

B. C. BALL.
LOCOMOTIVE.

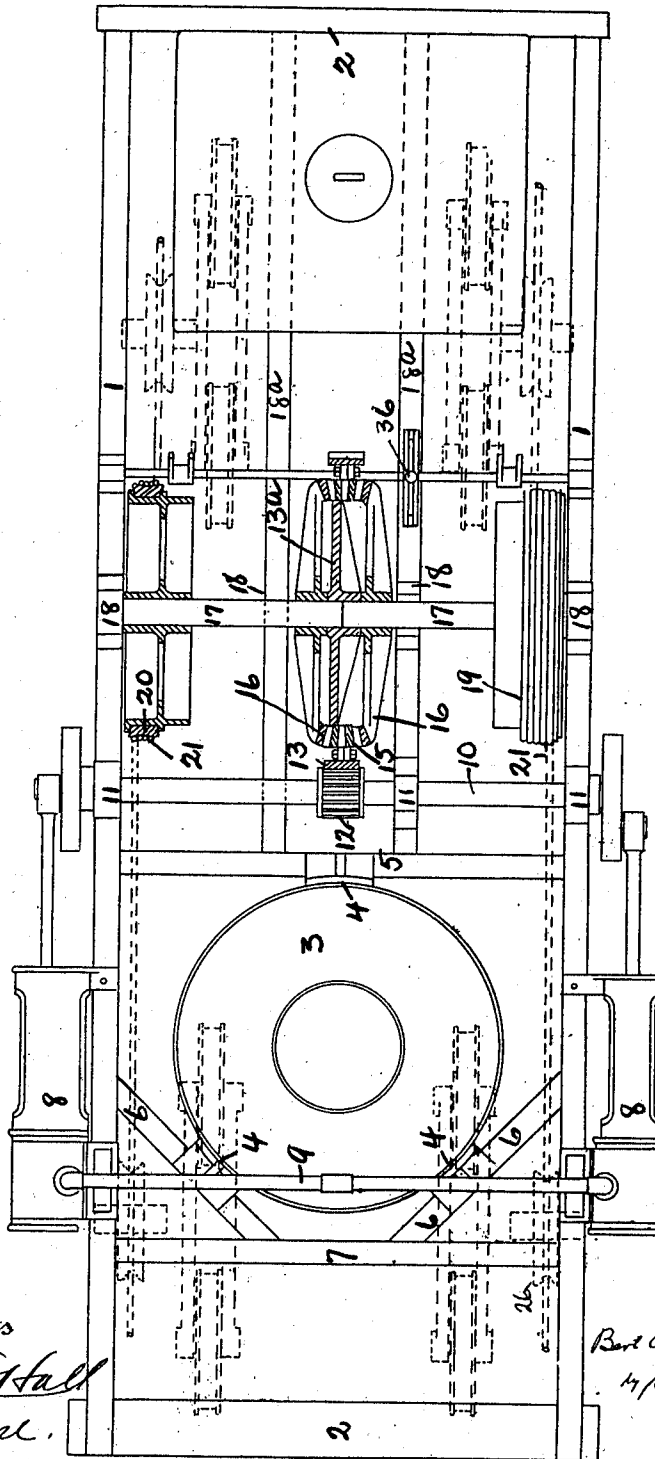
APPLICATION FILED NOV. 30, 1908.

974,459.

Patented Nov. 1, 1910.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses

Geo. F. Hall
R. R. Kane

Inventor
Bert Charles Ball
17/82 & mod.

