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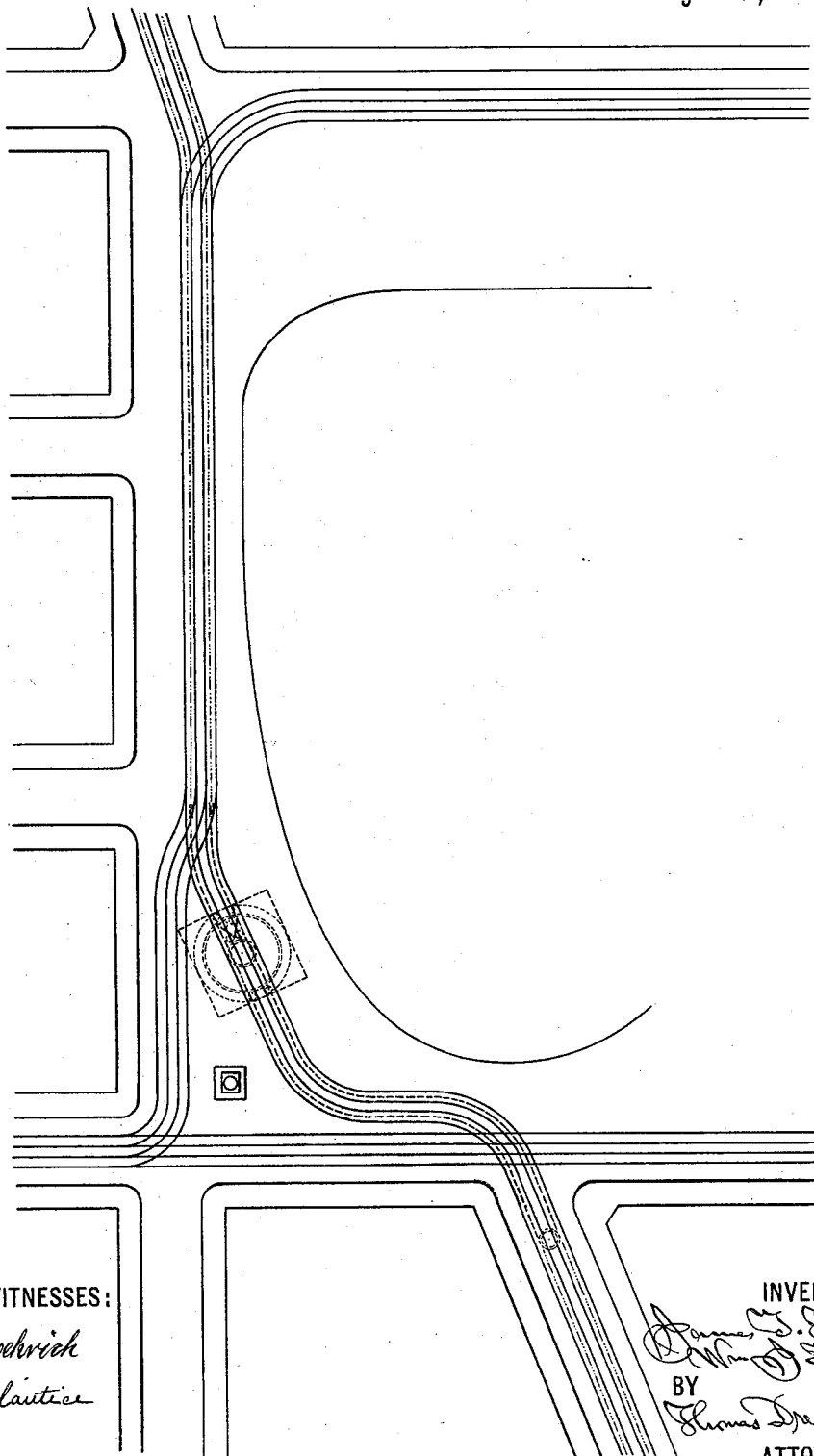
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J. T. & W. J. HUNTER.
SECONDARY CABLE MECHANISM.

No. 586,901.

Patented July 20, 1897.

FIG. 1.



