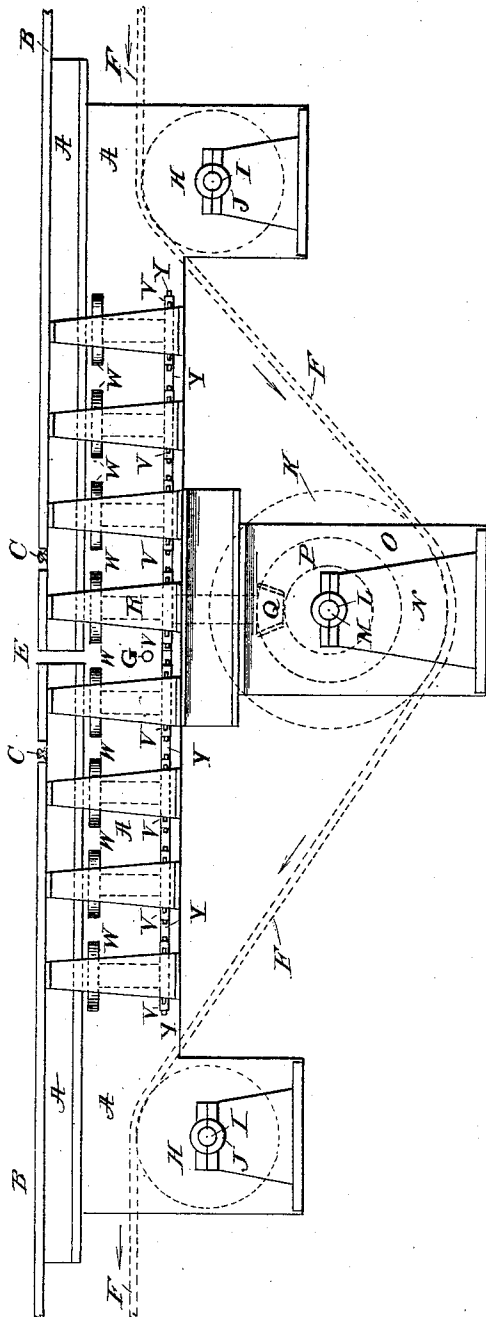


H. A. BENEDICT.
CABLE CROSSING.

No. 484,772.

Patented Oct. 25, 1892.

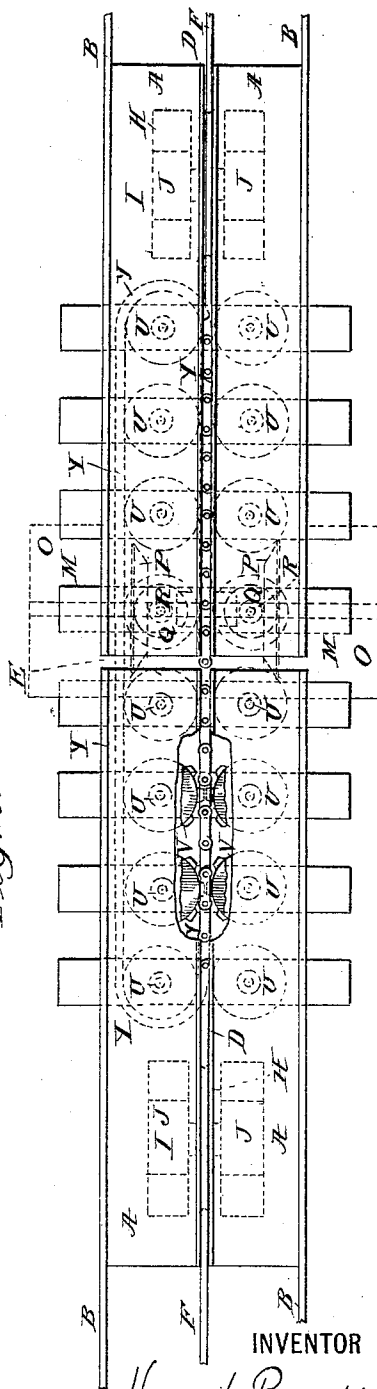
Fig. 1.



WITNESSES:

Edward C. Rowland.
J. E. Hoffman.

Fig. 2.



INVENTOR

William A. Benedict
BY *Phillips Abbott*
his ATTORNEY

H. A. BENEDICT.
CABLE CROSSING.

No. 484,772.

Patented Oct. 25, 1892.

Fig. 3

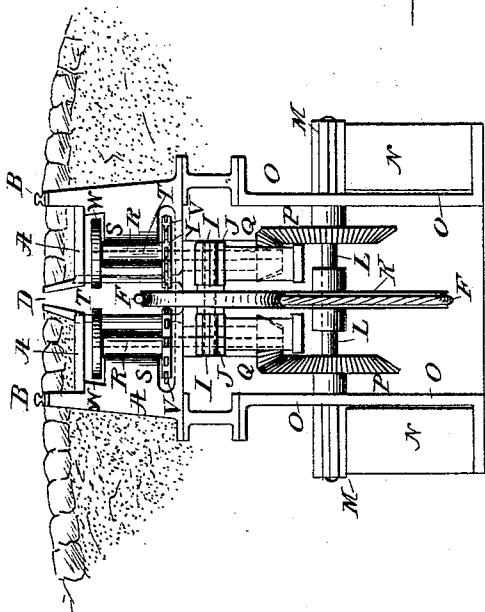


Fig. 4.

