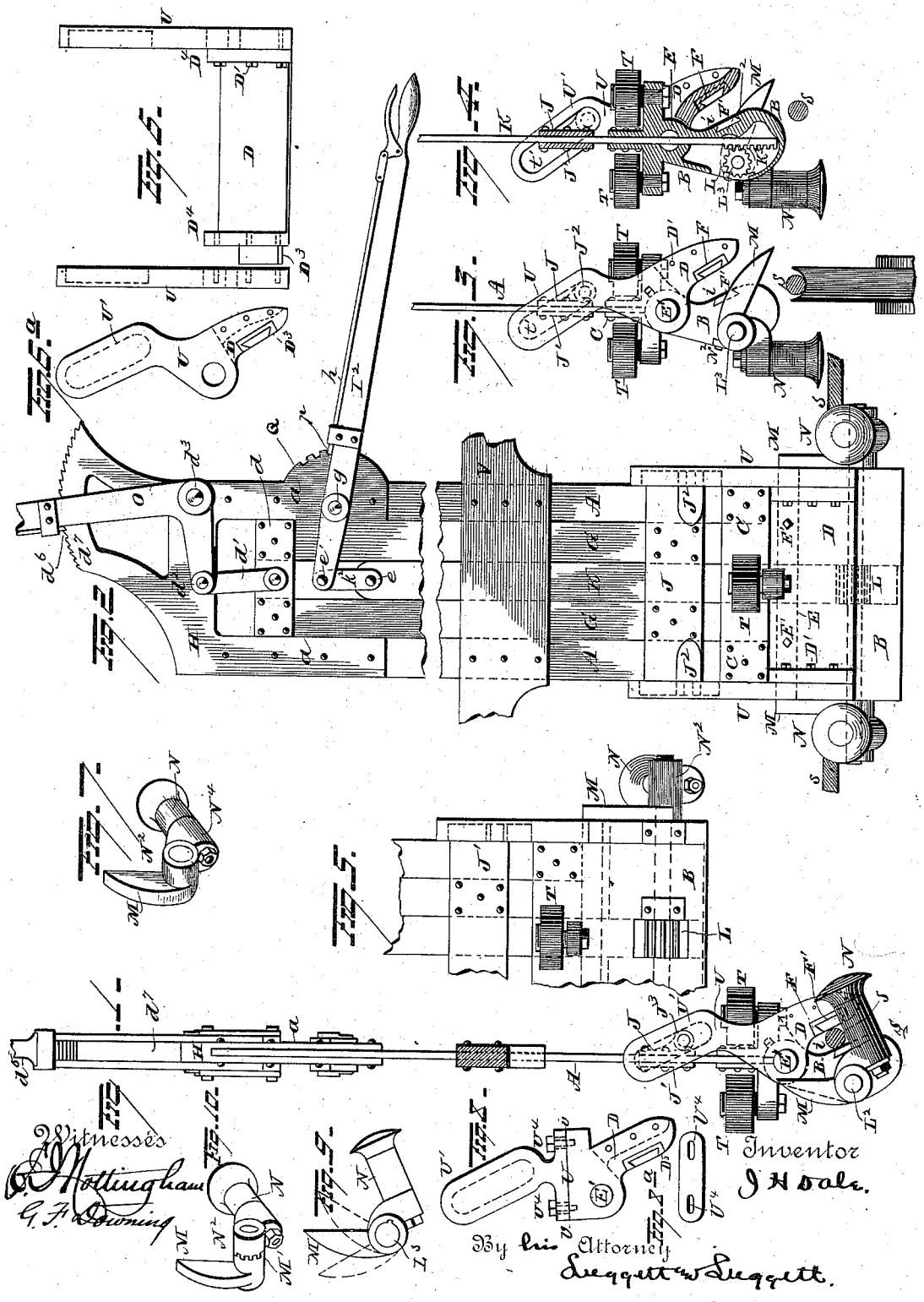
(No Model.)

J. H. DALE.

CABLE GRIPPING APPARATUS FOR STREET RAILWAYS.

No. 385,246. Patented June 26, 1888.



Witnesses
C. Nottingham
G. F. Downing

Inventor
J. H. Dale.

