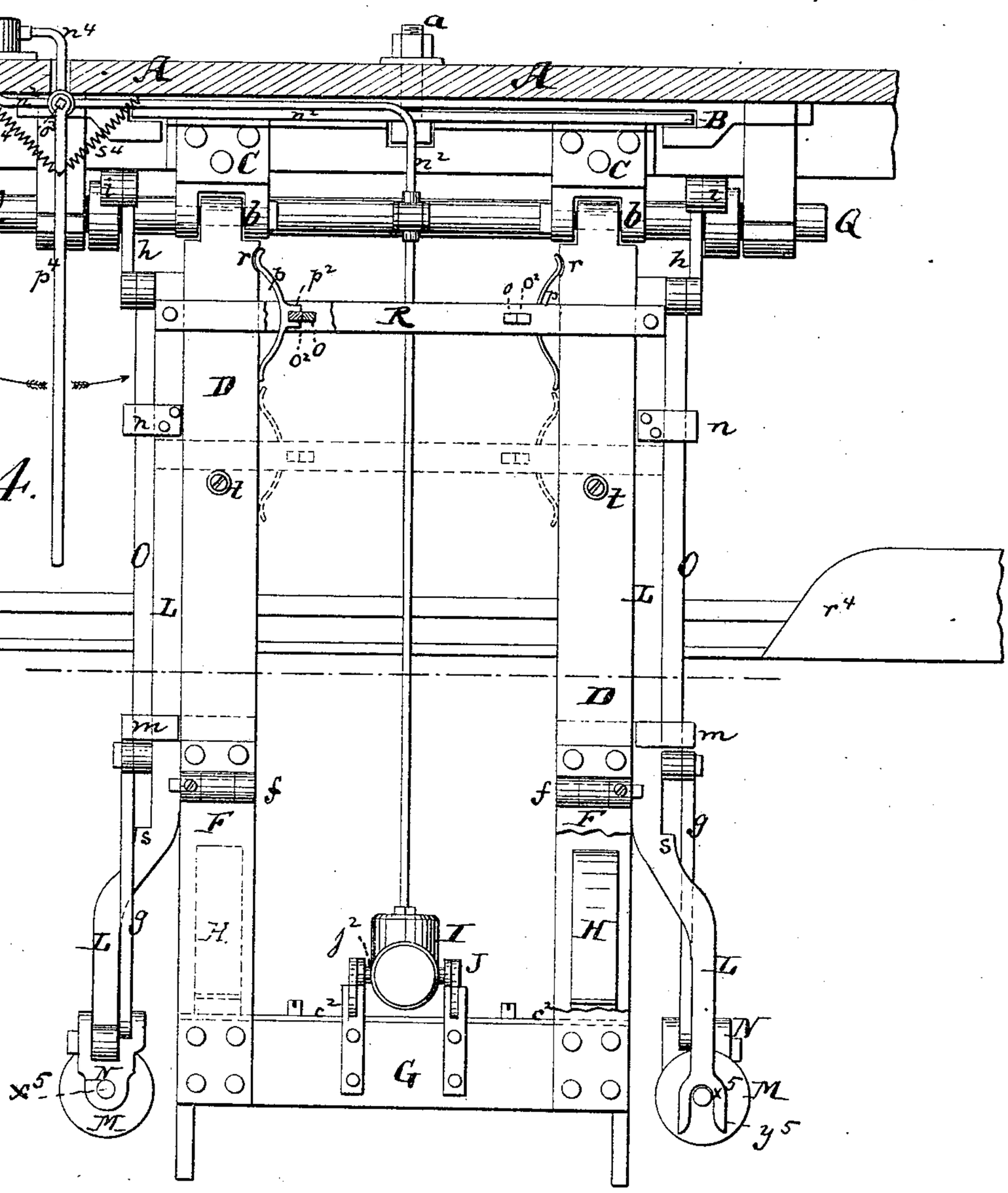

Fig: 5.