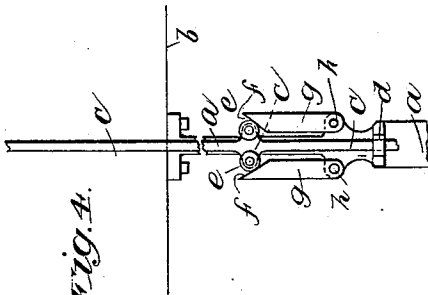
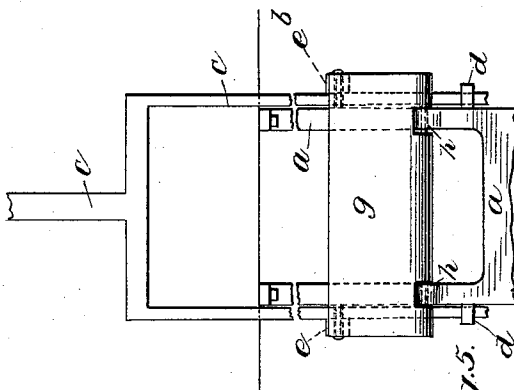


Fig. 5.



WITNESSES:

Edward Rawland.
J. E. Hoffman.

INVENTOR

Hiram A. Benedict
BY *Phillips Abbott*
his ATTORNEY

UNITED STATES PATENT OFFICE.

HIRAM A. BENEDICT, OF NEW YORK, N. Y.

CABLE-CROSSING.

SPECIFICATION forming part of Letters Patent No. 484,772, dated October 25, 1892.

Application filed April 9, 1892. Serial No. 428,428. (No model.)

To all whom it may concern:

Be it known that I, HIRAM A. BENEDICT, a citizen of the United States, and a resident of New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Cable-Crossings, of which the following is a specification.

My invention relates to improvements in cable-crossings; and it consists, generally stated, in arranging the cables of the crossing lines in different horizontal planes and in depressing the upper cable and carrying it below the lower one, and also mechanism is provided which is operated by the depressed cable, with which the grip-arm of the car which is moved by the cable which is depressed engages in such manner that certain expansible plates upon the grip-arm come in contact with said mechanism, whereby the car is carried across the cable of the other line.

In the drawings hereof, Figure 1 represents an elevation of the apparatus, being shown as out of the ground. Fig. 2 is a plan of the same, partly broken away. Fig. 3 is an end view taken from the right in Figs. 1 and 2. Fig. 4 is an end view of the grip-arm having the expansible contact-plates upon it. Fig. 5 is a side view of that which is shown in Fig. 4. These two last figures are somewhat enlarged.

A A, &c., are the ordinary metallic casing used in cable roads. It may be of any preferred construction.

B B are the rails of one car-line.

C C are the rails of the crossing line.

D is the slot through which the grip-arm of the main line extends.

E is the slot through which the grip-arm of the cross-line extends.

F is the cable of the main line.

G is the cable of the cross-line.

H H are two grooved pulleys mounted upon shafts I I, supported in journals J J.

K is a centrally-located grooved pulley, preferably quite large in diameter, supported upon a shaft L, which is supported on bearings M, resting upon a support N, forming part of a depressed framework O.

P P are two beveled gears keyed upon the shaft L, which mesh into beveled pinions Q Q, which are keyed, respectively, to vertical shafts R R. These shafts are supported on

webs S S, (see Fig. 3,) which have tubular portions T T on their ends, through which the shafts pass.

U U U, &c., are a number of other shafts arranged on both sides of the cable, supported in webs projecting inwardly from metallic casing the same as those marked S S, and upon all of the shafts there are arranged near their lower ends sprocket-wheels V V, &c., (see Figs. 1 and 3,) and at or near their upper ends they have friction-rollers W W, &c.

Y is a sprocket-chain, which passes around all of the sprocket-wheels on one side of the track, (see particularly Fig. 2,) and the two sets of sprocket-wheels are so adjusted relative to each other that there is just space between them for the chain to pass somewhat snugly, and the width of the links of the chain is such that they will somewhat more than receive within them the teeth or cogs of both sets of sprocket-wheels, so that both sets will be positively driven by the same sprocket-chain. This is clearly shown in Fig. 2 at the cut-away portion thereof, which shows the sprocket-wheels V and the chain Y passing between them, the teeth of the wheels being directly opposite each other and those of both sets of wheels within the same link of the sprocket-chain.