By his Attorney
Leggett & Leggett.

UNITED STATES PATENT OFFICE.

JOHN H. DALE, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO EDWARD D. DOUGHERTY, OF SAME PLACE.

CABLE-GRIPPING APPARATUS FOR STREET-RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 385,246, dated June 26, 1888.

Application filed August 24, 1887. Serial No. 247,761. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. DALE, a resident of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Cable-Gripping Apparatus for Street-Railways; 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 an improvement in grip mechanism for street cable railways, and more particularly to an improved device whereby the cable will be lifted from a plane below the clamping-jaws of the "grip," be secured instantly and rigidly between these jaws, and also released and projected laterally from the jaws when it is desired.

The object of my present invention is to simplify and improve the construction of the cable-gripping mechanism shown in my patent, numbered 364,488, dated June 7, 1887, whereby the parts are rendered more compact, taking up less room in the cable-conduit, affording more ready access to working and wearing parts for cleaning or repair, and cheapening the cost of construction of the grip apparatus.

With these objects in view my invention consists in certain features of construction and combinations of parts, that will be hereinafter described, and pointed out in the claims.

Referring to the drawings, Figure 1 is an edge elevation of the gripping apparatus with a cable picked up and gripped between the grip-jaws. Fig. 2 is a side elevation of the gripping mechanism with the cable raised and gripped. Fig. 3 is an edge view of the grip with the grip-jaws separated and the pick-up arms in position to swing up and engage the cable. Fig. 4 is an edge elevation in section of the gripping apparatus, taken on line through center of slide-bar K, showing the pick-up arms depressed to lift a cable. Fig. 5 is a side elevation of the grip-jaws and connected parts. Figs. 6 and 6^a illustrate the construction of the vibrating upper grip-jaw and connected cam-arms, edge and side views of the cam-arms being shown. Fig. 7 is a detached perspective view of a pick-up arm and cable-discharging bracket-limb that are integrally connected and are supported by one shaft. Figs. 8 and 8^a are modified forms of the upper grip-jaws and the cam-arms shown in Figs. 6 and 6^a constructed to afford means of adjustment. Figs. 9 and 10 are views of a pick-up arm and cable-discharging limb constructed to permit a change of relative position of these devices.

The cable-gripping apparatus is suspended by proper connections to a horizontal frame of the grip-carriage. This carriage in construction is identically the same as is now patented to me, and is therefore not illustrated in detail here, only a portion of the grip-carriage frame being shown, to which the vertical cable-gripping device is readily secured at such a point as to allow the portion of the grip that picks up the cable and clamps it to be held in proper position in the underground conduit in which the cable is supported to travel when actuated by power at a station.

In the drawings, A A are housings or frame-plates of the gripping apparatus. They are made parallel on their sides and edges, a proper distance intervening between said inner edges to receive other working parts of the device. The lower terminations, C C, are readily attached to the base-block B. The base-block B is preferably made of metal and given the form shown, the lower portion being of an ovate form in cross-section and the inner face inclined diagonally or outward and downward at *i* to afford a gripping-face.

The upper ends of the plates A A are secured by any suitable means to the depending parallel limbs *a a* of the yoke-piece H, this yoke having each of its limbs *a a* slotted vertically to receive and neatly fit upon the upper ends of the housing-plates A A, as shown in Figs. 1 and 2.

Between the inner edges of the housing-plates A A the parallel sliding bars G G are placed. These bars are held apart such a relative distance at their upper ends that their outer edges will have sliding contact with the inner or adjacent edges of the housing-plates A A. The spacing-plates *d*, which serve to hold the sliding bars G G apart but connected

at their upper ends, are riveted or bolted upon each side of these bars, two plates being provided that are attached in position by the rivets or bolts passing through them as well as the intervening upper ends of the bars G G.

A proper relative distance below the horizontal frame V of the grip-carriage, to which the housing-plates A A are rigidly secured, the cross-bars J J′ are affixed to the upright sliding bars G G, (see Fig. 2,) these mated cross-bars being placed directly opposite each other, the bolts or rivets passing directly through them and the bars G G.