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(No Model.)

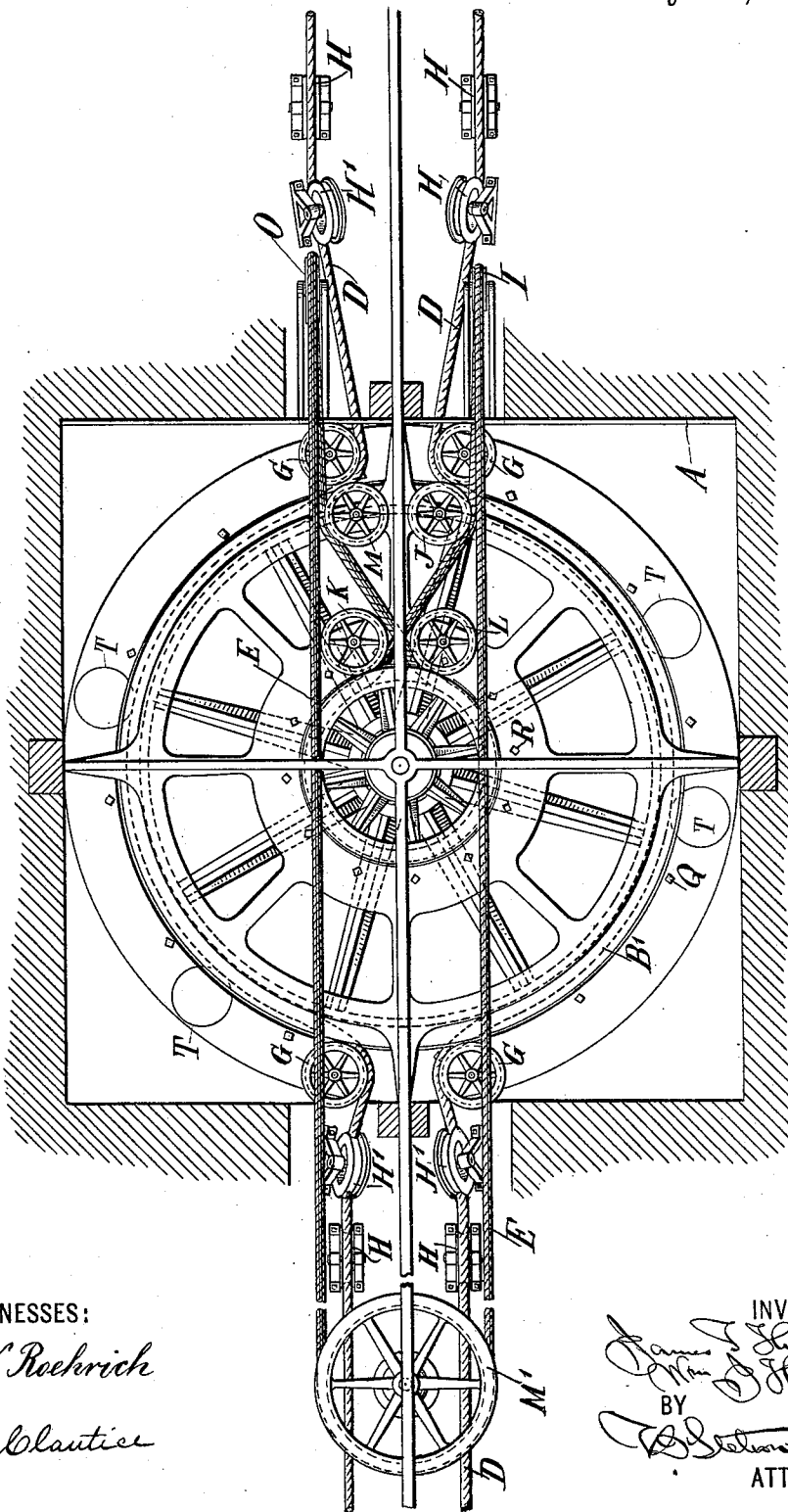
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Fig. 2.