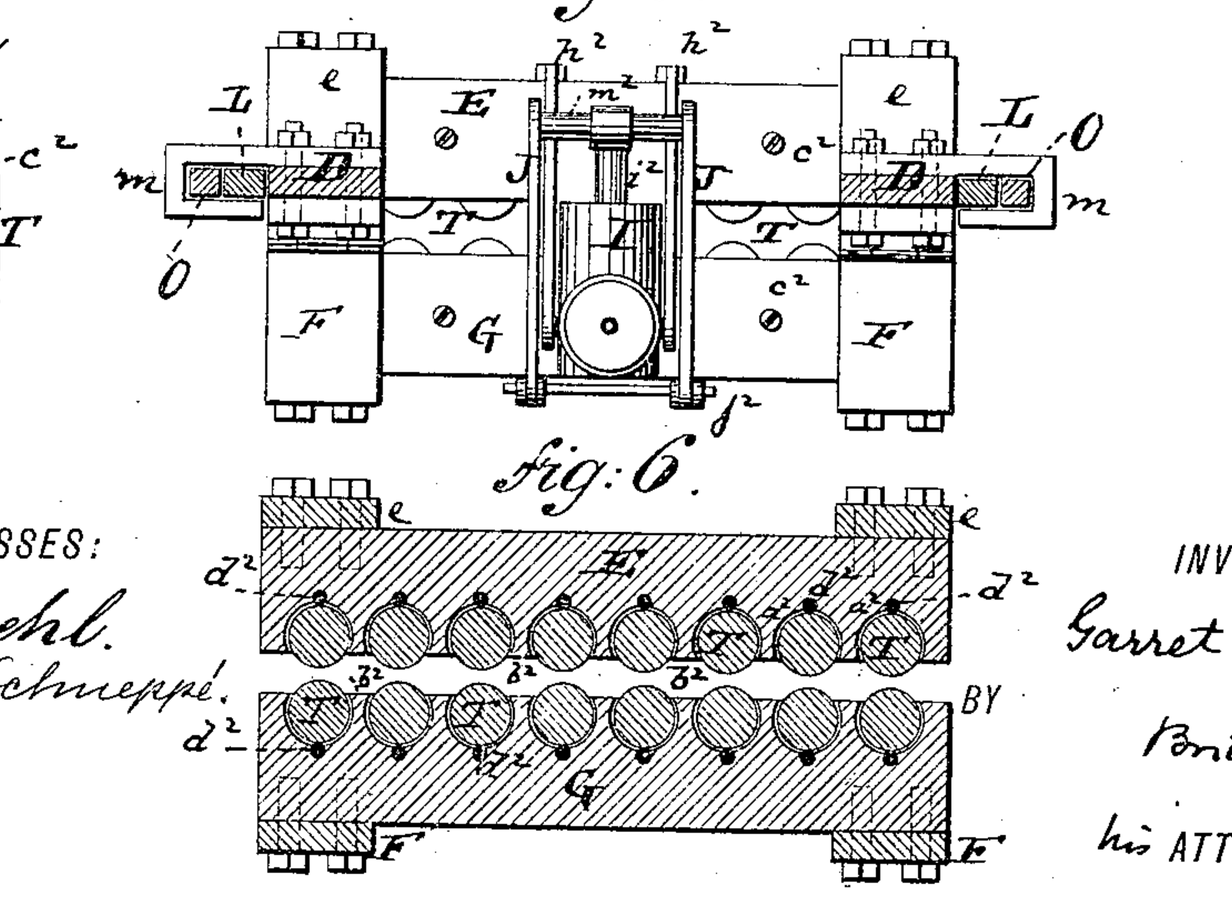

Fig: 7.

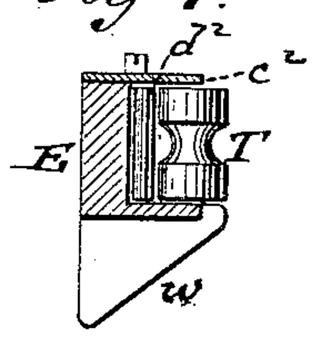

Fig: 6.

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ROLLER CABLE GRIP.

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Fig: 8.

