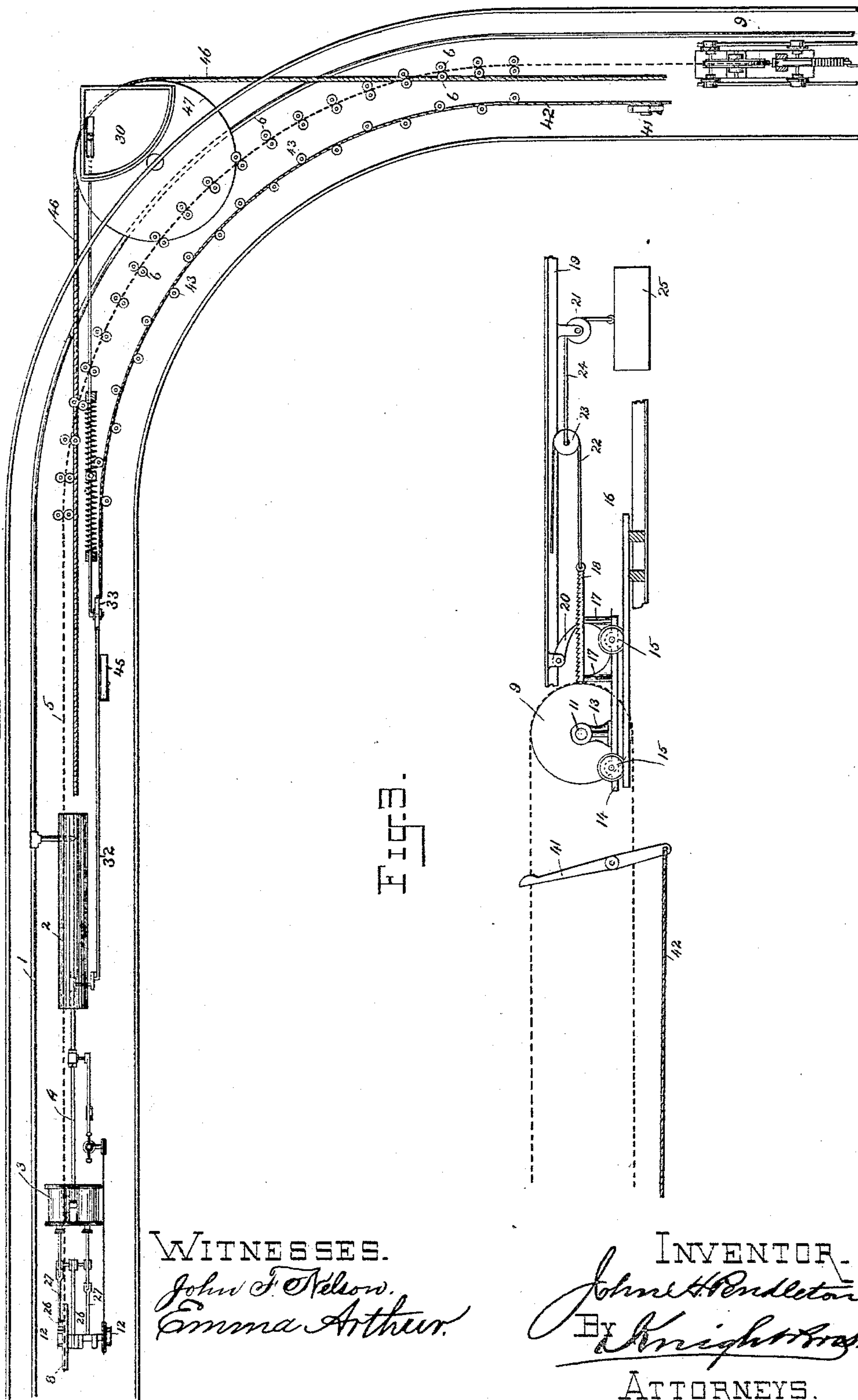
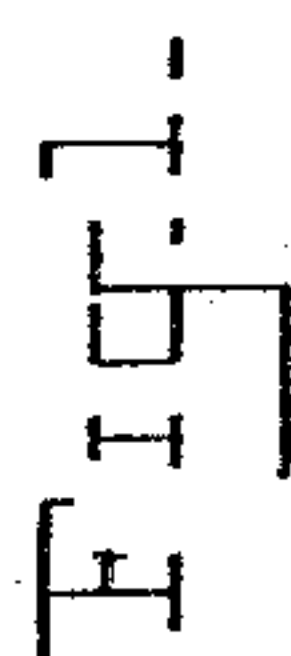


2 Sheets—Sheet 1.

CABLE RAILWAY.