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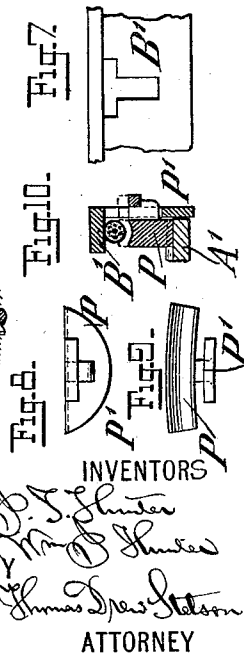
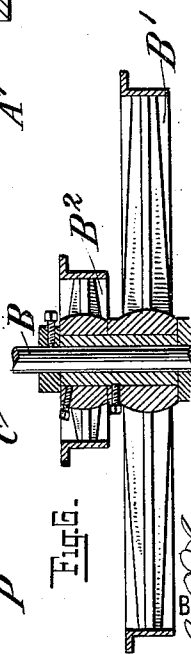
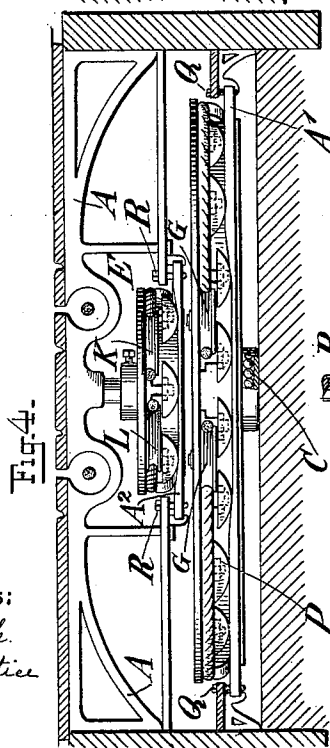
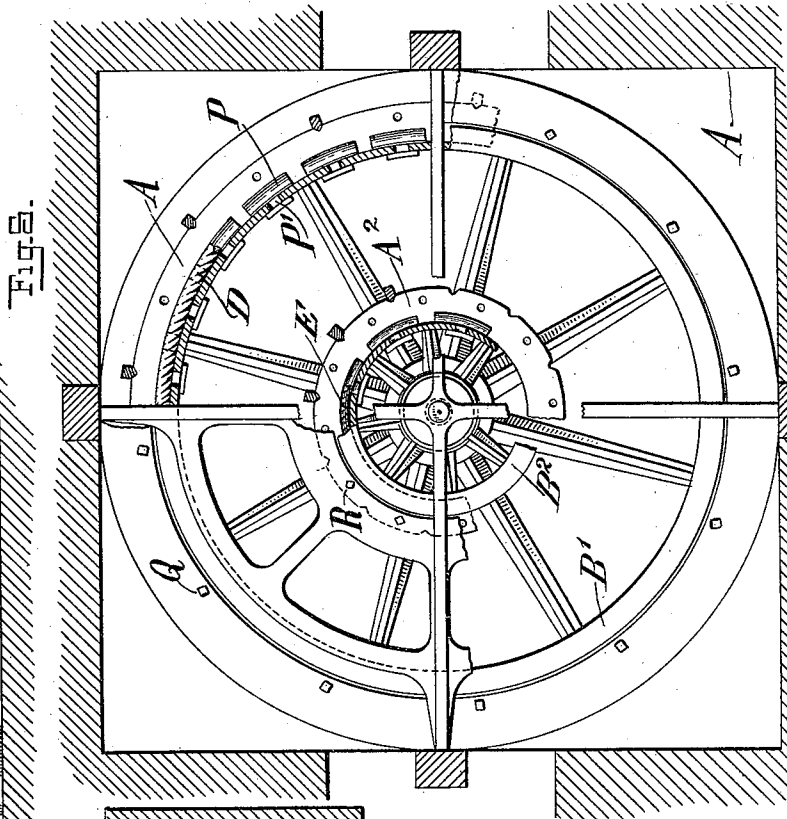
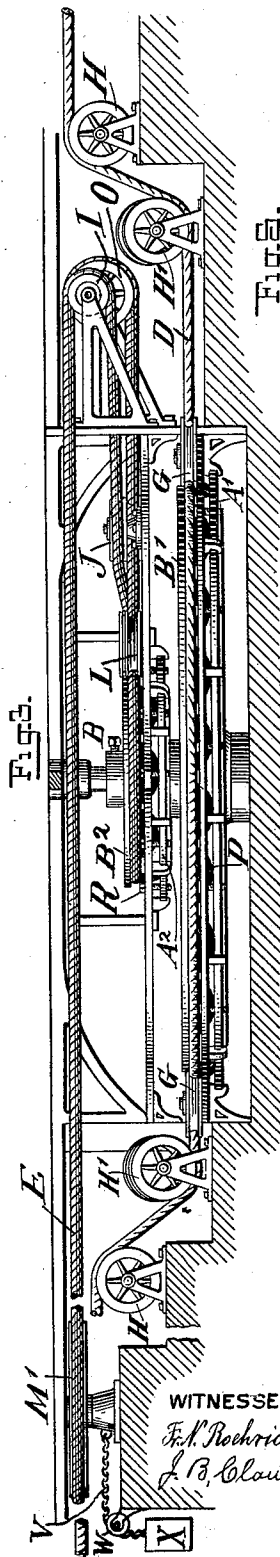
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UNITED STATES PATENT OFFICE.

