(No Model.) 3 Sheets—Sheet 1.

S. A. & O. KNEEDLER.

CABLE GRIP.

No. 493,551. Patented Mar. 14, 1893.

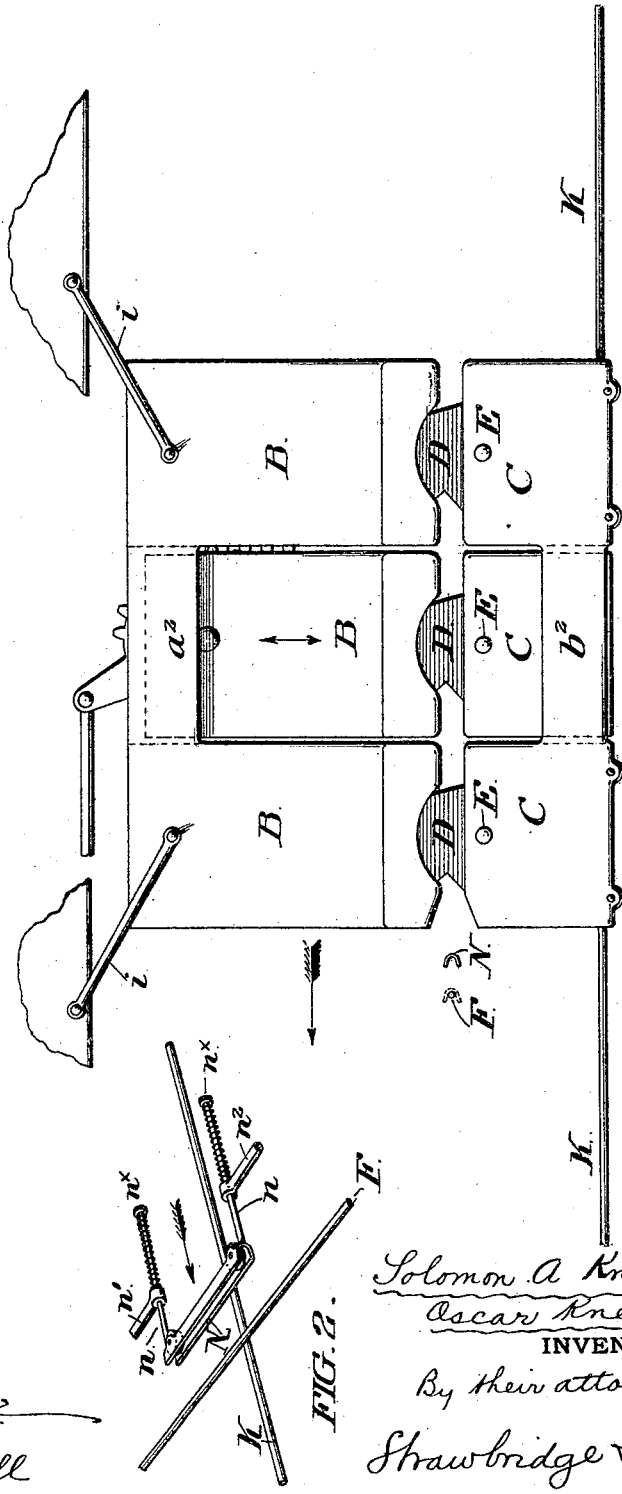

FIG. 1.

FIG. 2.

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(No Model.) 3 Sheets—Sheet 2.