Patented Aug. 14, 1888.



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WITNESSES.

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Emma Arthur.

INVENTOR\_

INVENTOR.  
John H. Pendleton.  
By A. Knight & Co.

ATTORNEYS.

(No Model.)

2 Sheets—Sheet 2.

J. H. PENDLETON.  
CABLE RAILWAY.

No. 387,908.

Patented Aug. 14, 1888.

FIG. 2.

WITNESSES.  
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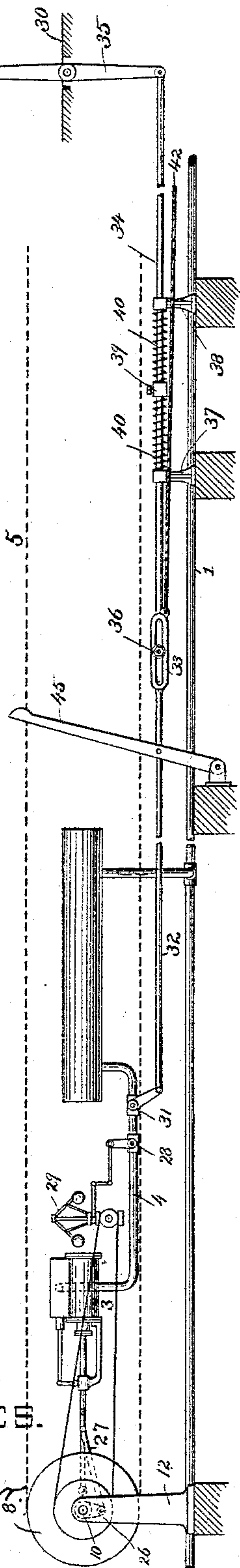


FIG. 5.