JAMES T. HUNTER AND WILLIAM J. HUNTER, OF NEW YORK, N. Y.

SECONDARY-CABLE MECHANISM.

SPECIFICATION forming part of Letters Patent No. 586,901, dated July 20, 1897.

Application filed March 13, 1897. Serial No. 627,286. (No model.)

To all whom it may concern:

Be it known that we, JAMES T. HUNTER and WILLIAM J. HUNTER, citizens of the United States, residing in the city and county of New York, in the State of New York, have invented a certain new and useful Improvement in Secondary-Cable-Railway Mechanism; and we do hereby declare that the following is a full and exact description thereof.

Our invention provides improved means for operating a slow cable by the aid of the quick-running cable, the parts being arranged to allow the ordinary gripping mechanism carried on the car to serve with either cable, as required.

We provide means for insuring a firm and reliable engagement of each cable with its proper wheel. We also provide for running successfully with parts of the apparatus disabled.

The accompanying drawings form a part of this specification and represent what we consider the best means of carrying out the invention.

Figure 1 is a plan view or map showing a portion of a track where it is desired to run a short distance at a slower rate than over the main portion of the track. The locality delineated is in the heart of the city of New York, at the lower end of Union Square, a point which from its liability to accidents has been sometimes denominated "Dead Man's Curve." Fig. 2 is a plan view showing the principal portions of our improvement on a larger scale. Fig. 3 is a corresponding side elevation, partly in vertical section. Fig. 4 is an elevation at right angles to the view in Fig. 3. Fig. 5 is a plan, partly in horizontal section. The remaining figures show parts detached. Fig. 6 is a cross-sectional view of the wheels, the antifriction-balls being omitted. The remaining figures show one of the clamping-pieces which serve in the wheels to effect the automatic gripping and releasing of the cable. Fig. 7 shows a portion of one of the wheels. Fig. 8 is a corresponding view of one of the clamping-pieces. Fig. 9 is a corresponding plan view. Fig. 10 is a cross-section showing a part of the wheel with the grip or clamp attached thereto.

Similar letters of reference indicate corre-

sponding parts in all the figures where they appear.

A is a casing of wood or metal sunk in the earth and extending across both the tracks, 55 affording sufficient room to accommodate a large horizontal wheel B', having keyed or otherwise secured firmly thereto a smaller wheel B² at a higher level. Both are mounted on a vertical shaft B, supported in substantial bearings, the lower of which is provided with one or more concentric grooves in which are antifriction-balls C, which sustain the weight and offer but little resistance by friction. The periphery of the large wheel B' receives the quick-running cable D. The 65 periphery of the small wheel B² receives the slow cable E. The wheels are both provided with automatically-operating clamps or grips, which insure a reliable engagement of each 70 wheel with its proper cable during a portion of the revolution and the liberation and free separation when the right point in each is reached.