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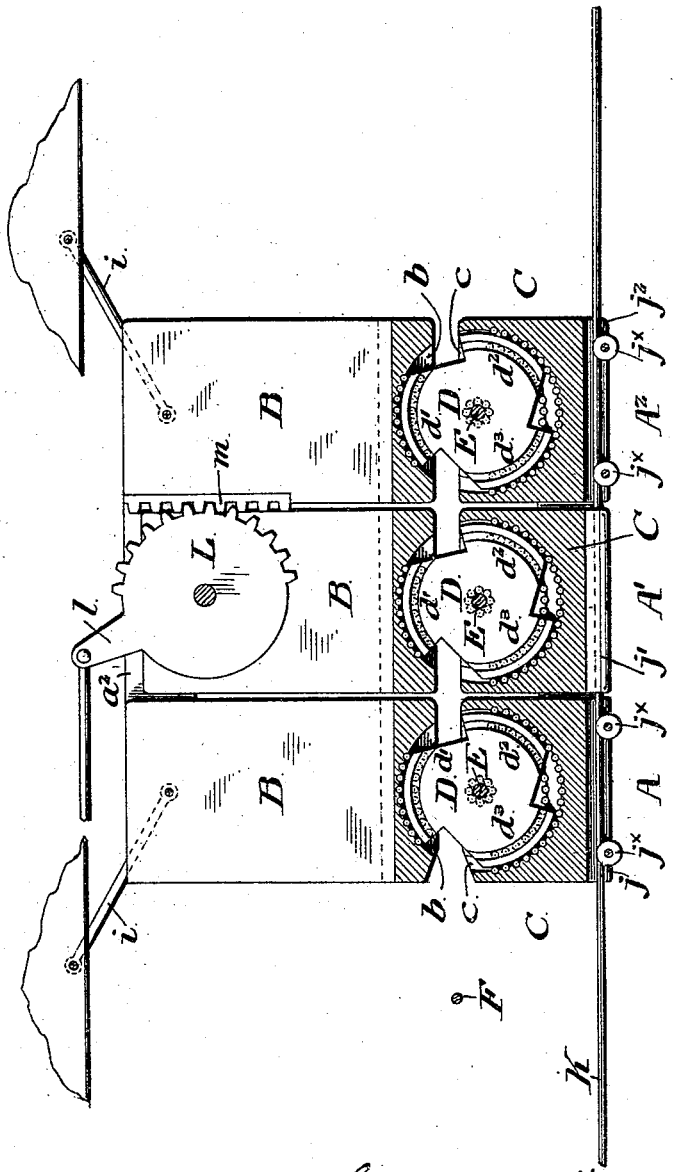
FIG. 3.



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(No Model.) 3 Sheets—Sheet 3.

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FIG. 3.

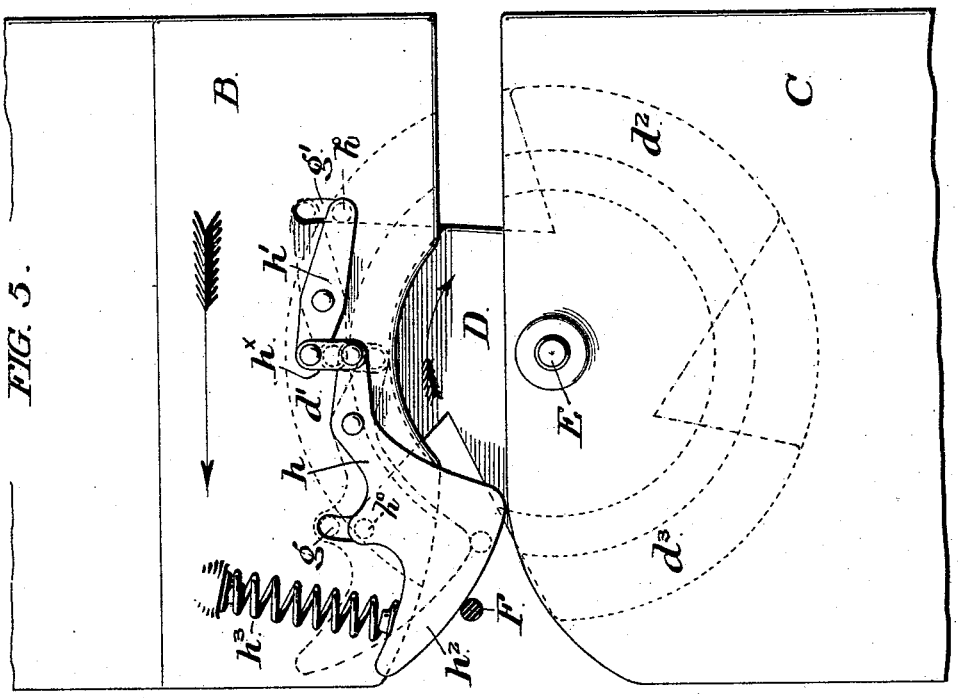
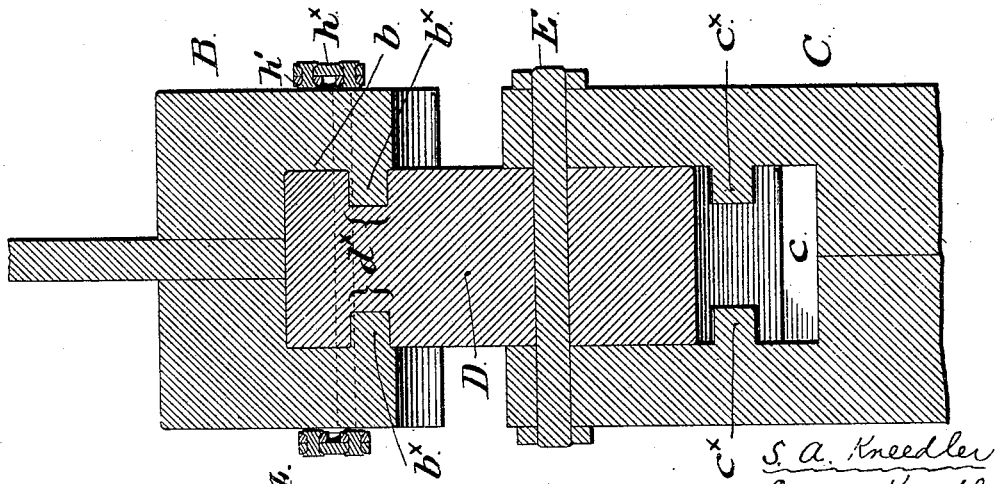