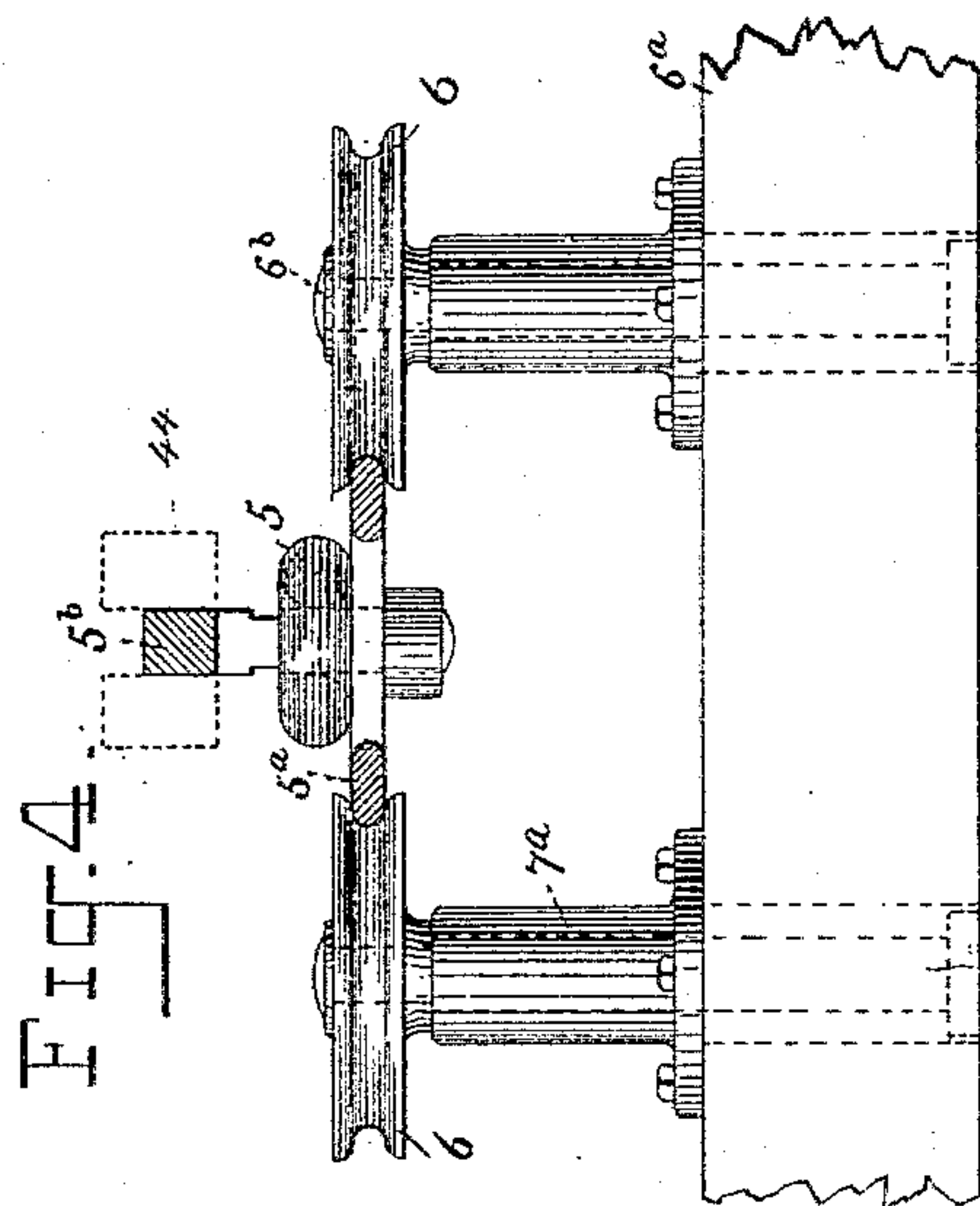


FIG. 4.

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# UNITED STATES PATENT OFFICE.

JOHN H. PENDLETON, OF BROOKLYN, ASSIGNOR TO THE RAPID TRANSIT  
CABLE COMPANY, OF NEW YORK, N. Y.

## CABLE RAILWAY.

SPECIFICATION forming part of Letters Patent No. 387,908, dated August 14, 1888.

Application filed December 19, 1887. Serial No. 258,345. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN H. PENDLETON, a citizen of the United States, residing at Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Cable Railroads, of which the following is a full, clear, and exact specification.

My invention appertains to cable railways; but it relates more particularly to traction devices designed more especially for use at curves on elevated cable railroads for the purpose of conveying the cars around the curves without the employment of the main traction-cable at such junctures. Therefore the object of my invention is to accomplish this end and at the same time prevent a great loss entailed by damage done to the main traction-cable by running the same around a series of small wheels or rollers arranged to conform to the radius of the curve. This old method is especially detrimental to the cable and expensive, for the reason that in an exceedingly short time the small rollers become grooved and their bearings worn to worthlessness, and the cable, sinking itself into these grooves, is continually frayed by their sharp edges, and when the spliced portions reach the rollers they do not fit the grooves like the balance of the cable, but are supported entirely by the ragged edges of the grooves, and thus to these portions particularly great detriment is caused.

My invention consists, essentially, of an auxiliary chain or cable-belt, situated at the curves in the road, with suitable means for operating it, and an arrangement by which the said chain is automatically put in and out of motion by the traveling train or car.

The invention consists, also, of various features of novelty, which will be specifically pointed out in the claims hereto annexed; but first I will describe the invention with reference to the accompanying drawings, which form a part of this application, and in which—

Figure 1 is a plan view of the track at a curve, showing the auxiliary cable employed by a dotted line. Fig. 2 is a side view of the mechanism at one end of the curve, showing a portion of the cable which extends around the curve for automatically operating the device, and also showing the operating-rod ex-

tending to the watchman's box. Fig. 3 is a view showing the balance of the operating-cable and the operating-lever attached thereto, and the form of cable-tightener employed at the other end of the curve, these latter two views being of a single track only. Fig. 4 is a transverse section of the track, showing the manner of guiding the auxiliary chain and the automatic operating-cable around the curve. Fig. 5 is a transverse section of the track employed for guiding the chain at the straight course.