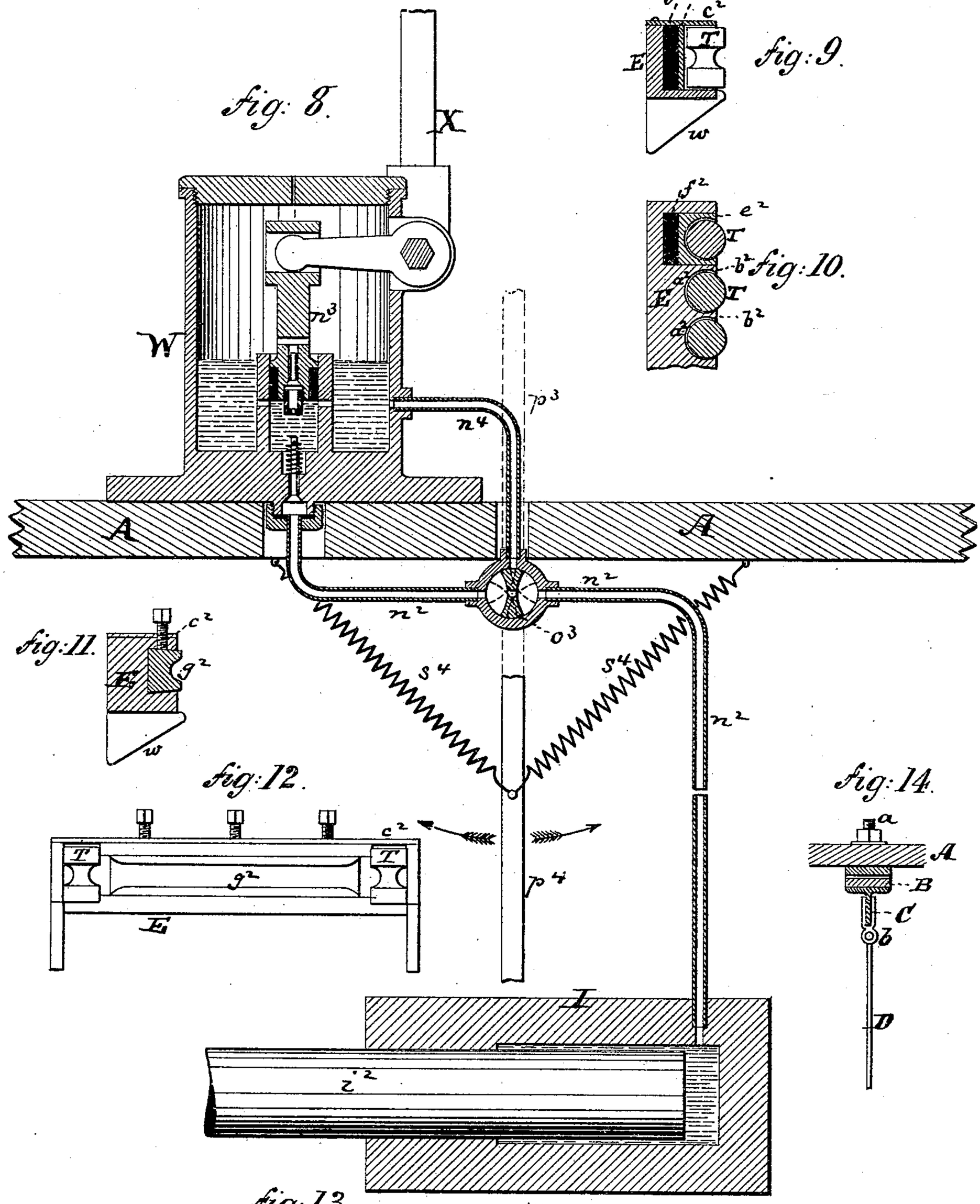

Fig: 9.

Fig: 10.

Fig: 11.

Fig: 12.

Fig: 13.