The length of the cross-bars J J′ is so proportioned that their outer ends will line with the outer edges of the housing-plates A A, and upon their front faces, at or near the lower edges of the cross-bars J J′, the integral bosses J^2 J^2 are formed and made to extend laterally a short distance outside of the edges of the housing-plates A A, as shown in Fig. 2. The projecting edges of the bosses J^2 are rounded to produce smooth true bearings, upon which are placed thimbles J^3.

Between the upright bars G G, and having sliding contact with them, the vertical rack-bar K is located, this flat bar being pivotally connected at its upper end to the lower end of the short link K^2 by the bolt *e*.

Upon the front side of the depending limb *a* of the yoke H a lever, I′, is pivoted at *g*, to have a vertical vibratory movement.

A quadrant, Q, is formed upon the edge of the limb *a* of yoke H, the curvature of the quadrant conforming to the sweep of the lever I^2, so that the pawl *p* (see Fig. 2) will engage the notches made in the quadrant to secure the lever I^2 and the attached rack K in any desired position of vertical adjustment, it being understood that the inner end of the lever I^2 is pivoted to the upper end of the short link K^2.

The inclined gripping-face *i* of the base-block B has a longitudinal dovetail groove cut through it from end to end, in which is firmly inserted a wearing-block, F′, (see Fig. 3,) that is intended to receive the cable when it is elevated and gripped.

The upper portion of the base-block B is contracted and rounded to produce a semi-cylindrical boss, E, which is centrally perforated throughout its length to receive a round bolt, E′.

The swinging upper grip-jaw, D, is made of the same width as the base-block B, and consists of two outer vertical and parallel limbs and a connecting-block that is bolted between the limbs near their outer ends to afford a gripping-jaw, the limbs being intended to give motion to the jaw, as will be more specifically explained.

The vertical limbs U U of the swinging grip-jaw D are shown in position in Figs. 2 and 3 and detached in Figs. 6, 6^a. They are attached to the ends of the jaw D by bolting the flanges D^4, which are formed on the ends of the jaw, to the lower ends of the limbs, as shown in Figs. 6, 6^a, Fig. 6 being a side view of the grip-jaw D and an edge view of the two limbs U U, the side of one limb being shown in Fig. 6^a.

The limbs U U are each provided with enlargements or rounded bosses that are rule-jointed to the outer ends of the perforated boss E, formed on the upper part of the base-block B, the bolt E′ projecting at each side to engage the limbs at their rule-joints, and thus afford journals upon which the limbs U U may be vibrated. Each limb U is projected outward and downward to form inclined portions of the grip-jaw, which is completed by the securing of the jaw proper, D, between them, as has been explained.

The jaw D and attached lower portions of the limbs U U are slotted to produce a dovetail groove, into which the wear-plate F is introduced and fixed, this plate F being directly opposite the similar plate, F′, that is inserted in a groove in the base-block B. Both the lower ends of the base-block B and vibrating grip-jaw D are rounded off from the lower edges of the wear-plates F′ F, to allow the cable when lifted to readily enter between these wear-plates.

It will be noticed that the relative position and manner of connection of the swinging grip-jaw and fixed lower jaw that is an integral portion of the base-block B will secure a parallel approach of the upper jaw toward the lower jaw considered lengthwise of these opposed jaws, and thus insure a clamping with equal pressure of the cable throughout the whole gripping-surface when said cable is engaged by the jaws.

The upper portions of the limbs U U are forwardly inclined and widened sufficiently to allow diagonal slots *t′* to be formed on their inner surfaces, which slots extend nearly through the body of the limbs and are of a width to receive the thimbles which encircle the projecting ends of the bosses J^2, and thus connect these cam-slots *t′* or the cam-heads U′, in which these slots are produced, with the vertical sliding bars G G.

In Fig. 8 is shown a method of constructing the upper grip-jaw, D, and cam-limbs U U, so that these cam-slotted limbs may be adjusted in position with regard to the grip-surface of the jaw D. To effect this the limbs are separated on the line *v v*, Fig. 8, and the separated pieces are joined by the bolts U^4 U^4, these bolts passing through the slotted holes in the upper portion of the limbs (see Fig. 8^a) and into threaded holes in the lower portions of the limbs above the grip-jaw D. It will be seen that by making this provision the cam-slotted portion of the limbs U U may be changed in position, so as to cause the wear-plate F of the grip-jaw D to approach more closely toward the opposed wear-plate of the lower grip-jaw that is formed upon the base-block B. This feature is important, as it permits an accurate regulation of the upper jaw to compensate for wear, and also permits the grip-jaw-operating mechanism, that will presently be described,

to be suitably adjusted and made to assume proper relative positions, whereby the continuous effective operation of the gripping apparatus is assured.