The quick cable D is usually long and is 75 driven by the power engine or engines at any convenient point in the route. The regulation of the engine may be adjusted to give it a speed of eight miles an hour or other speed which it is desired the cars shall successfully 80 assume and maintain during their traverse over the main portion of the route; but as each car approaches the point where it is required to run slower—we will assume that it is a reversed curve of which that shown in 85 Fig. 1 is an example—the gripman relaxes his hold of the quick cable, and letting the car run freely across a little interval by its momentum until it has entered fairly upon the portion of the route traversed by the slow 90 cable he applies the grip again and seizes this time the slow cable. This should be done gently, in order that the car, if traveling slower or faster than the slow cable, may gradually change its velocity. So soon as the car is 95 properly engaged with the slow cable the hold thereon may be tightened, and the car thenceforward runs with the slow motion of the cable until it approaches the termination of that portion of its route. Then the gripman again 100 lets go of the cable, and after moving by the moderate momentum due to the motion re-

tained from the slow cable or being moved by other means, as the force of men, across the short interval between the cables it will soon be again on the proper quick part of the route, and the grip may be again engaged, this time taking hold gently at first of the quick cable, and it soon resumes its previous rapid rate of traveling. The same gripping mechanism on the car may serve for both, because the slow cable runs at the same level and along the same line as the quick cable would. In traversing this part of the route the quick cable D makes nearly a half-revolution around the periphery of the large wheel B', being held in the proper contact therewith by pulleys G, which are mounted on fixed bearings and are idle except as they serve to hold the quick cable in its proper relation to the large wheel, describing the arc of a circle around nearly half thereof in its passage in one direction and the same on the opposite side of the wheel in its return.

The sinking and the raising of the quick cable is determined by other pulleys H H', arranged the pulley H at the top and the pulley H' at the bottom of each incline. It will be understood that the large wheel B' and the small wheel B² run at a level considerably below the lines which are traversed by the cables in operating the cars. The quick cable D is led down the deep incline from the top of the pulley H to the bottom of the pulley H'. This carries it down to the level of the large wheel, and, guided by the pulleys G, it performs its duty of traversing partially around the large wheel and communicating motion thereto.

The slow cable E descends to a less depth and its arrangement differs very greatly from that of the quick cable. In serving to impel the car it traverses at the same level and along the same lines as if it were the quick cable. It will be understood that it is similarly held up on supporting-pulleys (not shown) and allows itself to be seized and released by the grips of the cars (not shown) in the same manner as the quick cable. Its route may be long or short. It is shown in Figs. 2 and 3 as having a portion broken out. At the termination of its route it describes a half-circle of a horizontal wheel properly arranged and returns, serving to impel the cars successively in their return trips; but in the vicinity of the small wheel B² it is peculiarly arranged, one marked feature being its crossing itself, abrasion being avoided by carrying one part just sufficiently higher than the other to avoid contact.

I is a pulley running on a horizontal shaft arranged to carry the slow cable down to about the level of the small wheel B². The returning part of the slow cable, that on the lower side in Fig. 3, finds this pulley arranged to receive it, and making a half-turn around it and being thereby carried down to the proper level it moves again in the opposite direction and is deflected around a horizontal

pulley J. Thence it moves diagonally across the route and comes in contact with the small wheel B² and is pressed thereon by a pulley K. It is applied firmly against the wheel B² and is held firmly in contact therewith during a nearly complete revolution of this wheel. Thence, after being deflected around a pulley L, it moves again diagonally across the route and is deflected around a pulley M. From here it moves parallel to the useful position of the cable, but at a lower level, and turns half around an upright pulley O, corresponding in position to the pulley I, before described, but on the other side of the route. This pulley carries it up and puts it into the line of its useful traverse, with which our description commenced. The pulley I is smaller than the pulley O and it carries the cable down to a certain depth. The pulley O, of larger diameter, receives the cable at a lower depth and brings it up. The highest points in each pulley I and O are at equal levels. This difference between the two sides favors the crossing of the cable. The pulley J is higher than the pulley M. The cable delivered from the lowest point in the pulley I moves at a moderate depth to the pulley J and thence inclines downward as it crosses the route to the pulley K, where it comes in contact with the wheel B². After it has made the circuit of this wheel and is delivered past the pulley L it descends in moving to the lower pulley M. It follows from this arrangement that the oblique traverse of the cable from J to K is at so much higher level at the point of crossing than the oblique traverse from M to L that no contact of the cable with itself occurs in crossing.