FIG. 4.



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UNITED STATES PATENT OFFICE.

SOLOMON A. KNEEDLER AND OSCAR KNEEDLER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNORS OF ONE-FOURTH TO SARAH A. BOYD, OF SAME PLACE, EXECUTRIX OF HENRY M. BOYD, DECEASED.

CABLE-GRIP.

SPECIFICATION forming part of Letters Patent No. 493,551, dated March 14, 1893.

Application filed September 14, 1892. Serial No. 445,864. (No model.)

To all whom it may concern:

Be it known that we, SOLOMON A. KNEEDLER and OSCAR KNEEDLER, citizens of the United States, residing at Philadelphia, in the county of Philadelphia, in the State of Pennsylvania, have jointly invented certain new and useful Improvements in Cable-Grips, of which the following is a specification.

A serious problem in the practical running of cable railways is the provision of means by which a crossing cable may be passed by a car the grip of which is engaged with an under cable, and it is a desideratum that the passage of the car past said crossing cable should be performed automatically and without special attention on the part of the gripman to the end that the accidents resulting from inattention on his part may be avoided.

Generally stated, it is the object of our invention to provide a cable crossing mechanism for cable railroads, which will enable a car attached to the under cable to pass an overlying crossing cable without the necessity for any special attention on the part of, or act to be performed by, the gripman in charge of said car, and, specifically, to provide such mechanism in the grip by which said car is attached to the cable, thus dispensing with auxiliary cables, auxiliary grips, or auxiliary motors.

A good form of a convenient embodiment of our invention is illustrated in the accompanying drawings, the particular subject-matter claimed as novel being hereinafter definitely specified.

In the drawings, Figure 1 is a view in side elevation of a grip embodying our invention. Fig. 2 is a view in perspective of a cable guard. Fig. 3 is a view in side elevation, partly in section, of our improved grip. Fig. 4 is a transverse vertical sectional elevation of a pair of blocks and connecting disk; and Fig. 5 is a view in side elevation of a pair of blocks and connecting disk, this view being designed to especially illustrate the latching devices.

Similar letters of reference indicate corresponding parts.

