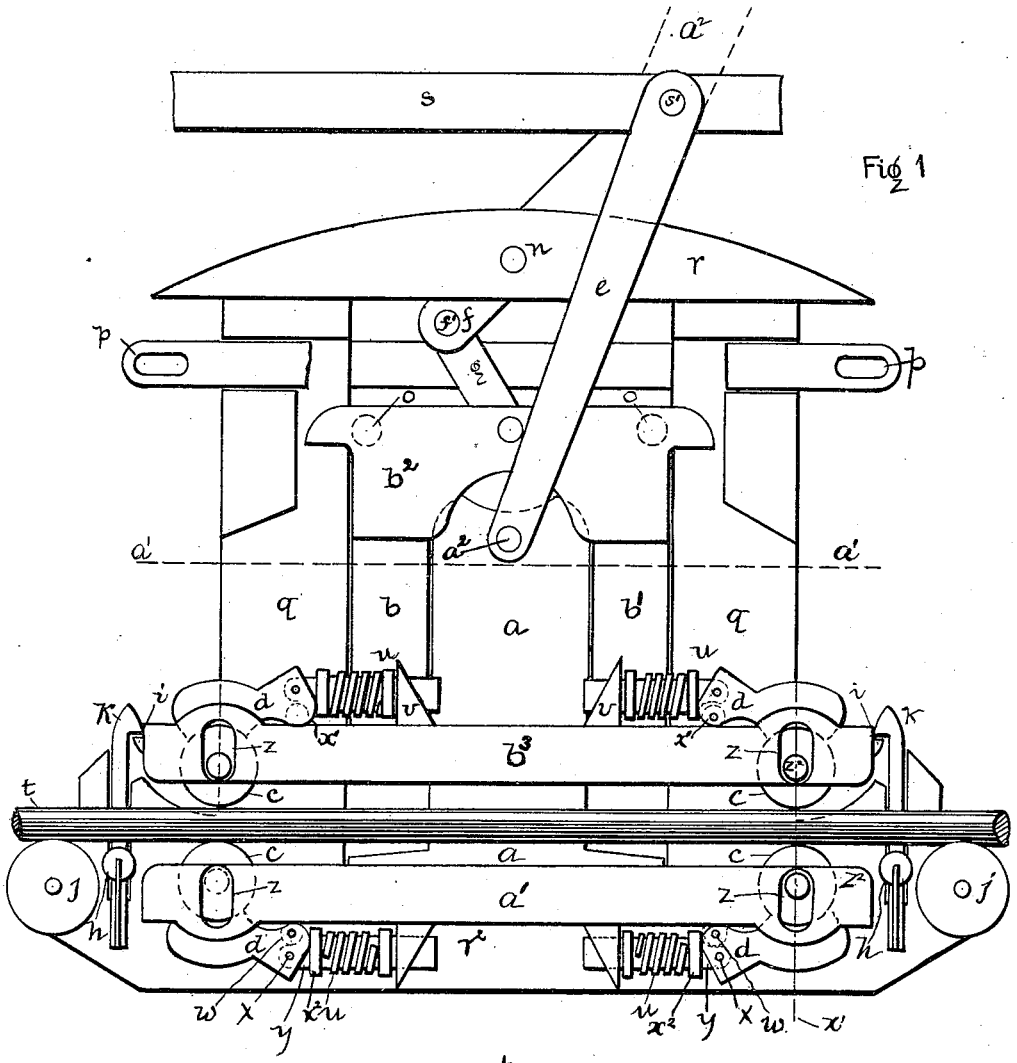
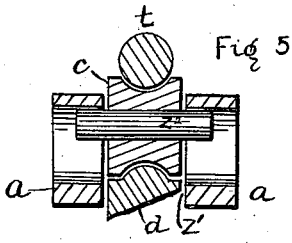
(No Model.) 2 Sheets—Sheet 1.

N. ABBOTT.

GRIP FOR CABLE RAILWAYS.

No. 345,354. Patented July 13, 1886.





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(No Model.) 2 Sheets—Sheet 2.