About the center of the plates *d*, which connect and hold spaced apart the sliding bars G G, the links *d'* are pivoted upon each side of these plates, and the upper ends of the links are pivoted at d^2 to the short horizontal arm of the bell-crank lever O, this lever being pivoted at d^3 to the side of the yoke H.

The upright limb of the lever O is provided with the ordinary tripping-dog, d^6, which is made to engage the teeth of the quadrant d^7, which latter is formed integral with the yoke-plate H and of proper arched form to allow the dog d^6 of the lever O to engage with it, and thus lock the upper grip-jaw, D, either in open or closed adjustment, as it is apparent that by the connection of parts just described the movement of the lever O will operate the swinging upper jaw, D, to open and receive a cable or close upon a picked-up cable to grip and retain it securely.

The cable elevating or "pick-up" device and the pieces that push the cable outwardly when the jaws of the gripping mechanism are separated to discharge the cable from the grip-jaws are both made together, there being one of each of these connected lifting and ejecting arms secured to one shaft to operate simultaneously at each end of the grip-jaws.

The pick-up and dropping or ejecting devices just mentioned are operated by the rack-bar K and its connected vibratory lever I^2, the bar K being cut with gear-teeth upon the front side of its lower end, and to allow it, with other parts, to work freely the base-block B is recessed about midway between its ends, the space thus afforded being sufficient to admit the body of the bar K to reciprocate in it.

A perforation is made through the base-block B from one end to the other to receive a round shaft, L^3, upon which is mounted and secured the pinion L, this pinion from its position being made to engage the teeth of the rack-bar K.

The shaft L^3 projects far enough beyond the ends of the base-block B to receive at each end the cable pick-up and ejecting devices which are mounted upon and secured to it.

In Fig. 7 a pick-up arm and the joined ejector-limb are shown removed from the grip apparatus. As seen, it consists of two axially-perforated cylinders, N^2 N^4, that are so joined at one end of each that the cylinder which gives support to the rotating thimble N—that is, the pick-up device—will lie in a plane below and at right angles to the perforated cylinder or hub N^2 of the cable-ejector limb M, this latter-named piece being projected upwardly and adapted to rock in a plane parallel to that of the pick-up arm, the relative positions of the pick-up arm N and ejector-limb M being such that the latter-named piece will be projected vertically by a movement of the supporting-shaft L^3 that causes the pick-up arm N to be carried up under the cable and elevate it to a position shown in Figs. 1 and 2.

When the cable is ejected, the pick-up arms will hang depended vertically and the ejector-arms will move downwardly, bearing against the cable which has been previously released by an upward rocking of the top grip-jaw, D. The cable will be ejected in this manner. The position of the grip-jaws, pick-up arms, and ejector-limbs when this operation is completed is shown in Figs. 3 and 4, these figures also illustrating the relative position of the above-named parts with regard to a cable which is to be picked up and gripped.

In Figs. 9 and 10 a modified and preferred form of construction of the consolidated pick-up arm and a cable-ejector limb is shown.

It is of great advantage to be enabled to readily change the relative positions of the cable discharger and pick-up arm with regard to their angle of divergence from each other. To effect this the hub of the ejector-limb is separated at M', and the adjacent end surfaces of the separate parts of the hub are serrated radially with equal-sized teeth, which should be so spaced and relatively located that the two sections of the hub may be joined and the ratchet-locking teeth, just described, be made to register correctly, as shown in Fig. 10 at M'. By this arrangement of the connected parts, which, when adjusted, are secured together by any suitable means, the outer ends of the ejector-limb M and the pick-up arm N may be adjusted toward or from each other and the cable-ejector be made to discharge the cable sooner or later, as may be desired.

