(No Model.) 3 Sheets—Sheet 1.

E. N. WALLIS.

CURVE AND CROSSING FOR CABLE RAILWAYS.

No. 505,737. Patented Sept. 26, 1893.

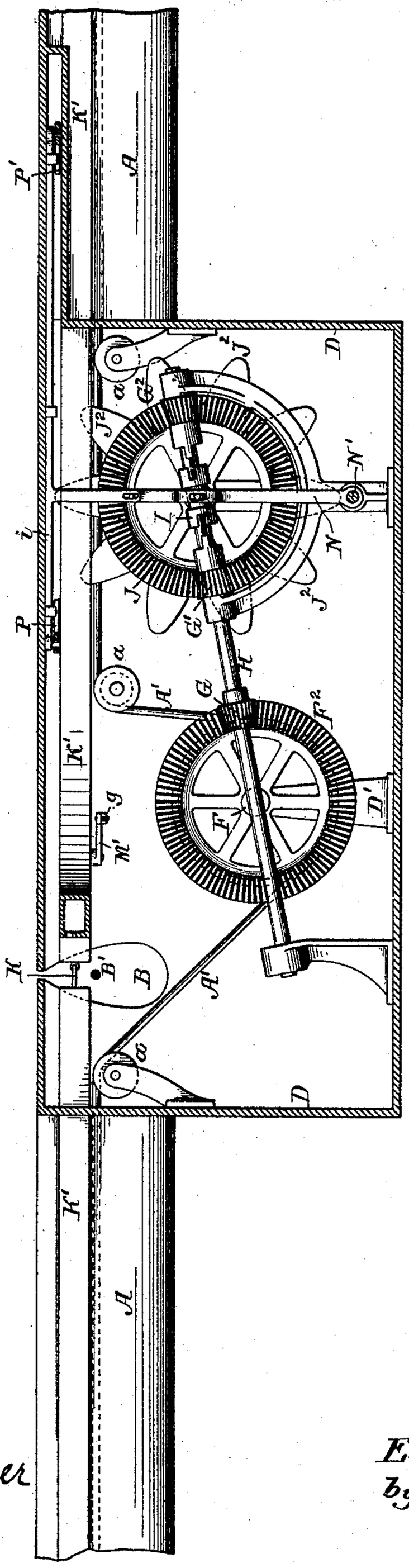

FIG. 1.

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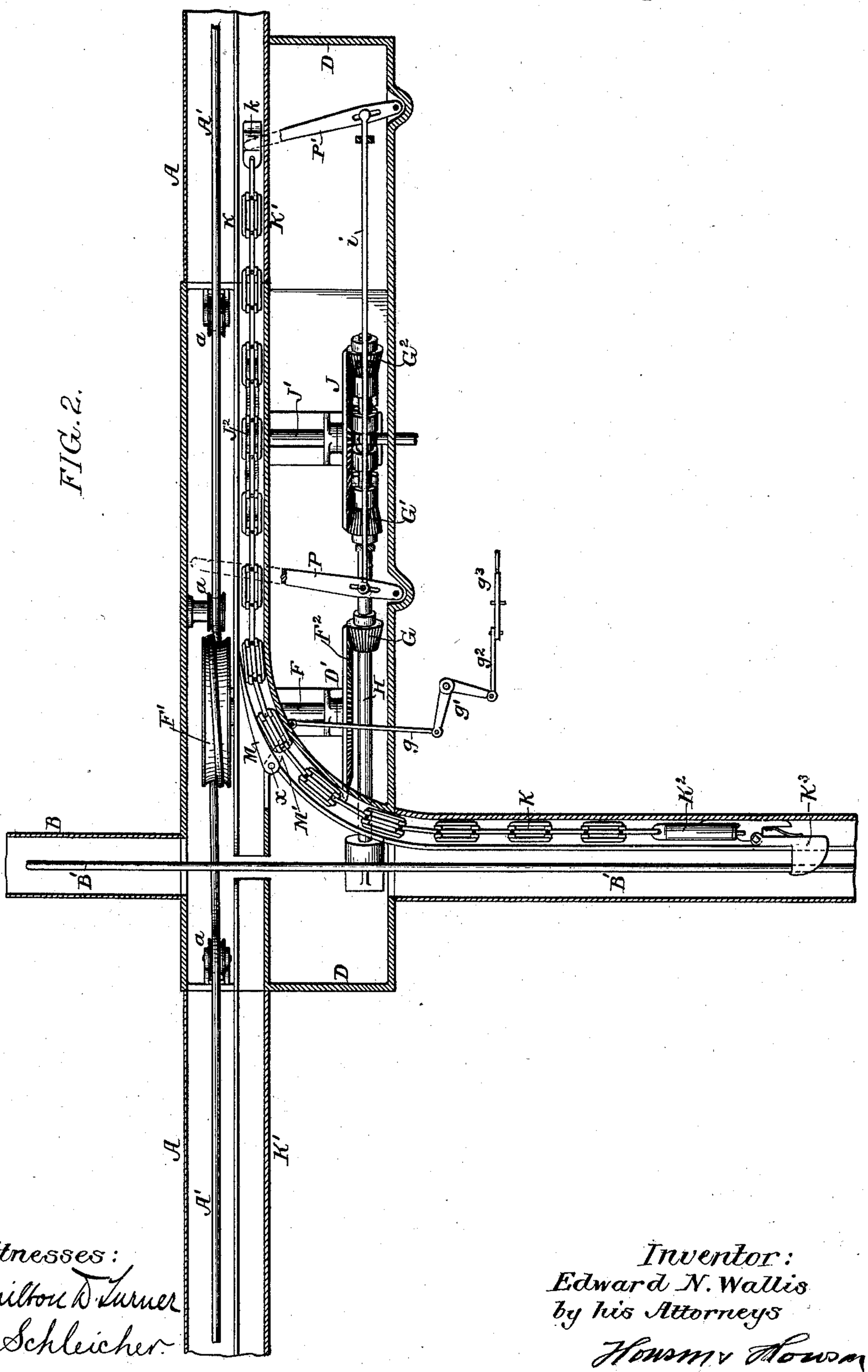
FIG. 2.