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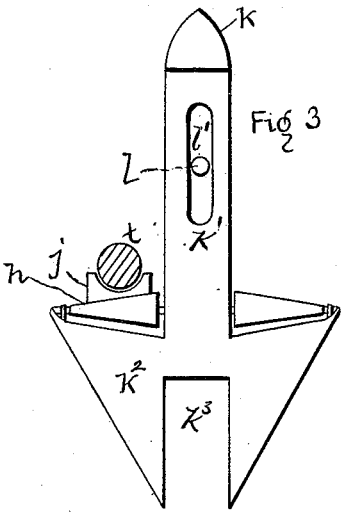

Fig 3

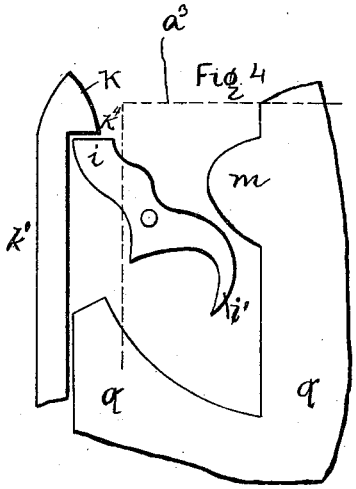

Fig 4

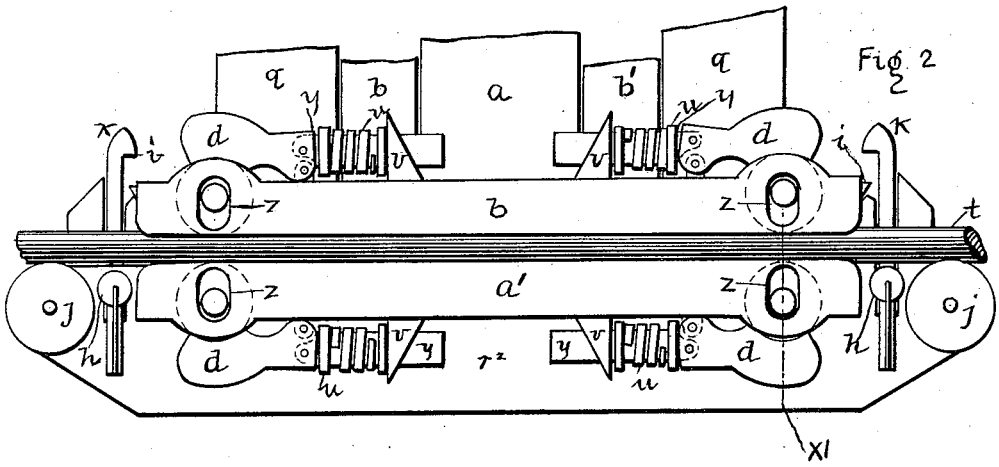

Fig 2

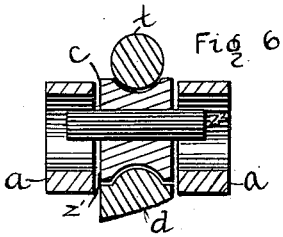

Fig 6

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NOEL ABBOTT, OF KANSAS CITY, MISSOURI.

GRIP FOR CABLE RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 345,354, dated July 13, 1886.

Application filed December 2, 1885. Serial No. 184,457. (No model.)

To all whom it may concern:

Be it known that I, NOEL ABBOTT, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Gripping Apparatus for Cable Railways; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming a part of this specification.

The object of my invention is to provide for the movable jaws of a cable-gripping apparatus of an anti-friction yielding device and brake, which will enable the seizure of the cable to be made gradually and the motion to the car either in starting or stopping conveyed in degrees without imparting shock thereto and lessening friction upon the cable, and also to provide means for simplifying the action of throwing the cable away from the control of the cable-grip apparatus and enable the depressing-plates to be actuated with less degree of friction; and it consists in the novel means and mechanism hereinafter fully described, and specifically pointed out in the claims.