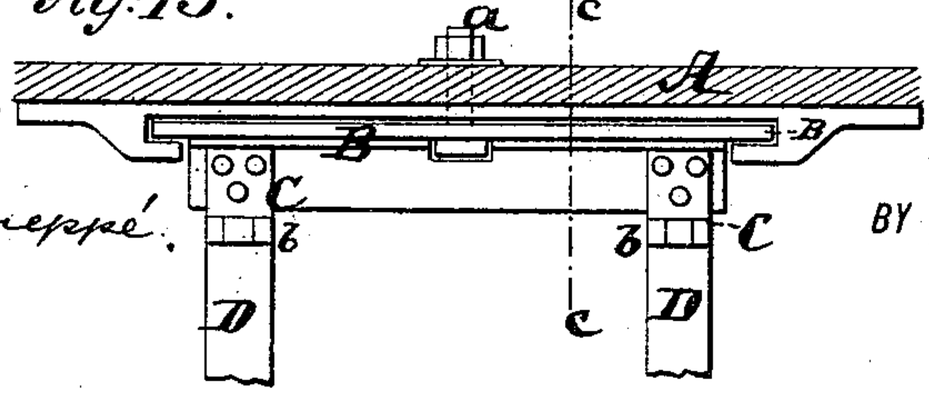

Fig: 14.

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UNITED STATES PATENT OFFICE.

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ROLLER CABLE-GRIP.

SPECIFICATION forming part of Letters Patent No. 353,809, dated December 7, 1886.

Application filed January 14, 1886. Serial No. 188,542. (No model.)

To all whom it may concern:

Be it known that I, GARRET A. POLHEMEUS, of Nyack, in Rockland county, New York, have invented an Improved Roller Cable-Grip, of which the following is a complete specification, reference being had to the accompanying drawings, in which—

Figures 1, 2, and 3 are end views of my improved roller-cable grip, showing the parts in different positions. Fig. 4 is a side view, partly in section, of the same; Fig. 5, a plan or top view thereof; Fig. 6, a horizontal section through the jaws, and Fig. 7 a vertical cross-section of one of the jaws. Figure 8 is a vertical section through the pump for moving the jaws; Fig. 9, a cross-section of a modified form of the jaw; Fig. 10, a horizontal section of the modified form of the jaw; Fig. 11, a cross-section of another modified form of the jaw; Fig. 12, a face view of the same; Fig. 13, a detailed side view showing how the grip is suspended from the bottom of the car; Fig. 14, a cross-section of the same on the line *c c*, Fig. 13. Fig. 1ª is a detailed end view of the grip, showing the jaws and pump. Fig. 1ᵇ is a detailed top view of the stationary roller which supports the cable when down and of its frame for guiding the lifting-rollers, so that they shall not strike said supporting-roller.

This invention relates to sundry improvements on the cable-grips which were described in Letters Patent No. 305,107, of September 16, 1884, and No. 328,517, of October 20, 1885, the Letters Patent last mentioned having been reissued under date of January 12, 1886.

The present invention consists of sundry features of improvement, which will be hereinafter more fully specified.

In the drawings, the letter A represents the bottom or frame of the car. This bottom or frame A has attached to it by an upright bolt, *a*, a turn-table, B, (see Fig. 13,) which turn-table carries brackets C C, to which the uprights D D of the grip are hinged at *b*. By hinging these uprights the grip is enabled to swing horizontally, and thus to follow the car around a curve, while the rigid connection of the grip with the car-body, which is shown in the former patents, can be used only when the car runs on a sufficiently straight track. The turn-table B, which is swiveled by the bolt *a* to the under side of the car, as in Fig. 13, also assists in giving freedom of motion to the grip and to the car, the one with respect to the other, whenever the car travels on a curved track. The two uprights D D may meet and be, in fact, a single plate.

The uprights D D pass through the horizontal slit *d*, which is between the tracks, and have their lower end bent aside, as shown at *e* in Fig. 3, the bent arms *e e* of the two uprights carrying one of the grip-plates E. To the uprights D D are also hinged at *f* the bars F F, to which is secured the other grip-plate, G. Elliptic springs H H, which are clearly shown in Figs. 1, 2, and 3, have the tendency to throw the bars F F away from the arms *e e* on the hinges *f*, as in Figs. 2 and 3, thereby holding the grip-plates separated; but by the connection of the hydraulic pump I, which is carried by the grip-plate E, and the plunger of which connects by the yoke J with the grip-plate G, as in Fig. 1ª, the said grip plates can be brought together.

The elliptic springs H H are fastened each with one end to the bent arm *e*, while its other end is free to press against the hinged bar F. This arrangement of spring H is superior to the coiled spring contained in a cylinder, as shown in my former patent, No. 328,517, because the springs H H, with their free ends, are at liberty to follow the movement of the hinged arms F F in the act of separating the grip-plates.