Generally stated, the principal feature of our invention resides in the provision of a cable grip structure supported at its upper portion in any suitable manner from the body of a car, and adapted at its lower portion to engage in any suitable manner with the cable, which structure, while rigid and practically continuous from end to end, embodies in its body a horizontal passage-way which is normally closed by a connecting disk, and which passage, in the travel of the grip, receives and is traversed by the crossing cable, the latter in the travel of the car, successively encountering and tripping any number of connecting disks employed without destroying the vertical continuity or impairing the rigidity of the grip frame.

The preferred form of our improved grip shown in the drawings comprises three distinct members, A A′ A^2, which are, however, all similar as to the connecting-disk arrangement employed, and description of one of which will therefore suffice for all.

Each member is composed of an upper block B, and a lower block C, formed of iron or any selected material, the lower block C and the lower portion of the upper block B being conveniently formed each of two plates secured together in any desired manner, as shown in Fig. 4. In the lower end of the block B is formed a housing *b*, being a groove or recess the plane of which is parallel with the cable to which the grip is applied, and which is of segmental outline, the line of the base of the groove or housing constituting the arc of a circle. The upper face of the lower block C embodies a housing *c*, which corresponds to the housing *b* of the block B, that is to say, it lies in the same plane as said housing *b*, and is of segmental form, the line of its base constituting the arc of a circle of the same radius as the arc of the housing *b;* the circle, arcs of which the bottoms of both housings constitute, is of such radius that in order to bring the bottoms of the housings into coincidence with it, the blocks must be separated a distance to form a cable-way, as shown in the drawings. The side walls of each of the housings embody tongues, designated $b^{\times}$ $c^{\times}$ respectively, which project into the interior of the housings and are concentrically disposed with reference to the same.

D is what we term the connecting disk, the

same being a disk, conveniently of metal, adapted to connect the blocks B and C by being seated in both housings, with the common curvature of which it corresponds. The disk D embodies lateral grooves $d^{\times}$ concentrically disposed which receive the tongues $b^{\times}$ $c^{\times}$. The tongues and grooves referred to constitute, when the connecting disk is in place within the housings in the respective blocks, a permanent connection between said disk and blocks, and, manifestly, when so mounted in position, said disk serves to firmly unite the blocks B and C at a predetermined distance apart, but said disk is, at the same time, free to be rotated and this without impairing the strength of the union which it constitutes between the blocks B and C.

Equidistant notches formed in the periphery of the disk serve to form the latter into a series of three wings d' d^2 d^3. The inclination and depth of the notches is a matter within the province of the constructor; we prefer, however, to form them of a V-shape, of a depth a little more than equal to half the radius of the disk, and having mouths slightly wider than the cable-way left between the blocks B and C.

Where the axis of the connecting disk lies within one of the housings we prefer to provide an axle E passing through the side walls of its block, upon which said disk is journaled for additional strength.

As an expedient of construction, and to induce ease of operation, we also prefer to provide ball or roller bearings at such points as considerable friction is likely to occur in operation, and in fact we may provide roller or ball bearings around the axle when said axle is employed,—between the bases of the housings and the periphery of the disk,—and between the tongues $b^{\times}$ $c^{\times}$ and the walls of the groove $d^{\times}$, all as illustrated in Fig. 3.

Assuming the parts set in the position represented in the drawings, and a crossing cable F about to be encountered in the travel of the grip, the operation of the device will be readily understood.

In the travel of the grip, the member A receives the cable F within the cable-way between the blocks B and C, (the blocks B and C being shown as so conformed as to constitute a flaring mouth for said space) and said cable travels along said way and into a notch of the connecting disk of said member A, and, encountering the bottom of said notch, in the further travel of the grip, said cable F (which may be referred to as traveling in a direction opposite to that of the grip although in point of fact of course stationary) occasions the rotation of said disk in the direction of the arrow in Fig. 5, so that, lying within said notch, it is carried along the cable-way between the blocks B and C until the disk wing against which it bears descends to the level of the upper edge of the block C, whereupon the cable clears or travels away from said disk. Said cable then, in like manner, successively encounters the disks of the members A' A^2, and finally emerges from the cable-way between the blocks B and C of the member A^2. The notches and wings of each disk are of such predetermined dimensions and disposition that when a cable has been received in a notch facing the front of a member, and has been carried with said notch to the rear of said member, said disk has been rotated to a position or set in which its next succeeding notch occupies a position facing the front and in line with the cable-way and is ready to receive and be rotated by the next succeeding crossing cable. In order however that the disk may remain in this set, we prefer to provide a locking arrangement, as follows:

g g' are two vertical slots placed in such position and at such distance apart that when the disk is in its set position one of its wings lies between said slots.

h h' are a pair of levers, each mounted upon a pivot in the wall of the block in which the slots are formed, the extremities of which levers are preferably connected by a link $h^{\times}$ so that the throw of one lever communicates a corresponding throw to the other. Each lever is provided with a stud, h^0, which studs project through the respective slots. The free front end of the lever h embodies an enlargement h^2, the weight of which serves to maintain both levers in their lowest position or that in which their studs are at the lower ends of the slots, so as to lie on either side of a wing of the disk to hold the disk against movement. Said enlargement h^2 also preferably embodies an inclined deflecting face, extending across the cable-way.

As will be understood, when the parts are in the position shown in Fig. 5, in which, as stated, the levers are in their lowermost position, their studs or projections are engaged on opposite sides of a wing of the disk and serve to lock the same securely in position. When, however, the grip encounters a crossing cable, said cable, entering the cable-way, encounters the deflecting face of the lever h and throws said lever and also of course the lever h', upward, and this upward throw of the levers carries said studs out of engagement with the disk and allows of that rotation of the disk which the cable occasions, and, when the cable leaves said lever h, the levers drop into position upon opposite sides of the next succeeding wing of the disk, premature descent being prevented by the riding of the stud of the lever h upon the crest of the succeeding wing. If desired a spring h^3 may be employed to assist the gravitative descent of the lever h.

In practice, as stated, we prefer to employ three of the grip members. The blocks of the two end members of the series of three, namely, the members A and A^2, are conveniently connected by the webs or plates a^2 b^2 to form in effect a single structure, which is attached to the car in any convenient manner, as by the

links *i*, and the other member of the series, namely, the member A′, is conveniently disposed between the two first named.

At the lower end of each of the members A A′ A^2 are mounted grip jaws $j\,j'\,j^2$ two of said jaws, $j\,j^2$, adapted to present on one side of the cable, being shown as applied respectively to the members A A^2, the other of said jaws, j', adapted to present on the opposite side of the cable, or to practically inclose it being shown as applied to the member A′. If desired the jaws may be provided with rollers $j^\times$, and two of said jaws, namely those designated j and j^2, are shown in the drawings as provided with such rollers. The jaw j' may embody a groove or channel adapted to receive the cable, as indicated in dotted lines in Fig. 3. The cable K which is the under cable and the one to which the grip is shown as applied, is engaged by the jaws $j\,j'\,j^2$, and therefore by occasioning the descent of the member A′ said cable may be tightly gripped, the members A and A^2 constituting in effect one member,—and the member A′ the other member, of a gripping mechanism. It will be readily understood that the cable, being not only constantly held taut, but also (because composed of wire and of large diameter) possessed of considerable rigidity, will upon the descent of the member A′ be readily and firmly gripped between the jaws $j\,j^2$ on the one hand, and the jaw j' on the other. To occasion the vertical movement of the member A′ with respect to the other members, to accomplish the alternate grip and release of the cable, we prefer to mount a toothed wheel L upon the block B of said member A′, and to provide a toothed rack M upon the block of member A^2 in such position that the teeth of the toothed wheel L mesh with it, and, as will be understood, through a lever arm *l* projecting from the wheel L, the throw of the toothed wheel may be accomplished by means of any suitable hand-operated mechanism of an ordinary character connected to said arm *l*.