In the drawings, Figure 1 is a side elevation of my improved gripping apparatus, showing the jaws of the grip released from the cable and the cable held by the carrying-rollers. Fig. 2 is a side view in detail of the lower portion of the gripping apparatus, showing the position of the yielding rollers and brake-blocks when the jaws are gripping the cable. Fig. 3 is a front view of the tripping-lever. Fig. 4 is a detail side view of the tripping-pawl, and showing the means for upsetting the pawl. Fig. 5 is a sectional view of the yielding roller, taken on the line x' of Fig. 1, showing portion of jaw of grip in open position. Fig. 6 is a similar view of Fig. 5, showing position of jaw of grip closed upon the cable.

Similar letters of reference indicate corresponding parts in all the figures.

In the construction of my improved gripping apparatus I attach to the horizontal supporting and pivot beam r the opposite vertical fixed side plates, $q\,q$, which are arranged a suitable distance apart to receive between said plates the movable elevating and depressing plates a and $b\,b'$, and are connected at their lower ends to a horizontal beam, r^2, said plates and beams forming the frame to the apparatus. Between the fixed side plates, $q\,q$, is arranged a movable cross-head, b^2, consisting of plates attached horizontally to the depressing-plates at their upper ends and with extension guide-plates, which extend from the cross-head b^2 laterally over a suitable portion of the vertical side plates, $q\,q$, and from opposite sides of said cross-head, thereby forming a guide to the cross-head, and retaining said cross-head between the side plates, $q\,q$, and guiding its movements. The central and lower portion of the cross-head b^2 is cut away in a transverse relation, to permit the upward movement of the pivot a^2 on lever e, attached to elevating-plate a, and to the opposite ends of said movable cross-head are attached the upper ends of the depressing-plates $b\,b'$. To the lower ends of the depressing-plates $b\,b'$, and upon the face side, is attached the horizontal upper grip-jaw, b^3. Between the movable depressing-plates $b\,b'$ is fitted an elevating-plate, a, which slides at its upper end between the opposite vertical depressing-plates $b\,b'$ and between the plates of the cross-head b^2. To the side and lower end of the elevating-plate a is attached the horizontal lower grip-jaw, a', both of said jaws a' and b^3 being upon one relative side of the grip apparatus and in opposite gripping relation to each other. Upon the side of the grip apparatus having said jaws a' b^3, I attach to the upper end of the elevating-plate a one end of a lever, e, by means of the pivot a^2, which pivot projects so far outwardly as to permit the lever e to be attached without binding upon the cross-head b^2 in its to-and-fro movement. The lever e extends above the supporting or pivot beam r, and is connected pivotally to a horizontal operating-lever s. Upon the opposite side of the grip apparatus and to the upper portion of the cross-head b^2, I attach one end of a short toggle-lever, g. To the operating-lever s, I then attach one end of a short lever, f, at the same point of attachment on said operating-lever as the lever e is attached, the bolt s' passing

through the operating-lever *s*, and, for a proper fulcrum, I pass through said lever *f*, at a point removed from the center toward its opposite end, and also through the upper portion of the pivot-beam *r*, the pivot *n*. The opposite or lower end of said lever *f* is then pivotally attached at *f'* to the upper end of the toggle or short lever *g*. Thus it will be seen that as the operating-lever *s* throws the lever *e*, attached to the elevating-plate *a*, toward the pivot *n*, the lever *f*, fulcrumed at *n*, elevates said lever *e* a corresponding distance, governed by the length of lever *f* beyond its fulcrum *n*, and in the same movement of the operating-lever *s* the pivotal end of the short or toggle lever *g* at its point of connection with the lower end of lever *f* is thrown in the direction of lever *e*, the cross-head to which said short or toggle-lever *g* is attached being depressed, and the jaws *a' b*³ of the grip apparatus thrown together, while a reverse movement of the levers *e f* acts to throw the jaws apart. Beneath the pivot-beam *r* is arranged the horizontal beams *p*, one upon each side of the grip apparatus, by means of which the grip apparatus is suspended from the car. Between the opposite plates, which make the head-block *b*², and near the inner edge of the vertical fixed side plates, *q q*, and rotating upon suitable pivots, are the anti-friction rollers *o o*, the periphery of said rollers bearing upon the edge of said side plates, *q q*.