Along each upright D is a sliding bar, L, whose lower end is forked, and carries in its fork the hinged roller-arm N, to which the cable-lifting roller M is secured. The roller-arm N connects by the rod *g* with another sliding bar, O, that slides alongside the upright D. The entire arrangement of the parts L, M, N, *g*, and O is duplicated, one set for each upright D, so that the grip of a car has two lifting-rollers, M M, but these lifting-rollers are hung on opposite sides of the cable P, as shown in Fig. 3, so that when they are swung up into a horizontal position (see Fig. 1) they approach the cable intervening from opposite

sides, thus insuring the proper elevation of the cable into the space between the grip plates or jaws. The slide O, which carries the rod *g*, is by a link, *h*, connected with the crank *i* of a crank-shaft, Q, that is hung on proper supports beneath or on the bottom A of the car, and that has the handle or lever *j*, by which it can be turned from the car-platform to raise or lower the slide O. When this slide O is lowered, it serves to swing the roller-arm M aside, as in Fig. 3, while when the said slide O is lifted it tends to swing the roller-arm N up into the position shown in Fig. 1, so as to lift the roller M for raising the cable. Each slide O is guided in a strap, *m*, which is fastened to the uprights D D, and embraces the said slides O and L, which are next to one upright, D. Each slide O is also guided in a strap, *n*, which is attached to the slide L, as shown, to assist in holding the slides O in position. The two slides L L are connected near their upper ends by the cross-bar R, which is a double bar, holding between it on cleats *o* springs *p*, that bear against the edges or faces of the uprights D D and serve to hold the slides L L in the desired position by frictional contact.

To insure the holding of the slides L L in the raised position, which is shown by full lines in Fig. 4, the uprights D D have recesses or notches *r*, into which the rounded ends of the springs *p* enter. Out of this position the slides L L are conducted on their downward motion by the downwardly-moving slides O O as soon as the latter strike the projecting shoulders *s* of the slides L L; and when the slides L L are thus moved down they carry the lifting-rollers M M and the roller-arms N N down with them into the position which is shown in Fig. 3. In their lowermost position they are arrested and maintained by, preferably cushioned, projections or pins *t t*, which project from the uprights D D, and against which the cross-bar R is brought. The lower position of this cross-bar R is indicated by dotted lines in Fig. 4, showing it to rest on the cushioned pins *t*. This is also shown in Fig. 3.

When, by turning the shaft Q, the slide O is raised, it first draws on the rod *g*, and swings the free end of the pin x^5, which carries the lifting-roller M into the fork, which is provided for its reception in the corresponding portion, y^5, of the bifurcated slide L, as indicated on the right-hand side of Fig. 4. The slide L now begins to ascend, the horizontal roller M being connected with the slide L, serving to lift the same until all the parts are in the position which is indicated in Fig. 1. Fig. 1 shows the rollers M M raised, and the grip-jaws closed against the cable P, the parts being therefore in the operative position for connecting the grip with the cable.

Fig. 2 shows the parts in the position which results from spreading the jaws E G apart, so as to let the cable drop, the slides O O being also moved down sufficiently far to swing the lifting-rollers M M down, but the slides L L are not yet moved down in this figure. When they are moved down by the continued downward motion of the slides O O, they assume the position which is represented in Fig. 3.

Each spring *p* has its central portion constructed with projecting lugs p^2, that straddle the cleat o^2, and alongside of this cleat is a wedge, *o*, which can be driven into the cross-bar R more or less, to properly tighten and lock its spring. By uniting the two slides L L by means of the cross-bar R, which slides with them, I add materially to the rigidity and reliability of the apparatus, and by using the stops *t*, I prevent the parts being strained when the slides are in the lowered position.

When the cable P is dropped from the grip, as in Figs. 2 and 3, it falls upon supporting-rollers *u*, which are hung in frames *v*, that stand at the bottom of the well within which the grip hangs. Now, in order to prevent the rollers M M, when they are in the position shown in Fig. 3, from striking against the rollers *u* and their frames *v*, which they might do if the car were in motion—going down hill for example—and not being in engagement with the cable, I surround the frame *v* by a doubly-pointed shield, S, which is more clearly shown, although on a reduced scale, in Fig. 1^b, and which lies in the path of the lower ends of the rollers M M, serving to guide them aside, so that they should not strike the frame *v* and the roller *u*. Fig. 3 shows one of the rollers M in contact with the said shield S.