Attorney

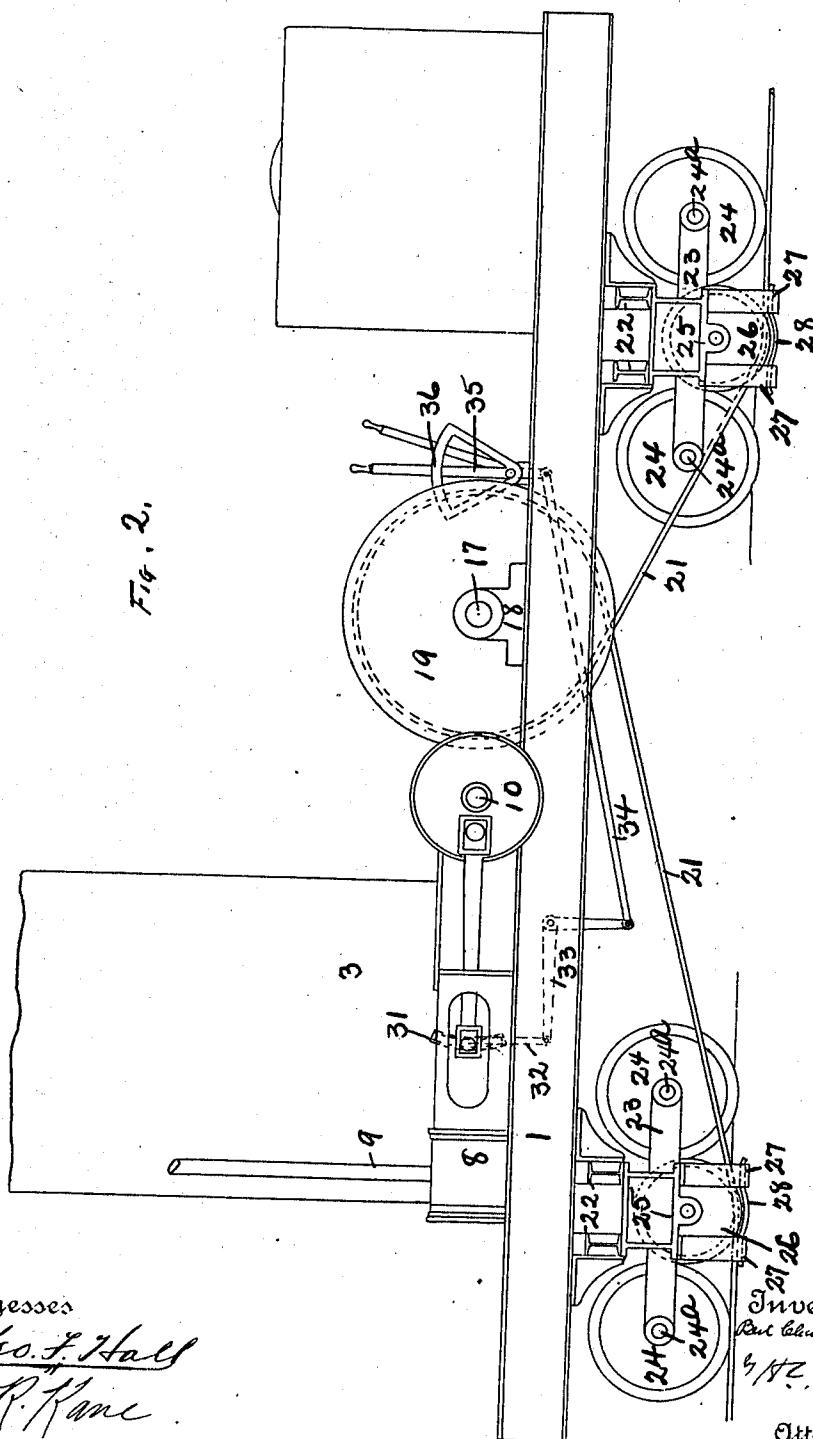
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3 SHEETS-SHEET 2.

Fig. 2.



Witnesses

Geo. F. Hall
R. R. Kane

Inventor
B. C. Ball
By *H. Z. Ford*

Attorney

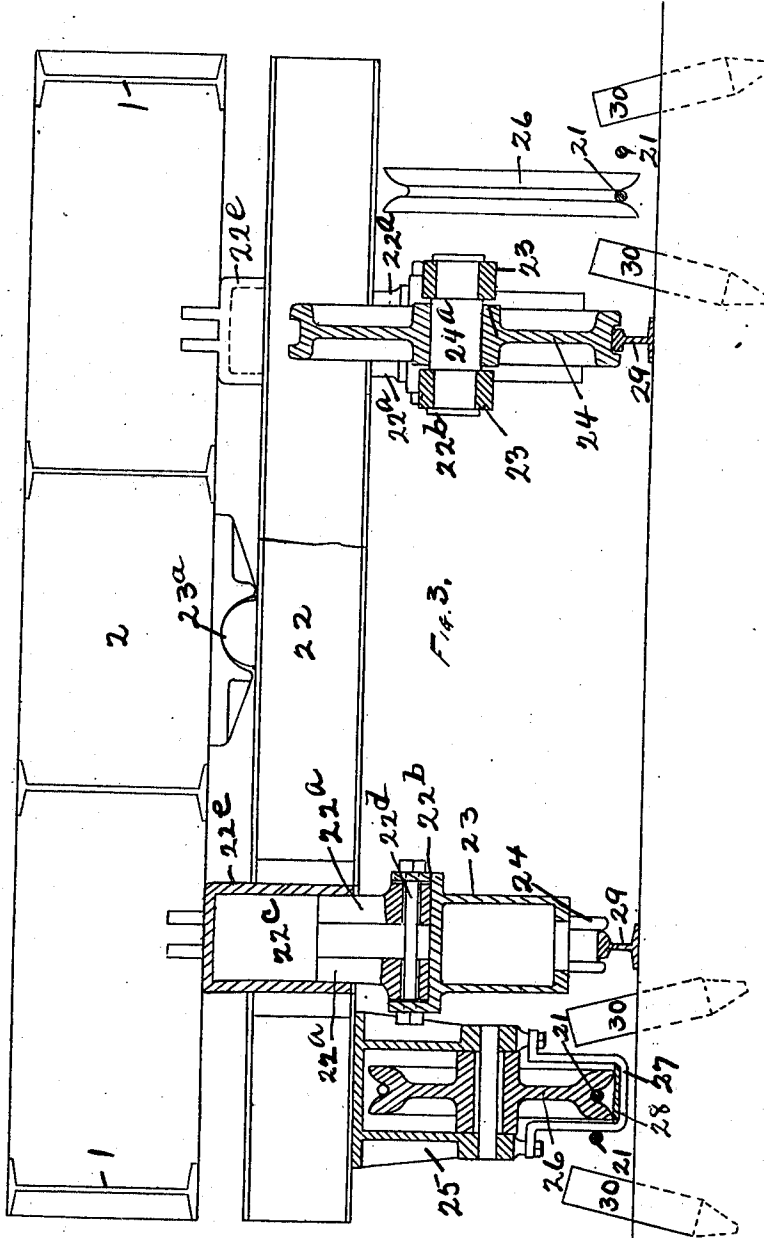
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Geo. F. Hall
K. R. Kane