In the construction of the yielding anti-friction devices for the jaws of the gripping apparatus I make in the opposite ends of each of the upper and lower jaws a vertical longitudinal slot, *z'*, of the proper depth and width to receive the grooved rollers *c c*. Through the sides of the jaws *a'* and *b*³, and in a transverse relation to the slot *z'*, I make a vertical slot, *z*, through which I introduce the pin *z*², which passes through the center of roller *c* and permits said roller to turn with said pin *z*² in the said slot *z*. A portion of the grip jaws *a' b*³ is made of increased width upon the side of the jaw, through which the rollers *c* are introduced, and the vertical slot through said portion enables the slot *z* to be given its proper depth, and also to conceal a portion of the yielding rollers *c c*. The depth of the vertical slot *z* enables the rollers *c c* to project within the jaws of the grip, and are arranged opposite each other.

For checking the rotation at the proper time, and to permit a gradual yielding of the rollers *c c*, I arrange in the vertical slot *z'*, over each roller, a brake-block, *d*. These brake-blocks are made curved upon one side, to inclose a portion of the grooved rollers, and are provided with a suitable bead, which fits the groove in said rollers, as shown in the cross-section of Figs. 5 and 6, and are placed in the vertical slots in the jaw *b*³ from its upper side and against the pulleys in the lower jaw, *a'*, from the under side. The rear end of each brake-block is made of an increased width, and is pivotally attached at its lower end by pivot *x* to a small lug, *x'*, upon the grip-jaws. To the upper portion of the rear end of the brake-block I pivotally attach one end of a bolt, *y*, and a suitable distance in rear of the end of the brake-block I attach to the jaw a lug, *v*, which lug is perforated transversely, and through which lug I insert the opposite end of the bolt *y*. The bolt *y* is provided with a collar, *x*², fixedly attached to said bolt in rear of the point of connection with the brake-block, and around said bolt is arranged the spiral spring *u*, one end of which bears against the collar *x*² and the opposite end against the lug *v* on the grip-jaw.

For the purpose of throwing the cable from the control of the carrying-rollers, I form upon the extreme ends of the lower grip-beam, *r*², and upon the upper portion of said beam, a vertical guide-post, *k'*. I then make the tripping-lever *k* of a suitable length to extend from the bottom of the grip-beam to a point slightly above the upper jaw, *b*³, of the grip and to play between the guide-post *k'* and the fixed side plates, *q q*. In the upper portion of the lever, I make a vertical slot, *l'*, and upon the vertical guide-post *k'*, I place a pin, *l*, which pin enters the slot *l'* when the lever is in place and sliding on said post *k'*, the length of said slot limiting the upward play of said lever. I then attach to the lever *k*, midway its length and so as to project laterally therefrom and in a transverse relation to the grip-beam *r*², a conical roller, *h*, the surface of said roller being tapered from said lever toward its outer end. From the extreme end of the conical roller *h* the lever *k* is made with a wing, *k*², inclined to the lower end of the lever *k*, and an opposite wing is made upon an opposite side thereto, which provides for an open slot, *k*³, which slot is of the relative width of the grip-beam *r*², and permits the wings *k*² to pass on each side of said grip-beam. A portion of the grip-beam is cut away transversely on the path of the lever *k*, to permit the lever to descend below the line of the rollers *c c*, upon the lower grip-jaw, and give the field necessary for the fall of said lever.

For the purpose of automatically releasing the lever *k*, I attach to the rear portion one end of the upper grip-jaw the centrally-pivoted pawl *i*, and in the path of said pawl, and upon the upper end of the lever *k*, opposite thereto, I form the lip *k*⁴. Upon the outer edge of the vertical fixed side plates, *q q*, and in the path of the said pawl *i*, I place a lug, *m*. The pawl *i* is made with a rear curved extension, *i'*, which extension strikes against the lug *m*, and the opposite end, extending in the opposite direction in a more direct line, engages with the lip *k*⁴ on lever *k*.