In order to insure the proper guidance of the cable P into its proper position between the gripping-jaws, the lower parts of the grip-plates E G are beveled, as is clearly shown at *w* in Figs. 1, 2, and 3, the two bevels forming the "flaring mouth," so to speak, into which the lifting-rollers M M raise the cable, and by which it is guided between the gripping-jaws, that are hereinafter more specifically described.

I will now proceed to describe the construction of the jaws proper. Each grip-plate E G carries a series of friction-rollers, T T, which, however, are made without pins or gudgeons at the ends by which they are pivoted. I have found that such pins or gudgeons as are shown in my Letters Patent No. 328,517, at the ends of the grip-rollers, are liable to be strained, and that they, in fact, constitute the weakest part of the apparatus. In order to do away with their use, I construct each grip-plate with cavities a^2 for receiving the said rollers, each cavity being more than semi-cylindrical, so that the partitions b^2, which are formed between the several rollers T because of these cavities, will serve to keep the rollers in place, since they (said partitions) extend forward in front of the line which is drawn through the centers of the rollers. The rollers T T are held in their places by removable top plates, c^2, or by equivalent bottom plates which are fastened

by screws to the grip-plates, so as to overlap the larger part of the end of each of said rollers. By unscrewing each plate c^2 all the rollers T T are laid bare to be removed, inspected, and replaced. Behind each roller T, I prefer to hang a parallel or smaller roller, d^2, against which said roller T is crowded when it first begins to engage the cable. In fact, before the grip is tightened on the cable it is desired that the rollers T T be free to revolve. I therefore find that the rollers d^2 add to the efficiency of the apparatus by keeping the rollers T T free to revolve until they are actually pressed firmly against the cable, whereupon they (the rollers d^2) will be crowded by the rollers T T, so that both will be unable to revolve.

A modification of the jaws is shown in Figs. 9 and 10, and consists in setting one or more of the rollers T T in a sliding box, e^2, the sides of which form the partitions b^2, behind which box is placed the cushion f^2.

Another modification of the jaw arrangement is shown in Figs. 11 and 12, and consists in placing a grooved plate, g^2, in the grip-plate E, between the set of rollers T T, the groove in the face of the plate g^2 being in alignment with the grooves in the said rollers, as shown in Fig. 12.

The pump I, which is rigidly secured by a bracket, h^2, to the grip-plate E, has a plunger, i^2, which connects pivotally with a yoke, J, which in turn is pivoted at j^2 to the grip-plate G. (See Fig. 1ª.) The cross-piece m^2, which connects the arms of the yoke J with the plunger i^2, rests on top of the bracket h^2, which holds the pump-body, so that when the plunger is moved to contract the jaws it will push the said cross-bar m^2, which, meanwhile, slides on the upper face of the bracket h^2, and which pulls the yoke J behind it, so as to draw the grip-plate G toward the grip-plate E. This will be fully understood by reference to Fig. 1ª. By thus resting the cross-bar m^2, I get a steady and reliable motion of the parts.

In my former patent, No. 328,517, I showed a pump for moving one grip-plate toward the other and mechanism for actuating the pump beneath the bottom of the car. One object of my present invention is to simplify the mechanism for actuating the pump and to have it mostly on the car-platform, whereby the operation of working the pump will be greatly facilitated. For this purpose I connect the cylinder I, which is secured to the grip-plate E by the pipe n^2, with the cylinder W, which stands or hangs on the bottom A of the car. The pipe n^2 passes through the slit d, which is formed in the street between the rails of the cable road. The actuating-plunger n^3 of the cylinder W is worked by a suitable lever, X, and serves, when said lever is properly moved, to force the liquid or other substance through the pipe n^2 into the cylinder I, so as to move the plunger i^2. The means for actuating the liquid by the plunger n^3 is not of my invention, and need not here be specifically described; but it is my invention to connect the cylinder W, which is carried by the platform or bottom of the car, by the pipe n^2 with the cylinder I, which is carried by the grip-plate E. To this I have added the further improvement of putting into the pipe n^2 a valve, o^3, which can be moved by a hand-lever, p^3, so as to establish connection between the pipe n^2 and another, n^4, that leads from the shell of the valve o^3 into the cylinder W. This lever p^3 is moved whenever it may be desired to open the grip-jaws and let the cable drop, because, as soon as the pipes n^2 and n^4 communicate, the hydraulic pressure will be taken off the plunger i^2, and the springs H H will force the grip-plates apart.