Inventor

Bert C. Ball
by W. L. L.

Attorney

UNITED STATES PATENT OFFICE.

BERT CHARLES BALL, OF PORTLAND, OREGON.

LOCOMOTIVE.

974,459.

Specification of Letters Patent.

Patented Nov. 1, 1910.

Application filed November 30, 1908. Serial No. 465,019.

To all whom it may concern:

Be it known that I, BERT CHARLES BALL, a citizen of the United States, residing at Portland, in the county of Multnomah and State of Oregon, have invented new and useful Improvements in Locomotives, of which the following is a specification.

This invention relates to locomotives, and consists in certain improvements in the construction thereof as will be hereinafter fully described and pointed out in the claims.

More particularly the invention relates to a locomotive which is arranged to pick up a cable extending along the track, and to derive its motion from the pull on the cable rather than by traction. In this way the locomotive may be operated upon grades which should be impractical for a locomotive of the traction type.

In the preferred form of locomotives, I utilize two cables one at each side of the locomotive and each led over a bull wheel, the bull wheels being arranged on shafts in alinement and driven through a differential gear. In this preferred form, the apparatus is adapted to operate upon a cable that is drawn taut, and extends from a locomotive both front and rear, the locomotive picking up the cable as it passes. In this way, locomotive if provided with a reversing gear may be driven in either direction without any rearrangement of the cable.

The invention is illustrated in the accompanying drawings as follows:

Figure 1 shows a plan view of the locomotive, the differential gear and bull wheels of the locomotive being in section. Fig. 2 a side elevation of the locomotive, and Fig. 3 is an end view of the locomotive partly in section, the section at the left of the figure being through the center of the truck; the section at the right of the figure being on the center of the truck wheel.

1 marks the sides of the engine frame; 2 the ends connecting the side frames.

The boiler 3 is mounted on the brackets 4. One of these brackets is supported by a cross beam 5, and two of these brackets are supported by the angular beams 6—6 extending from the side frame 1—1 to a cross beam 7. The engines 8 are arranged on the side frames 1. Preferably there are two cylinders, one cylinder being arranged at each side of the locomotive. Each is connected with the boiler by the pipe 9, and with a driving shaft 10. The shaft 10 extends

across the locomotive from side to side, and is mounted in the bearings 11—11—11.

A spur gear 12 is fixed on the shaft 10 between its ends, preferably about in the middle of the locomotive. This meshes the gear 13, the said gear being carried by a web 13^a journaled on the ends of the shafts 17. Small pinions 16 are mounted on the web 13^a and mesh the beveled gears 16. The beveled gears 16 are fixed on the shafts 17, thus forming what is ordinarily known as a differential gear.

The shafts 17 are mounted in the bearings 18, two of these bearings being on the side frames. Bull wheels 19 are fixed on the shafts 17, one at each side of the locomotive. These bull wheels have the ordinary grooves 20 around which the cable 21 may be wrapped. Ordinarily the cable is wrapped around the bull wheels several times so as to assure an effective grip on the wheel.