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(No Model.) 3 Sheets—Sheet 3.

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FIG. 5.

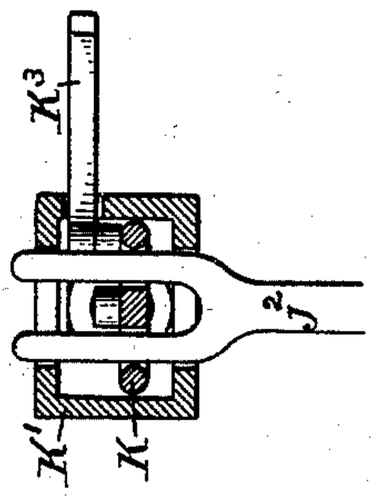


FIG. 4.

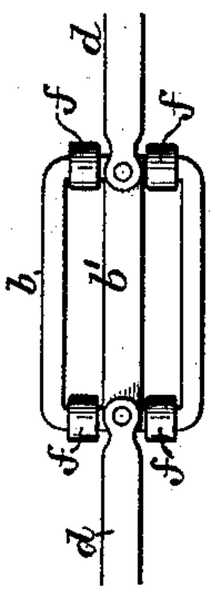
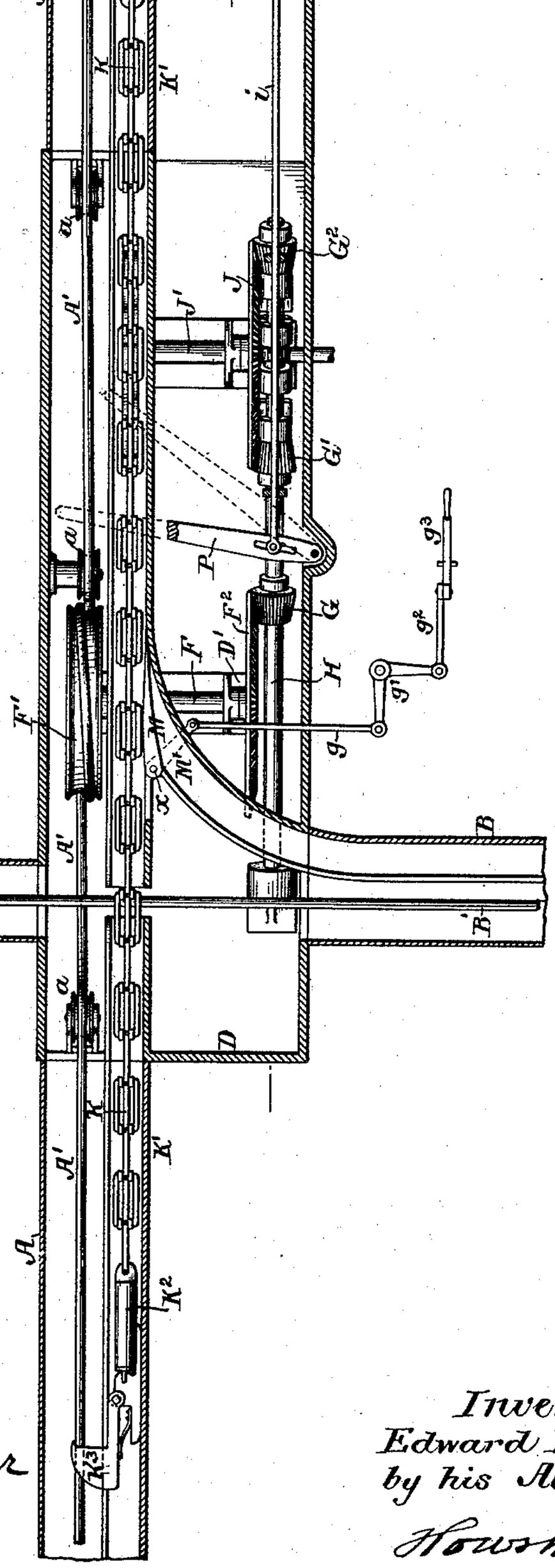


FIG. 3.