It will be understood that the slow cable, like the quick one, may be guided by a series of small horizontal pulleys if the route is curved.

The invention is admirably adapted for serving at dangerous curves in streets. It may be extended any distance along the route.

There may be provision at any required point for allowing for the expansion and contraction of the slow cable E or for imperfections in the mechanism or for irregularities in the motion due to any cause in the same manner as has long been practiced in allowing for such irregularities in the longer and quicker cable. We believe that allowance for but a small amount of such variation in the position of any one of the pulleys will suffice, and we propose that it shall be accomplished by a chain V, attached to the bearings of the pulley M, running over a small pulley W and carrying a sufficiently heavy weight X, adapted to rise and sink in a pit, as indicated in Fig. 3.

PP, &c., are peculiarly-formed blocks, each having a T-shaped projection P' on its inner face and adapted to rise and sink in a corresponding groove in the wheel B'. There may be as many of these slots and of the blocks, which we call "grips," as may be desired.

We prefer to provide so many, as shown in Fig. 4, that one or more may become inefficient through wear or through any accident and yet allow the mechanism to operate successfully until midnight or the hour which is most convenient for stopping for repairs. The upper portion of each slot is sufficiently wide and deep to allow the T-shaped part of the block to be inserted and removed.

Any block can be inserted or removed in that portion of the periphery which lies between the bearings of the pulleys G on the respective sides. In traversing that portion of the periphery of the wheel where the cable is the blocks cannot be lifted except to a moderate extent by reason of the cable lying over them. The wheel B' is provided with a broad overhanging flange at its upper edge. The cable runs under this flange and rests on the upper ends of the several blocks or grips P. These blocks must be raised and held up so as to grip the cable in traversing the proper portion of the revolution of the wheel where the cable is engaged; but in traversing the other portions of the wheel the grips must be lowered. We attain this condition by means of what we term a "track," which is a smoothly-finished circular rail A', held up by brackets at a number of places around its outer edge and presenting a smooth track for the circular traverse of the blocks P. This track is elevated in two portions of its circuit—that where it gets hold of the quick cable on its route in one direction and that where it gets hold of the same cable on its route in the other direction; but in the spaces between these parts the surface of the track is appreciably lowered. The transition is by moderate inclines, and the bottom surfaces of the several grips being smoothly rounded, it follows that in traversing rapidly around on the circular and nearly plane track A' the several grips will be lowered to liberate the cable and allow it to escape from the wheel freely, and a little later to allow the portion of the quick cable which is traversing in the opposite direction to be received, and then during the main portion of the period while the quick cable is in contact with the wheel the grips are held up on the plane portion of the track A', so as to firmly grasp the cable between the upper face of each grip and the lower face of the flange at the upper edge of the wheel B'. This secures the requisite automatic gripping and releasing of the quick cable by the wheel B'.

The slow cable E is correspondingly seized and released by a corresponding series of grippers carried on the small wheel B². The mode of engagement with the wheel and the mode of holding up and lowering the grips on the small wheel are substantially the same as those described for the large wheel. The principal difference is that the small wheel receives the cable at one time nearly around its entire periphery, and the track A², which holds up the grips for the small wheel B², is correspond-

ingly formed—that is to say, the track A², strongly held up by the main casing A at a higher level than the track A', has its upper surface continuously high during some nine-tenths of its circuit and low only at the small portion of its circuit which lies between the two pulleys L and K. The lower track A' may be raised and lowered by screws Q. The upper track A² may be raised and lowered by screws R. It will be seen that the cable may be efficiently seized and firmly held in its traverse around the proper part of each of the wheels, so that the double wheel B' B² is certain to receive the proper motion from the quick cable D to impart the proper slower motion to the slow cable E.