Upon each side of the base-block B integral projections are formed to give support to the loosely-mounted pulleys T T, which latter are intended to protect the sides of the grip apparatus from any improper frictional contact with the sides of the cable-conduit pipe or chamber, as these rollers will first engage the conduit and check undue vibration of the gripping device.

It will be seen from the foregoing description that the working parts are compact and the upper grip-jaw, D, rendered detachable from the limbs U U, which latter are made a part of this jaw, so that the connection between the sliding bars G G and grip-jaw D is direct and affords a powerful and effective control of the clamping-jaw D without complication of working parts.

The consolidation of the pick-up and ejecting devices, as herein shown and described, affords a compact and simple mechanism for the purposes named, and it is claimed that the present form of grip mechanism possesses all the advantages and overcomes the objectionable features of other patented grip apparatus.

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

1. The combination, with a block having

flanges upon its ends, of two cam-grooved limbs adjustably secured to the ends of the block, substantially as set forth.

2. The combination, with a base-block having one inclined face and a wear-plate inserted longitudinally in the gripping-face of this base-block, of an upper grip-jaw having two upright limbs secured adjustably to its grip-block, said limbs being slotted diagonally to afford cams, housing-plates to support the base-block, and sliding bars secured together by cross-bars which are provided with bosses, and thimbles on these bosses to engage the cam-slots of the limbs of the upper swinging jaw, substantially as set forth.

3. A pick-up arm and a cable-ejector limb secured to a single hub and mounted on one shaft, substantially as set forth.

4. A pick-up arm and a cable-ejector limb supported on the same shaft adjacent to each other, they being placed at right angles to each other on this shaft and adapted to move in parallel planes, substantially as set forth.

5. A pick-up arm and a cable-ejector limb affixed on the end of the supporting-shaft, adapted to receive motion from a lever, their relative positions on the shaft being such that the cable-ejector will be nearly upright when the cable-pick-up arm has raised the cable, and said ejector-limb be depressed to eject the cable when the cable-pick-up arm is downwardly moved, substantially as set forth.

6. The combination, with a base-block, housing-plates to support the base block, a shaft that is longitudinally supported in a perforation of the base-block, a pinion affixed near the center of length of the shaft, and a connected cable pick-up arm and ejector limb mounted upon the same shaft, of a pair of sliding bars, a central rack-bar, and links and levers pivoted to the sliding bars and rack-bar to operate the swinging grip-jaw as well as the cable pick-up and ejecting devices simultaneously or consecutively and independently, substantially as set forth.

7. The combination, with a base-plate having an inclined jaw on one side, a pivoted upper grip-jaw, cam-grooves in the top ends of the limbs of the upper grip-jaw, two housing-plates attached to the base-block, a yoke, and a quadrant on top edge of the yoke, of two sliding bars held spaced apart by rigidly-affixed plates and adapted to engage the cam-grooves of the pivoted upper grip-jaw to vibrate this jaw, a center bar having rack-teeth on lower end, a cross-shaft supported to rotate in the base-block, a pinion on this shaft that engages the teeth of the rack-bar, a joined cable pick-up arm and ejector limb mounted together, one set at each end of the base-block, links and levers to operate the sliding bars and center rack-bar, and a means for locking the levers to hold the sliding bar and rack-bar in raised or lowered adjustment, substantially as set forth.

8. The combination, with an upper grip-jaw block, of an attached cam-slotted limb adapted to be adjusted to change the pressure of the upper jaw upon the lower jaw or base-block, substantially as set forth.

9. The combination, with a swinging upper grip-jaw and an adjustable wear-plate affixed to this jaw, of a movable cam-grooved limb adapted to be adjusted and regulate the pressure of the upper jaw upon the lower jaw or base-block, substantially as set forth.

10. The combination, with a pick-up arm, of a cable-ejector limb adapted to work in parallel planes and be changed in regard to the angle of divergence of their outer ends and bodies, substantially as set forth.

11. The combination, with a cable-pick-up arm and a cable-ejector limb made to move in parallel planes and have the angle of their divergence changed, of a shaft adapted to support and simultaneously rock the arm and limb, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

JOHN H. DALE.

Witnesses:
CHARLES HARVEY,
D. HARVEY, Jr.