Witnesses:
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R. Schleicher.

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UNITED STATES PATENT OFFICE.

EDWARD N. WALLIS, OF PHILADELPHIA, PENNSYLVANIA.

CURVE OR CROSSING FOR CABLE RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 505,737, dated September 26, 1893.

Application filed August 16, 1892. Serial No. 443,197. (No model.)

To all whom it may concern:

Be it known that I, EDWARD N. WALLIS, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented certain Improvements in Curve or Crossing Structures for Cable Railways, of which the following is a specification.

My invention relates to turn-out or crossing structures for cable railways, or to combined turn-out and crossing structures, the object of my invention being to provide mechanism serving to operate a pull bar or hook whereby a car may be carried around the curve or over the crossing or whereby both operations may be effected in a combined curve and crossing structure. This object I attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1, is a longitudinal section of sufficient of a curve and crossing structure of a cable railway to illustrate my invention. Fig. 2, is a plan view of the same showing the parts in position for drawing a car around the curve from one cable line to another at right angles thereto. Fig. 3, is a similar plan view showing the parts adjusted for drawing a car along one cable line and across the other. Fig. 4, is a plan view on an enlarged scale of part of a draft chain which I employ in carrying out my invention; and Fig. 5, is an enlarged transverse section of part of the device.

In Fig. 1, A represents part of a cable conduit extending in one direction, and B part of a conduit extending in a direction at right angles thereto, A′ representing the cable in the conduit A, and B′ the cable in the conduit B.

At the point where the two conduits cross each other or where it is desired to provide a turn-out from one conduit to the other, or where both these structures are combined in one, I locate a box or casing D in which are suitable bearings D′ for a shaft F, the latter having at one end a drum or pulley F′ which receives one or more turns of the cable A′, the latter being preferably directed to said drum or pulley F′ by means of guide rollers *a*. At the other end of the shaft is a bevel wheel F^2 which meshes with a pinion G on a shaft H mounted in an inclined position in suitable bearings on the bottom of the box. Mounted on said shaft H are two pinions G′ and G^2 which, however, are loose on the shaft but can be clutched thereto when desired by means of a clutch sleeve I splined or otherwise secured to the shaft so as to be compelled to turn therewith but at liberty to move between the pinions G′ G^2 so as to engage with the hub of either pinion or so as to occupy a mid position where it is free from engagement with either hub. Both pinions G′ and G^2 are in engagement with a bevel wheel J on a transverse shaft J′ which carries a sprocket wheel J^2 the teeth of which are adapted to engage with the links of a chain K the latter being guided in a suitable box or groove K′ formed along the inner side of each conduit below the slot of the same. The sprocket wheel passes completely through the box K′ so that the chain is prevented from rising to such an extent as to slip from the teeth of the wheel. (See Fig. 5.)

The chain K is composed of alternate loop links *b* and bars *d* as shown in Fig. 4, the loop links having a central bar *b′* and the teeth of the sprocket wheel J^2 being forked or split so as to straddle the same. (See Fig. 5.) The connecting bars *d* between the loop links *b* of the chain are pivoted to said loop links, as shown in Fig. 4, so that the chain is free to bend laterally in passing around a curve, said bars, however, lapping sufficiently to prevent any buckling or rising of the links. Hence the chain is rigid longitudinally so far as regards vertical yielding, and is only flexible laterally.

The end portions of each loop link are provided with antifriction rollers *f* for running in the box or groove K′ formed in the conduit for the guidance of the chain, these rollers also serving as antifriction contacts for the teeth of the sprocket wheel, three of which teeth are always in engagement with the links of the chain, so as to provide for the steady and powerful driving of the latter.