Referring now to Figs. 4 and 5, *a* represents the clutch-arm, and *b* represents the bottom of the car. *c* is a bar or bifurcated frame, which is supported at its lower end upon guides and supports *d d* on the grip-arm, and it passes upwardly into the car or into such position that it may be acted upon by suitable mechanism—such as a worm or crank or equivalent device—operated by the gripman or conductor of the car, as the case may be, whereby it (the frame *c*) will be depressed. *e e e* are rollers pivoted upon the bifurcated frame *c*, which during their descent press against the beveled edges *f f* of two pivoted plates *g g*, which are pivoted at *h h* to the grip-arm *a*. From the foregoing it will be seen that when the bar or bifurcated frame *c* is depressed the plates *g g* will be swung outwardly or expanded. It will be also observed that the cable G of the cross-line is in a lower horizontal plane than the cable F.

The operation is as follows: Assuming that the cable F is in continuous motion in the di-

rection of the arrows, (see Fig. 1,) the car is carried by the cable F up to about the first pulley H. At this point the grip is let go and the plates *g g* (see Fig. 4) pass in between the first pair of friction-rollers W W. The gripman or conductor, as the case may be, then by operating a lever or hand-wheel or such other suitable mechanism as may be provided depresses or sends down the bifurcated frame c. This causes the plates *g g* (see Figs. 4 and 5) to come in forcible contact with the friction-rollers which are driven by the action of the cable F against the large roller K by means of the gears and sprocket-wheels and sprocket-chain, shafting, &c., already described, and, as will be seen by examination of the drawings, the direction of rotation of the friction-wheels W is the same as that of the cable F. Consequently the friction of those rollers against the plates *g g*, which are expanded against them forcibly, causes the car to move along, the plates *g g* passing in succession from one set to the next set, and they are of course made sufficiently long to extend from one set to the other. In this manner the car will be pulled along across the entire set of friction-rollers, during which it passes over the cross-cable, and that cable being set lower than the cable F the grip does not interfere with it. It will also be observed that the contact between the plates *g g* and the friction-rollers W being a frictional one and applied gradually, there will be no sudden jerking or wrenching of the parts; but, on the contrary, the car will be carried along smoothly and gently.

I prefer to round off or slightly bevel the front edges of the plates, so that there will be no sharp edge to mar the friction-rollers. The car will be carried clear across the crossing and into such position that the grip may be again engaged with the cable F beyond the second pulley H, whereby the car will be carried on its journey, as usual.

It will be observed that it is not essential to have two beveled gears P, beveled pinions Q Q, and coacting parts; that one of them only will do under many circumstances, the sprocket-chain being driven from one side only, the other set of sprocket-wheels and friction-plates being driven by contact or engagement with the sprocket-chain. I prefer, however, to drive both sets. It will also be observed that gearing may be interposed, if desired, between the beveled gears P and the pinions Q to accelerate or to retard the movement of the sprocket-chain, as desired, and that various mechanical alterations may be interposed in the system shown by me to additionally drive the parts or to increase or diminish the power and speed. I do not illustrate all of these changes, because they are almost numberless in possibility, and they are simply

modifications of or additions to the invention as disclosed by me.

I do not limit myself to the details of construction shown and described, because many alterations may be made therein without departing from the spirit of my invention.

I claim—

1. The combination, in a cable-crossing device, of two cables in different horizontal planes, the upper one being depressed and passing around a pulley, a shaft geared to the shaft of said pulley and having a sprocket-wheel and a friction-pulley upon it, other shafts arranged parallel thereto, each having a sprocket-wheel and a friction-pulley, and a sprocket-chain passing about all of said sprocket-wheels, substantially as set forth.

2. The combination, in a cable-crossing device, of two cables in different horizontal planes, the upper one being depressed and passing around a pulley mounted upon a shaft, two sets of sprocket-wheels, and friction-pulleys located between the two rails of the same track and mounted upon shafts which are connected to and driven by the shaft of said pulley, substantially as set forth.

3. The combination, in a cable-crossing device, of two cables in different horizontal planes, the upper one being depressed and passing around a pulley mounted upon a shaft, two sets of sprocket-wheels and friction-pulleys located between the rails of the same track and mounted upon shafts which are connected to and driven by the shaft of said pulley, and a single sprocket-chain, the said devices being so constructed and arranged that the chain engages the teeth of all of the sprocket-wheels, substantially as set forth.

4. The combination, in a cable-crossing device, of two cables, continuously-rotating friction-wheels driven by one of the cables, and adjustable laterally-expanding plates attached to the grip-arm of the car, and means attached to the car whereby the gripman may laterally expand the plates to bring them into contact with said frictional wheels, substantially as set forth.

5. The herein-described improvement in cable-grippers, comprising two plates pivoted at their lower ends to the grip-arm of the car and a vertically-movable bar adapted to be operated by the gripman or conductor, which engages with said pivoted plates, whereby they may be swung apart laterally, substantially as set forth.

Signed at New York, in the county of New York and State of New York, this 8th day of April, A. D. 1892.

HIRAM A. BENEDICT.

Witnesses:

PHILLIPS ABBOTT,
J. E. HOFFMAN.