As a protection to prevent the possibility of damage to the crossing cable or the grip, we prefer to provide a guard of the following arrangement:

N, Fig. 2, is a plate of length somewhat in excess of the breadth of the grip, bent to a semi-circular cross section, at the respective extremities of which plate are placed arms *n* equipped with heads $n^\times$. These arms are mounted for reciprocation in a pair of brackets $n'\,n^2$, and between the heads $n^\times$ and the brackets are mounted expansive springs which tend to draw the plate back toward said brackets. The brackets are mounted in such position as to support the plate in the same horizontal plane as, and with its concavity facing, the crossing cable, and at some little distance from said cable in the direction from which a car connected to the under cable approaches. When the car approaches, its grip encounters the plate N, carrying it forward against the cable F, and in the passage of said cable F through the cable-way of the grip, said plate N serves to protect both the cable and the grip.

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

1. The combination, to form a grip, of a plurality of members, each composed of two blocks and a notched connecting disk firmly secured to both blocks but free for rotation with respect thereto, means for supporting the grip, means for vertically moving one member with respect to another, and means for engaging or gripping a cable, substantially as set forth.

2. The combination, to form a grip, of a plurality of members, each composed of a pair of blocks connected by a notched rotatable disk engaged within housings in each of said pair, one of the grip members having an upper jaw, another of the grip members having a lower jaw, and means for vertically moving one member with respect to the other, substantially as set forth.

3. The combination, to form a grip, of a plurality of members, each composed of a pair of blocks and a notched rotatable connecting disk permanently connected with both of said blocks,—one of the grip members having an upper jaw, another of the grip members having a lower jaw, means for vertically moving one member with respect to another, and means for securing the disks against undue rotation, substantially as set forth.

4. The combination, to form a grip, of a plurality of members, each composed of a pair of blocks and a notched rotatable connecting disk permanently engaged with both of the blocks,—one of the grip members having an upper jaw, another of the grips members having a lower jaw, means for vertically moving one member with respect to the other, one block of each pair being provided with slots and with a pair of levers secured together and mounted upon said block, studs mounted on said levers and projecting through said slots into engagement with the notches of the disk, one of the levers having an inclined deflecting face normally existing in a space existing between the blocks, substantially as set forth.

5. The combination, to form a grip, of three members arranged in alignment, each member composed of two blocks and a notched rotatable connecting disk permanently engaged with both, the central member having a jaw adapted to present against the cable to be gripped, the other two members being connected together and having jaws adapted to present on the other side of the cable to be gripped, and means for moving one of said members in the appropriate direction to grip the cable, substantially as set forth.

6. A pair of blocks, each embodying a housing, a notched rotatable connecting disk permanently engaged within the housing of each of said blocks, slots formed in one of said

blocks, a pair of levers secured together and mounted upon one of said blocks, studs mounted on said levers and projecting through said slots into engagement with the notches of the disk, one of the levers having an inclined deflecting face normally existing within the space between the blocks, substantially as set forth.

7. In combination with a two-part or penetrable grip adapted when attached to and travelling with a cable, to pass as to its respective parts respectively above and below an upper crossing cable,—as a means to protect the upper cable from injury in the passage of the grip,—a guard plate adapted to partly inclose the upper cable and to pass with said cable between the respective parts of the grip, a pair of arms respectively attached to the respective extremities of said plate, means to support said arms free for sliding movement, and means to maintain the guard plate normally away from the upper cable, substantially as set forth.

8. In combination with a two part or penetrable grip adapted when attached to and traveling with a cable, to pass as to its respective parts respectively above and below an upper crossing cable,—as a means to protect the upper cable from injury in the passage of the grip,—a guard plate adapted to partly inclose the upper cable and to pass with said cable between the respective parts of the grip, a pair of arms respectively attached to the respective extremities of said plate, brackets in which said arms are mounted free for sliding movement, and springs which maintain said guard plate normally away from the upper cable, substantially as set forth.

In testimony that we claim the foregoing as our invention we have hereunto signed our names this 6th day of September, A. D. 1892.

SOLOMON A. KNEEDLER.
OSCAR KNEEDLER.

In presence of—
HENRY M. BOYD,
F. NORMAN DIXON.