Modifications may be made without departing from the principle or sacrificing the advantages of the invention. The two wheels B' B² may be cast integral, or the modification may be in the opposite direction, the large wheel B' being adapted to run with absolute looseness on the shaft B for any required period when desired, the action being controlled by any convenient means, as an ordinary friction-clutch. The casing A may be smaller or differently formed, but it is important that it shall provide ample space for workmen to descend and examine, lubricate, or repair the several wheels or any of the several grips as occasion shall require.

We have described the invention as applied with the slow cable shorter than the quick cable and arranged to drive the car along the same route as the quick cable. Either or both these conditions may be changed. The slow cable may extend in another direction to either side or both sides of the main route, so as to drive the cars on sidings or even on quite extended branches. The quick cable may be short and the slow cable may extend any length.

Conditions may be such that a fast cable may be run from a slow one or the secondary cable may be run at the same speed as the principal one.

Parts of the invention may be used without the whole. We can dispense with the grips on either or both the wheels and depend on the friction of the cable against the proper bearings on the wheels. We can increase the bearing of the cables against the wheels by pulleys properly placed to press the cable forcibly against the wheels. T T show pulleys thus arranged.

We claim as our invention—

1. In a cable-railway, a main high-tension cable depressed for an interval of its length, and an auxiliary cable driven from the main cable and located in the depression of the same, in combination with an automatically-yielding tension device exerting a gentle and approximately uniform tension on said auxiliary cable, all arranged to serve substantially as herein specified.

2. In a cable-railway, a main high-tension cable depressed for an interval of its length,

and an auxiliary cable located in said interval, in combination with an automatically-yielding tension device exerting a gentle and approximately uniform tension on the cable, and with mechanism for driving the auxiliary cable at a reduced speed by power received from the main cable, all arranged to serve substantially as herein specified.

3. In a cable-railway, a main high-tension cable, and an auxiliary cable, in combination with an automatically-yielding tension device, and with the horizontal wheels B' , B^2 , revolving together and engaging the respective cables, and with self engaging and releasing clamps P , all arranged to serve substantially as herein specified.

4. In a cable-railway having a quick and a slow cable, two horizontal wheels B' , B^2 fixed together and engaging the respective cables, in combination with blocks P arranged to grip the cable between themselves and the wheels, and with provisions as the tracks A' , A^2 , for automatically operating such grip, all arranged for joint operation substantially as herein specified.

5. In a cable-railway having a quick and a slow cable, two horizontal wheels B' , B^2 fixed together and engaging the respective cables, in combination with blocks P arranged to grip the cable between themselves and the wheels, the wheels having slots b on their working faces serving as guides for the blocks, the slots being widened above the working portions to allow the blocks to be applied and removed, all substantially as herein specified.

6. In a cable-railway having a quick and a slow cable, two horizontal wheels B' , B^2 , fixed

together and engaging the respective cables, in combination with blocks P arranged to grip the cable between themselves and the wheels, the wheels having slots b on their working faces serving as guides for the blocks, and with tracks A' , A^2 , arranged to serve camwise to raise and lower such blocks, all substantially as herein specified.

7. In a cable-railway having a quick and a slow cable, two horizontal wheels B' , B^2 , fixed together and engaging the respective cables, in combination with blocks P arranged to grip the cable between themselves and the wheels, the wheels having slots b on their working faces serving as guides for the blocks, and with tracks A' , A^2 , arranged to serve camwise to raise and lower such blocks, and means as the screws Q , R , for adjusting such action, all substantially as herein specified.

8. In a cable-railway having a quick cable and a separate slow cable, two horizontal wheels B' , B^2 fixed together and engaging the respective cables, the slow cable being wound nearly around the small wheel in a single contact, and crossed the two parts of the cable being guided one above the other at the point of crossing, in combination with suitable further guiding-wheels, all arranged for joint operation substantially as herein specified.

In testimony that we claim the invention above set forth we affix our signatures in presence of two witnesses.

JAMES T. HUNTER.
WILLIAM J. HUNTER.

Witnesses:

J. B. CLAUTICE,
M. F. BOYLE.