Where the turn-out adjoins the conduit A there is a switch point M mounted on a vertical rock shaft *x*, the latter having an arm M′ which is connected by a rod *g* to a bell crank lever *g′*, the latter being connected by a rod g^2 to an operating lever g^3 suitably located so that the switch point can be turned

to direct the draft chain around the curve and into the conduit B, as shown in Fig. 2, or across the conduit B and into the conduit A beyond the same, as shown in Fig. 3. The clutch I is under control of an arm N mounted on a rock shaft N′ which extends beyond the box D to any convenient point where it is under control of the same attendant who manipulates the lever g^3 and who can thus move the clutch sleeve I into engagement with either of the pinions G′ or G^2 or to a mid position where it is out of engagement with either of said pinions. When the clutch is in engagement with one of said pinions the sprocket wheel J^2 is rotated so as to move the chain K in one direction and when the clutch is in engagement with the other pinion the movement of said sprocket wheel is reversed and the chain is traversed in the opposite direction. Hence it will be seen that the chain can either be directed from the conduit A into the conduit B to pull a car around the curve or across said conduit B in order to pull a car from one portion of the conduit A to the other.

In order to prevent sudden strain on the chain K or jerk upon the car in starting, said chain K has at the draft end a spring clevis K^2 and a spring hook K^3, the latter yielding sidewise when struck by an advancing grip bar, but springing behind said bar after the latter has passed the same so as to be in position to engage the grip bar in order to pull it around the curve or across the conduit, the lateral yielding of this hook also permitting the free passage of the grip bars of cars which continue their straight course along the conduit B.

In order to provide for the automatic stoppage of the draft chain and its operating mechanism when said chain has reached the limit of its movement in either direction, I employ a pair of pivoted arms P P′ connected by a rod *i* which is also connected to the operating arm N of the clutch sleeve I. When said clutch sleeve is in engagement with the pinion G′ the free end of the arm P will project into the path of the grip bar of a car traversing the conduit A or the curve connecting said conduit with the conduit B as shown partly by full lines and partly by dotted lines in Figs. 2 and 3, and as soon as said grip bar has passed around the curve or has traversed so far across the box D as to be in position for engagement with the cable A′ it will strike the end of the arm P and move the same to the position shown by dotted lines throughout in Fig. 3 so as to move the clutch sleeve I to the central or inoperative position, and when the clutch is moved into engagement with the pinion G^2 in order to return the draft chain to position for a fresh operation, a block *k* at the forward end of said chain will strike the arm P′ and thereby move the clutch sleeve I to inoperative position, as shown in Figs. 2 and 3.

My improved draft mechanism, even when adapted for both curve and crossing structures as shown in the drawings, is of a comparatively simple and inexpensive character, and need require no driving power other than that afforded by the cable itself, and it can be accurately and readily controlled by one attendant. Some of the features of my invention, however, if desired may be embodied in draft mechanism deriving its power from means other than the cable.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. The combination in a curve or crossing structure, of a draft chain, a wheel for operating the same, and reversible driving mechanism for said wheel comprising a shaft having a drum or pulley for receiving one of the traction cables, a counter shaft geared to said drum shaft, a bevel wheel on the chain wheel shaft, two pinions on the countershaft in mesh with said bevel wheel, and a clutch whereby either of said pinions may be caused to rotate with said countershaft or either or both of said pinions may be released therefrom, substantially as specified.

2. The combination in a curve and crossing structure for cable railways, of the laterally flexible horizontal draft chain, a sprocket drive wheel engaging directly therewith, a drum driven by the cable, means for transmitting movement from said drum to the sprocket wheel, guide boxes for the draft chain formed on the curved and crossing portions of the conduit, and a switch finger pivoted at the junction of said curve and crossing boxes and having a point free to swing into contact with either the inner or outer wall of the straight portion of the guide box, whereby the chain can be directed either around the curve from one conduit to the other, or along one conduit and across the other, substantially as specified.

3. The combination in a curve structure for cable railways, of the draft chain composed of links pivoted together so that the chain is free to bend laterally in passing round a curve, but is inflexible in a vertical direction, guide boxes for said draft chain formed on the straight and curved portions of the conduit, a drive wheel having sprocket teeth engaging directly with the links of the drive chain, a drum rotated by the cable, and gearing whereby the sprocket drive wheel can be rotated in either direction from said drum, substantially as specified.

4. The combination in a curve or crossing structure for cable railways, of the draft chain, a spring clevis for attaching the draft hook to the chain, guides for said chain, a driving wheel therefor, and means for rotating said drive wheel in one direction or the other, substantially as specified.

5. The combination in a curve or crossing structure for cable railways, of the draft chain, a drive wheel therefor, mechanism for rotating said wheel, a clutch governing the di-

rection of such rotation, and stop levers connected to said clutch and serving to adjust the same to the inoperative position when the chain reaches the limit of its movement in either direction, substantially as specified.

6. The combination of the draft chain, the conduit structure having a guide box for said chain, and the drive wheel engaging with the chain and projecting through both bottom and top of the box, substantially as specified.

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

EDWARD N. WALLIS.

Witnesses:

FRANK E. BECHTOLD,

HARRY SMITH.