(No Model.)

# T. E. BROWN & C. F. PARKER.

## CABLE RAILWAY.

No. 549,701. Patented Nov. 12, 1895.

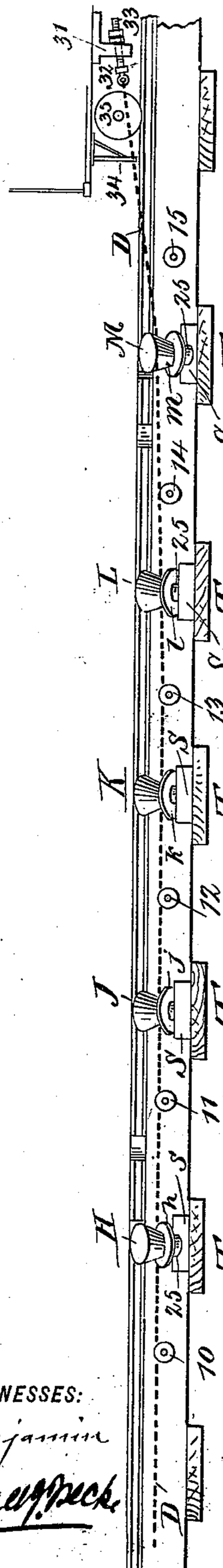

Fig. 4.

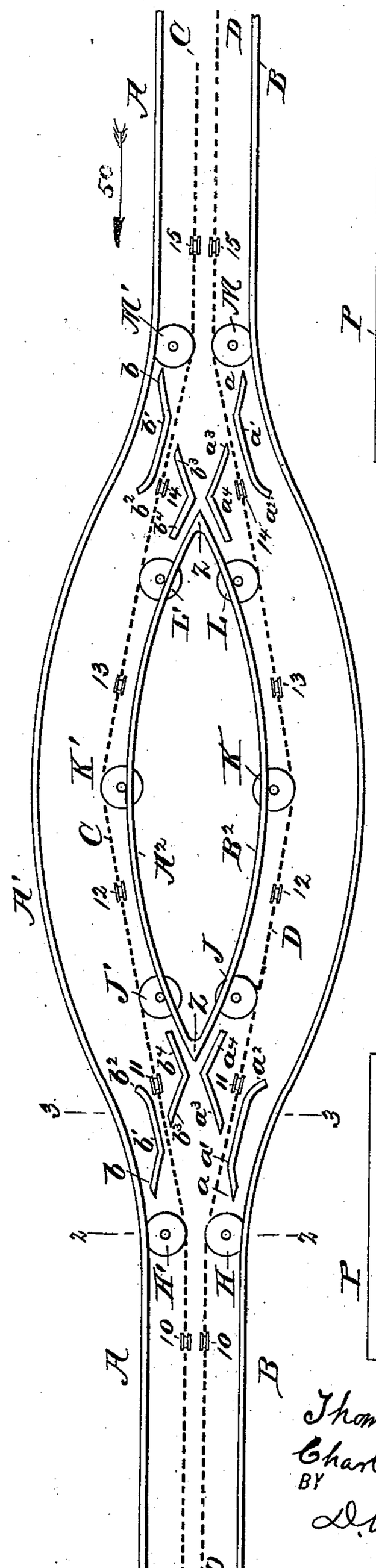

Fig. 1.