The endless-chain belt employed in this device forms the subject-matter of my application Serial No. 258,350, filed even date herewith, and to which reference may be had for a more detailed description of the same than that given herein; and the manner of arranging it is identical with that shown and described in my application for United States Letters Patent, Serial No. 258,352, filed even date with this, the main difference between the two inventions being that one device is operated by electricity, while the other (the present) is operated by compressed air or other suitable fluid, and consequently their operating mechanisms are widely different.

In this invention I employ a main pipe, 1, which runs from a main plant at the terminus of the road up one track and down the other. This main is suitably supported to the trellis-work of the road and feeds into auxiliary reservoirs 2, which are supported under the tracks near the end of each curve in the road, and from this reservoir the engine 3 is supplied with fluid under pressure through the pipe 4.

The endless chain belt 5, as in my aforesaid applications, has projecting edges 5<sup>a</sup> and a central upwardly-projecting fin, 5<sup>b</sup>, with which a suitable grip engages, is at the curve supported and guided above and below the track by horizontal grooved wheels or rollers 6, arranged in pairs, and at the straight portions at the ends of the curve by grooved track-rails 7, secured to the longitudinal beams 7', and in the grooves of which wheels and track-rails the projecting edges of said chain engage. These horizontal guide-wheels and beams 7' are supported by the cross-ties 6<sup>a</sup>, the wheels being mounted upon vertical spindles 6<sup>b</sup>, which latter are



5 journaled in the journal-boxes 7<sup>a</sup>, mounted upon the cross-ties. The large sprocket-wheels 8 9 at each end of this belt, and over which the belt travels, are mounted on shafts 10 11, which are journaled in standards 12 13. The standard 13 is mounted on a carriage, 14, having wheels 15, and which is itself mounted upon a track, 16. At the rear of this carriage are two upwardly-projecting brackets or standards, 17, and secured horizontally to this is a ratchet-bar, 18. Secured to the under side of the cross-ties directly above and parallel with this ratchet is a rail, 19, which has pivoted at one end a pawl, 20, adapted to engage said ratchet, and at the other is hung a pulley, 21. A cable, 22, is passed around a traveling sheave, 23, and is secured at its ends to the said rail and ratchet-bar, respectively, and secured to the pintle of this sheave is a cable, 24, which passes over the fixed pulley 21 and supports at its other end a weight, 25, which holds the belt normally tight and lodges the pawl in another notch when the slack is taken up.

25 On the shaft 10 are two cranks, 26, which project at an angle of forty-five degrees, or thereabout, from each other for the purpose of obviating dead-centers. These cranks have the piston-rods of the engines connected to them by pitmen 27, in the usual manner, and thus adapt the engine for revolving the sprocket-wheel 8 and causing the chain belt to travel with the car or train secured thereto by a suitable grip, 44.

35 The pipe 4, which feeds to the engines, may be provided with a valve, 28, operated by the governor 29, in order to regulate the speed of the engine while conveying the car around the curves.

40 As before stated, the operation of this device is automatic, as will presently be described in particular; but at the same time it is very desirable that the operation should also be under the immediate control of a watchman or other operator stationed at a point—such as the watchman's box 30—wherefrom a view of the track in both directions is commanded, as it often happens that an accident of some description occurs on or near the curve and necessitates the stopping of the train upon short notice, which could not be done unless some arrangement in addition to the automatic arrangement is employed.

55 The arrangement which places the operation of the device under the control of the watchman may be described as follows:

60 In the pipe 4, which feeds the engine, I locate a valve, 31, which is provided with an operating crank-arm, to which I attach a push-rod, 32, which is provided with a link or slotted end, 33.