A downward extension, p^4, of the lever p^3 may be utilized to automatically disengage the cable whenever the car arrives at a terminal station, for at those places a fixed incline, r^4, which is secured in the road in the path of the lever p^4 (see Figs. 1 and 4) will swing the said lever so as to open communication between the pipes n^2 and n^4, thereby opening the grip-plates and disengaging the cable.

Normally the lever p^4 is balanced by springs s^4 (see Fig. 8) or by equivalent weight to remain in an upright position in which to hold the end of the pipe n^4 shut. A passage through the valve o^3 is shown in Fig. 8 to indicate that such valve is not intended to interrupt communication between the two parts of the pipe n^2 into which said valve is set.

Whenever in this specification I mention uprights D D, I desire it understood that a single plate will be equivalent to the two separated uprights. In other words, uniting the two uprights by a web or plate or making them in one piece therewith would not be a departure from my invention.

I claim—

1. In the cable-grip, the uprights D, which carry the gripping-jaws, combined with the hinges b, from which the upper ends of the uprights are suspended, substantially as is herein shown and described.

2. The combination of the car-bottom A with the upright bolt a, swiveled turn-table B, brackets C, and hinged uprights D, which are connected to said brackets, substantially as herein shown and described.

3. The combination of the upright D, having bent arm e, with the grip-plate E, which is rigidly secured to said bent arm, and with the hinged bar F, carrying the grip-plate G, and with the elliptic spring H, which is rigidly attached to the bent arm e, but free to move in contact with the hinged arm F, substantially as described.

4. In combination with the uprights D of a cable-grip, the slides L L and cross-bar R, having springs p, which bear against the uprights D, substantially as shown and described.

5. The combination of the slides L L and their connecting cross-bar R with the springs

p and with the uprights D, having notches or recesses r, substantially as herein shown and described.

6. In combination with the slides L L, the cross-bar R, and frictional springs p, the pins t, and uprights D, substantially as described.

7. The spring p, constructed with the projecting lugs p^2, in combination with the cleat o^2, wedge o, cross-bar R, and upright D, substantially as herein shown and described.

8. The cable-supporting roller u, combined with its supporting-frame v, and with the double-pointed shield S, for the purpose of preventing the lifting-rollers M M of a grip from striking the roller u or frame v, as specified.

9. The grip-plates E G, combined with upright rollers T T, and constructed below said rollers with lower bevels, w, to form cable-guides, as described.

10. In combination with the recessed grip-plate E, the grip-rollers T T, and the frictional rollers d^2, set behind said grip-rollers, as specified.

11. The combination of the grip-plate E with the grooved rollers T T and grooved plate g^2, the groove in said plate being in alignment with the grooves in said rollers, substantially as herein shown and described.

12. A cable-grip constructed with uprights D, two connected slides, L L, which carry rollers M M, and two slides, O O, which connect with the frames M of said rollers, all arranged so that the two rollers M M will be raised from opposite sides against the cable P whenever the slides O O are raised, as specified.

13. The combination of the pump I, bracket h^2, and grip-plate E with the plunger i^2, cross-bar m^2, yoke J, pivot j^2, and grip-plate G, all arranged so that said cross-bar m^2 will slide on the bracket h^2 whenever the plunger i^2 is moved, as specified.

14. The combination of the grip-plate E and the hydraulic pump I, which it carries, with the pipe n^2, car-platform A, and operating-cylinder W, having plunger n^3, substantially as herein shown and described.

15. The combination of the hydraulic cylinder I, pipe n^2, cylinder W, having plunger n^3, with the pipe n^4, valve o^3, and lever p^3, substantially as herein shown and described.

16. The suspended lever p^4, which is connected with the grip-releasing valve o^3, in combination with the fixed incline r^4 on the track of a cable road, substantially as herein shown and described.

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