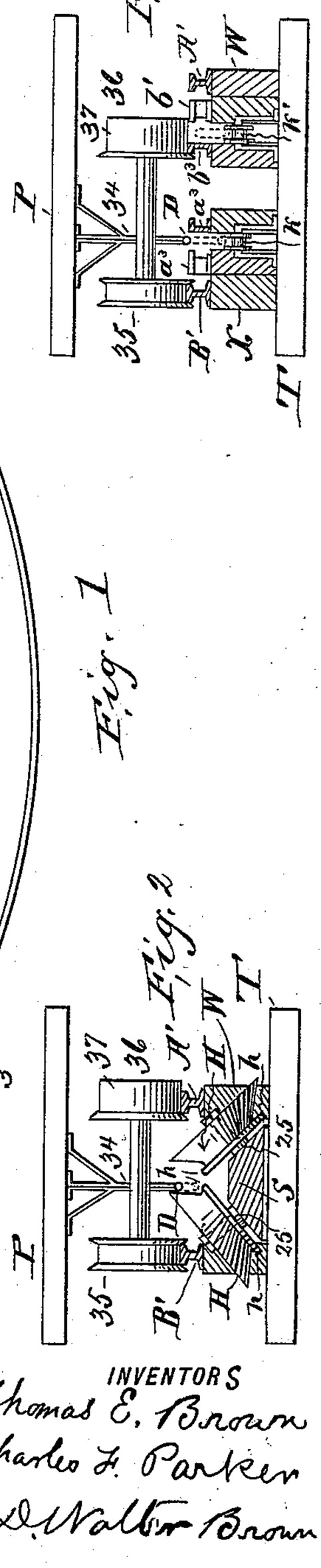

Fig. 3.



Fig. 2.

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## CABLE RAILWAY.

SPECIFICATION forming part of Letters Patent No. 549,701, dated November 12, 1895.

Application filed March 1, 1895. Serial No. 540,268. (No model.)

*To all whom it may concern:*

Be it known that we, THOMAS E. BROWN and CHARLES F. PARKER, citizens of the United States, and residents of the city of New York, in the county of New York, State of New York, have invented certain new and useful Improvements in Cable Railways, of which the following is a specification.

Our invention relates to improvements in cable railways; and it is the purpose of the invention to so arrange the rails of the track and the cable at the turn-outs, in combination with the flanges and treads of the wheels of the cars, that a single track of two rails, except at the turn-outs, will suffice for the simultaneous moving of the cars in both directions, the cars passing by each other and over the cables of the other cars at the turn-outs.

Hitherto the most economical system has been the three-rail system, in which the middle rail is used by the cars going in both directions; but even that system involves a great increase of cost, by reason of increased excavations and fills and wider trestles, bridges, viaducts, and tunnels than a two-rail system.

It is the purpose of our system, as stated, to substitute a two-rail system for the aforesaid three-rail system and secure the resultant economy of construction; but in such a two-rail system each car when passing over the turn-out must evidently cross over the cable which is running in the opposite direction, and also the cable or the part which connects the cable to each car must pass through the rail on which the car going in the opposite direction travels. Therefore the primary objects of our invention are to so arrange the cables and rails of the turn-outs, in combination with the treads and flanges of car-wheels, that, first, the wheels of a car will be supported above the cable of the car going in the opposite direction when crossing over said cable and will not be permitted to descend and crush the cable; that, second, the cable of a given car may rise up through the rail on which the car going in the opposite direction travels at the time when the car to which said cable is attached is passing over the turn-out, (or what is the equivalent operation that the connection between said cable and its car may pass through the rail on which the car going in the opposite direction travels,) and that, third, the arrangement of the rails and cables in combination with the flanges of the car-wheels shall infallibly switch the car to the outside of the turn-out no matter in what direction the car may be going. We accomplish these results by employing on the inside of each branch of the turn-out rails so slotted that the cable or cable connection of the car which travels on the other branch of the turn-out may pass through the slot, and combining with said slotted rails idlers or pulleys for the cable arranged so that normally said cable lies below the top of said slotted rail, and also by providing treads on the inner wheels of the cars wide enough to bridge over the slot in the rails. By the combination of the said elements of slotted rails, the cable normally below the top of the rails at the slot, and wide treads we insure that the wheels of a car will be supported when crossing the said slots and will not descend on the cable. In order to guide the cars properly around their respective branches of the turn-outs, we provide the outside wheels of the cars with two flanges—one at the inside, the other at the outside, of the outer rail of the turn-out. The effect of the double flanges is to compel a car when arriving at the turn-out in either direction to always turn out on the side of the double-flanged wheels, being guided by the continuous outer rail of the turn-out, and this compels the inner wheels of the car to travel on their proper inner rail of the turn-out. Our construction thus provides an automatic fixed switch, in contradistinction to a movable switch, whether of automatic or other type, which switch, having no movable parts, is certain in its operation and not liable to accidental derangement or to be misplaced by the mistake of the switchman.

Referring to the drawings which accompany the specification to aid the description, Figure 1 is a plan view of the turn-out. Fig. 2 is a cross-section on the line 2 2 of Fig. 1. Fig. 3 is a cross-section on the line 3 3 of Fig. 1. Fig. 4 is a side view of the turn-out, the outer rail and timbers being removed to per-

mit one of the cables to be seen. For the sake of clearness a car is indicated on this figure at a different position from where it is in Figs. 2 and 3.