The track bolster 22 is secured to the locomotive frame by a bolster joint 23^a. The trucks have the side frames 23 in which the wheels 24 are journaled by means of the axles 24^a. The side frames 23 extending each side of the wheels. The frames 23 have pockets 22^b, the bottoms of which are cylindrically shaped. The posts 22^c have ends 22^a resting in these pockets. The bolts 22^d hold the posts in place. The posts 22^c are swiveled in bearings 22^e secured to the bolsters 22.

A hanger 25 is secured to the end of the bolster outside of the frames, and the guide wheels 26 are journaled in this hanger. Straps 27 extend over the guide wheels, and preferably have the plates 28 arranged in close proximity with the edge of the guide wheels to prevent the cable 21 from leaving the guide wheels. These guide wheels are arranged slightly out of alinement front and rear, so as to properly lead the cable to and from the bull wheels, the position of cables passing to and from the locomotive being shown in Fig. 3.

The cables are preferably drawn taut along the sides of the rails 29, and are maintained in position by stakes 20 driven along the track, so as to take care of the cable at curves. The guide wheels pass between these stakes, pick up the cable, and deliver it again, so that the cable at all times remains in position to be picked up by the guide wheels.

I prefer to use a reversing motor, and

the use of taut cables leading to the front and rear of the locomotive makes this particularly desirable, in that the locomotive may be driven forward or back through its engagement with the cable. To accomplish this purpose, I provide the engine with the ordinary reversing link 31 which is connected through the link 32, bell crank 33 and link 34 with the operating lever 35. The lever 35 is arranged to operate upon the segment 36 in the well known manner; and the reversing link operates upon the engines in the well known manner for accomplishing the reversing movement.

15 What I claim as new is:

1. In a locomotive, the combination of a frame; a motor mounted on the frame; a bull wheel driven by the motor and mounted on the frame; a stationary taut cable extending to the front and rear of the locomotive and wrapped with a complete turn directly around the bull wheel; guides for maintaining the cable in the path of the locomotive; and guides on the locomotive acting upon the cable for taking the cable from and delivering the cable to the cable guides.

2. In a locomotive, the combination of a frame; devices at each side of the locomotive for operating upon a stationary cable extending to the front and rear of the locomotive for driving the locomotive; and means on the locomotive for actuating said devices.

3. In a locomotive, the combination of a frame; devices comprising a bull wheel upon which a cable may run with a complete turn directly around said wheel at each side of the locomotive for operating upon a taut stationary cable extending to the front and rear of the locomotive; and means on the locomotive for actuating said devices.

4. In a locomotive, the combination of a frame; devices comprising a bull wheel at each side of the locomotive over which a stationary cable extending to the front and rear of the locomotive may run with a complete turn directly around said wheel; and means on the locomotive for actuating said devices.

5. In a locomotive, the combination of a frame; wheels at each side of the frame over which a stationary cable may run for actuating the locomotive; and means on the locomotive for driving said wheels comprising a differential gear.

55 6. In a locomotive, the combination of a frame; a taut cable extending at each side of the locomotive to the front and rear; guides for each of said cables; and devices on the locomotive for picking up said cables

from said guides, acting upon the cables, and delivering them to the cable guides.

7. In a locomotive, the combination of a frame; a taut cable extending at each side of the locomotive to the front and rear; guides for each of said cables; and devices on the locomotive for picking up said cables from said guides, acting upon the cables, and delivering them to the cable guides, comprising driving wheels over which the cable runs; and guide wheels to guide the cable to and from the driving wheels and from and to the cable guides.

8. In a locomotive, the combination of a frame; bull wheels mounted at each side of the frame; taut cables extending to the front and rear of the locomotive at each side, said cables being wrapped with a complete turn directly around said bull wheels; cable guides for maintaining said cables in the path of the locomotive; and guide wheels mounted with relation to the bull wheels for guiding the cable to and from the bull wheels and from and to the cable guides.

9. In a locomotive, the combination of a frame; a motor mounted on the frame; bull wheels at each side of the frame; means comprising a differential for transmitting the motion of the motor to the bull wheels; taut cables wrapped with complete turns directly around the bull wheels; and guides for maintaining the cable in the path of the locomotive.

10. In a locomotive, the combination of a frame; trucks upon which the frame is mounted, comprising a truck bolster; supporting wheels to the front and rear of said bolster; a drive wheel mounted on the frame between the trucks adapted to operate upon a cable at the side of the locomotive; and guide wheels mounted on the bolster and between the truck wheels for guiding a cable to and from the drive wheel.

11. In a locomotive, the combination of a frame; a drive wheel mounted on the frame, adapted to operate upon a cable for actuating the locomotive; and guide wheels for guiding the cable to and from the guide wheel, said driving wheel being provided with means for preventing disengagement of the cable from the wheel.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

BERT CHARLES BALL.

Witnesses:

FRED. A. BALLIN,
JOHN F. BLAIN.