In the operation of my improved grip I have designed that the grip apparatus proper shall be located near the center and beneath the car, and with the operating-lever *s* extended to the end of the car and operated at that point. This is, however, immaterial. The lever may be continued directly above the grip appara-

tus into the center of the car, and operated at that point when found more convenient. When thrown forward, or in the direction indicated by the increased length of the operating-lever *s*, the action of the depressing-levers *f* and *g* depress the cross-head b^2 and, obviously, the grip-jaw b^3, and in combined movement the lever *e* elevates the plate *a* and the lower grip-jaw, *a'*. The cable *t* is supported upon the carrying-rollers *j*, and lies between the jaws of the grip apparatus, so that it will be seen that as the jaws b^3 and *a'* approach each other the yielding rollers *c c* first engage the cable *t*, and as the pressure upon the cable is increased the yielding rollers *c c* are thrown into the position indicated in Fig. 6, and as the final pressure is applied the pivots of said rollers will be in the extreme upper and lower end of the slots of the upper and lower jaws, respectively. In this position the brake-blocks *d* are brought to bear firmly upon the groove of the rollers by the consequent compression of the spring *u* on the bolt *y*, and the action of said rollers is under the control of the said brake-blocks until the jaws of the grip have seized the cable, thereby enabling the cable driven by power to be seized and its momentum conveyed to the grip-jaws and to the car in degrees without shock, the action of the rollers being retarded by the brake-blocks, the friction consequent upon sudden grasp of the cable by the grip-jaws being avoided. Upon releasing the grip-jaws the rollers are again brought into play, and the act of stopping the car is rendered more effective by the gradual diminution of friction afforded by the rollers and brake-blocks. When it is desired to throw the cable from the control of the cable-carrying rollers, the upper grip-jaw is elevated beyond its usual point necessary to release the cable. This is accomplished by the movement of the operating-lever contrary to the movement required to grasp the cable, and this action elevates the upper grip jaw, the pawl upon which catches the tripping-lever and carries said lever upwardly, the conical roller upon which lever engages with the cable, and it is tripped over the carrying-rollers to one side. When the lever has reached its ultimate height, the rear end of the pawl comes in contact with the lug *m* on the side plate, *q q*, and the pawl releases the lever, then permitting the lever to fall by its own weight to its normal position. In operating the lever *s* from the end of the car, the rollers *o o* prevent the depressing-plates from binding against the fixed side plates and increasing the ease of movement.

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

1. The combination, with the grip-jaws, of the yielding grasping-rollers journaled therein, and the spring-held brake-blocks in contact therewith, as and for the purpose specified.

2. The combination, with the grip-jaws, of the yielding grasping-rollers journaled therein, and brake-blocks in contact with said rollers and pivotally attached to said jaw at one end, a bolt pivoted to said end of brake-block opposite to its point of attachment to the said jaw, a perforated lug on said jaw, and a spring between said brake-block and said lug, for the purpose specified.

3. The combination, with the movable jaws of a grip, of an elevating-lever and a fulcrumed depressing and toggle-jointed lever, as and for the purpose specified.

4. The combination, with the supporting or pivot beam of a gripping apparatus and the movable jaws of said apparatus, of a depressing-lever fulcrumed on said pivot-beam, and a toggle-joint of said lever pivotally attached thereto, adapted to depress one of said jaws of the grip, and an elevating-lever pivotally attached to said depressing-lever and to an opposite movable jaw, as and for the purpose specified

5. The combination, with the lower grip-beam of the gripping apparatus, and the vertical fixed side plates, and the movable upper jaw of said apparatus, of a tripping-lever arranged on said beam and provided with a lateral and inclined anti-friction device, and a lip on said lever, a pawl on said movable jaw provided with a rear curved extension, and a lug on the said fixed guide-plates in the path of said pawl, as and for the purpose specified.

In witness whereof I have hereunto set my hand and seal this 27th day of November, 1885.

NOEL ABBOTT. [L. S.]

Witnesses:
E. F. ALLEN,
CHAS. E. HOCHSTETLER.