The parallel rails A B, supported in any suitable manner, as on stringers W X, are at the turn-out continued into the outer rails A′ B′, respectively, finally returning again to parallelism.

C D are the cables. The one cable C turns out to the one side of the turn-out and the other cable D to the other side of the turn-out.

The inner rails of the turn-out are arranged and constructed in the following manner: The rail $A^2$, which is parallel to the rail A′, has at the point where the turn-out begins a part *a* at a sufficient distance within the rail B′ to permit the flange of the car-wheels to pass, said part *a* extending parallel to rail A′ to a point adjacent to the cable D, and then continuing a short distance parallel to the cable D, as at *a′*, and then outwardly, as at $a^2$. From beyond the cable D said rail $A^2$ continues, with a part $a^3$ parallel to rail A′, to the frog Z, $a^4$ being a guide-wing of the ordinary kind. Thus the parts *a′* $a^3$ are separated, forming a slot for the passage of the cable D.

The rail $B^2$ is made up of parts *b* *b′* $b^2$ $b^3$ $b^4$, respectively corresponding to the parts *a* *a′* $a^2$ $a^3$ $a^4$ of the rail $A^2$, and the parts *b′* $b^3$ being separated to form a slot for the passage of the cable C.

At the other end of the turn-out the rails $A^2$ $B^2$ may be formed in the same manner as just described, as will be apparent on examining Fig. 1. In the case, however, of inclined railways having a car fixed to each end of the cable, the slot in the inner rails is not necessary at the lower end of the turn-out, for at this point one car evidently never crosses the cable of the other car, and the cable of whichever car happens at any time to be below the turn-out can be carried over the inner rails, yet the construction shown is adapted to such inclined railway.

The cables C D are deflected around the branches of the turn-out, as hereinbefore stated, and we prefer to guide them in the following manner: Referring for illustration to the cable D, vertical guide-pulleys 10, which we term "idlers," are arranged in any suitable manner on the stringers X to support the cable D normally below the rails A B. Other vertical idlers, as 11 12 13 14 15, are arranged in the course of the turn-out and beyond the other end thereof at such points as suit the normal direction of the cable D. Preferably the idler 11 is arranged a little lower than the idler 10 and idler 12 a little lower than idler 11, idler 13 being arranged at the head of idler 12 and idler 14 a little higher than idler 13, Fig. 4, so that said idlers will allow cable D to sag normally well down below the level of the flanges of the wheels of a car which is passing over the turn-out. At the points where the cable D normally deflects laterally we arrange idlers, as H J K L M. The face of each of these idlers is made wide enough to permit the cable D to rise to its extreme height without leaving the face of the idler. We prefer to make each of said idlers H J K L M a cone with bottom flange *h* *j* *k* *l* *m*, respectively, and to incline their axes 25. The axes of idlers H and M incline upwardly and outwardly, since the cable passes inside the said idlers; but the axes of each of the idlers J K L incline upwardly and inwardly, the cable D passing outside of them. Thus all the idlers can be arranged at an angle under the rails, as shown in Figs. 2 and 3. The axes 25 may be fixed in plates S, which are bolted on cross-pieces T, the stringers X being cut away at the points where the said idlers H J K L M are placed.

The cable C is arranged around the other side of the turn-out in manner similar to the cable D, the vertical idlers indicated in Fig. 1 in connection with cable C corresponding to those indicated by the same reference-numeral in connection with cable D and the idlers H′ J′ K′ L′ M′ respectively corresponding with the idlers H J K L M. Below the slots in the rails $A^2$ $B^2$ may be placed vertical idlers K K′, respectively, to support the cables at that point in their normal position, Fig. 3.

It will be evident from the description that whenever required additional idlers arranged generally similar to those hereinbefore described may be employed without essentially departing from the invention.

The cables C D are connected with the cars in any suitable manner, as by grips, or in the case of inclined railways having two cars on the ends of the cable by attaching the cable to an arm 31 by means of a swivel 32 and long bolt 33, which passes through the arm 31. By means of a nut on the bolt 33 the cable can be tightened. The cable passes through an eye in the lower end of a guide-arm 34 at the front end of the car, which arm descends about to the level of the top of the rails and is positioned to pass by the idlers H J K L M without striking them and vertically over the slots in the rails. The vertical idlers 10 11 12 13 14 15, and so on, are arranged low enough to permit the arm 34 to pass freely over them.