65 34 is a push-rod, which extends to the watchman's box 30, and is there provided with an operating-lever, 35. At the other end of this rod is a stud or lug, 36, which fits in the link 33, and which latter is adapted to slide to and fro therein. The rod 34 passes through two

standards, 37 38, and bears midway between these standards a lug, 39, at each side of which, coiled on the rod, is a spiral spring, 40, which springs bear equally against the lug 39, and thus hold the push-rod 34 in a normal position with the lug or stud 36, midway between the ends of the slot or link 33. It will be seen that by the employment of this link 33 the rod 34 is allowed a little lost motion when operated in either direction, the object of which will now be explained in connection with the mechanism for operating the device automatically. The said mechanism consists of an upwardly-projecting lever, 41, which is located at the end of the curve from which the car approaches, and is provided at its upper end with a cam or bent portion, as shown, with which any suitable projection from the car engages and oscillates the lever forward, carrying with it a cable, 42, which is attached to its lower end and supported around the curve between grooved wheels 43. This cable is attached at its other end to the link 33, as shown, and consequently pulls upon the rod 32 and opens the valve 31 in the pipe which feeds the engine, and causes the endless belt to travel over its sprocket-wheels; with the car securely fastened thereto by the suitable grip 44. Now, when the car reaches the end of the chain belt, the same projection aforesaid comes into contact with another upwardly-projecting lever, 45, which has the rod 32 pivoted thereto above its fulcrum, and closes the valve 31, and at the same time sets the lever 41 up in its normal position; but this action does not impart any motion whatever to the rod 34. The link slides harmlessly over the stud on the end of said rod, and the operating-lever 35 in the watchman's box is not caused to oscillate violently and endanger the watchman's safety.

The main traction-cable 46 goes straight forward at the curve and passes around a large pulley, 47, provided with a groove for the cable.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. In a railway, the combination, with the auxiliary traction device located at the curves, and the engine having a throttle-valve for operating said device, of an upwardly-projecting lever pivoted near one end of the curve, and a cable connecting said lever with said throttle-valve, whereby the latter may be operated, substantially as set forth.

2. The combination, with the endless traction-belt located at a curve, and a suitable engine provided with a throttle-valve and adapted to impart motion to said belt, of two upwardly-projecting levers, one pivoted near each end of the curve, a cable connected to one of said levers below its fulcrum and to the other above its fulcrum, and a rod connecting the latter lever with said throttle-valve, substantially as and for the purposes set forth.

3. In a railway, the combination, with a sprocket-wheel located at each end of a curve,



a chain belt on said wheels, and an engine provided with a throttle-valve and adapted to impart motion to one of said wheels, of two levers, 41 45, one near each end of said curve, 5 a cable secured at one end to the former lever below the fulcrum, a link to which the other end of said cable is attached, and a rod pivoted to the throttle-valve and to lever 45 above its fulcrum, and attached to said link and the rod 10 34, having its end secured in said link, substantially as set forth.

4. The combination, with the valve 31 in the feed-pipe, of the push-rod 32, adapted to operate said valve, a link or slot in said rod, 15 a stud adapted to slide in said link, a rod secured to said stud, a lug on said rod, and two springs bearing equally against both sides of said lug, whereby the stud is held normally in the center of said link or slot, substantially 20 as set forth.

5. The combination, with the sprocket-wheels 8 9, arranged one at each end of the curve with their axes horizontal, of a chain belt adapted to travel over said wheels and 25 having projecting edges, wheels arranged around the curve and having grooves for the

reception of said edges, an upwardly-projecting fin on said chain for the attachment of a grip, and a suitable engine for imparting motion to said sprocket-wheels, substantially as 30 set forth.

6. The combination, with the cross-ties and the chain 5, having projecting edges, of journal-boxes mounted on said cross-ties, vertical spindles in said boxes, and pulleys or rollers 35 mounted on said spindles and having grooved peripheries for the reception of the projecting edges of said chain, substantially as set forth.

7. In a railway, the combination, with the engine and a reservoir for containing fluid under pressure, of a feed-pipe extending from 40 said reservoir to the engine, a valve in said pipe, two levers, 41 45, pivoted below and extending above the track, a cable attached to the lever 41 below its fulcrum and connected 45 with the lever 45 above its fulcrum, and a rod pivoted to the latter lever and to said crank-valve, substantially as set forth.

J. H. PENDLETON.

Witnesses:

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F. A. HOPKINS.