The outer wheels 35 35 of the car P are provided with double flanges, traveling on the outer rails of the turn-out, as seen in Figs. 2 and 3. In the case of an inclined railway with a car attached to each end of the cable the double-flanged wheels of one car will travel on the rail A and of the other car on the rail B, and thus the same car will always turn to the same side of the turn-out, no matter in what direction the car is going. In the case of other cable roads the cars will be reversed at the ends of the line, so that all the cars going one way will turn to the one side and all the cars going the other way will turn to the other side of the turn-out. The inner wheels 36 are provided with treads 37, which are wide enough to bridge over the slots where the ca-

bles C or D pass through the rails $B^2$ or $A^2$, respectively, and also to bridge over the space between the rails *a* and B′ and *b* and A′. Thus when a car whose double-flanged wheels travel on the rail A and going in the direction of the arrow 50 arrives at the turn-out said double-flanged wheels compel the car to turn outward on rails A A′. When the wheels 36 arrive at the slot between the parts of the rail *a* and $a^3$, the tread spans the slot and continues traveling on the part *a*′ until it takes onto the part $a^3$. Thus the broad tread of the wheels 36, in combination with the parts *a a*′ $a^3$ of the slotted rail $A^2$, prevents the wheels from sinking upon and crushing the cable D; also as the car passes along over the slot the arm 34 raises the cable to the position shown in Fig. 3. Then as the car passes by the cable gradually sags back to its normal position. The parts $a^2$ $b^2$ of the rails $A^2$ $B^2$, respectively, serve to direct the cable back to the slot should it be momentarily displaced while descending.

In the case of an inclined railway the turnout will be situated where the ascending and the descending cars pass each other, and it will be evident from the foregoing explanation that each car will always turn out to the same side. In the case of other cable railways when a car arrives at the middle of the turn-out the brakeman will slack off the grip, stopping his car until the car going in the opposite direction comes opposite, when he will tighten his grip and proceed on his way.

Evidently the fixed switch produced by the co-operation of the continuous outer rails A′ B′, the inner rails *a b*, which are separated from the outer rails B′ A′, respectively, to admit of the passage of the flanges of the wheels of the car, and the double-flanged wheels is applicable to other roads than cable railways, and is of itself an important feature of our invention.

Now, having described our improvements, we claim as our invention—

1. The combination in a cable railway turnout, of a cable deflected around the turnout, conical idlers arranged on inclined axes, and adapted to support and guide the cable around the turnout and provided with faces as broad as the rise and fall of the cable, an outer rail of the turnout, and an inner rail slotted where it crosses the cable, substantially as described.

2. The combination in a cable railway turnout, of a cable deflected around the turnout, conical idlers arranged on inclined axes and adapted to support and guide the cable around the turnout and provided with faces as broad as the rise and fall of the cable, an outer rail of the turnout, an inner rail of the same slotted where it crosses the cable, and a car adapted to be connected with the cable, and wheels on one side of the car with treads broad enough to span the slot in said inner rail, substantially as described.

3. The combination in a cable railway turnout, of a cable deflected around the turnout, a slot in the inner rail of the turnout where it crosses the cable, and idlers arranged around the turnout at different elevations and so formed and mounted as to guide and support the cable, along the curves of the turnout, whereby said cable will be dropped through said slot, substantially as described.

4. The combination in a cable railway turnout of a cable, fixed continuous main line rails extended around the outsides of the turnout, fixed inner rails of the turnout, separated at their ends from the adjacent main rail, a slot in said inner rails where they cross the cable and wide enough to permit said cable to descend through the rails, and a car having double flanged wheels on one side adapted to switch the car around the turnout and also having wheels on the other side with treads wide enough to span said slots in the inner rails and prevent the wheels from descending on the cable, substantially as described.

In testimony that we claim the foregoing as our invention we have signed our names, in presence of two witnesses, this 9th day of February, 1895.

THOS. E. BROWN.
CHAS. F. PARKER.

Witnesses:
W. M. PECK,
L. F. BRAINE.