Jan. 8, 1935. J. GUTHRIE 1,987,104

TRAMRAIL TRACTOR

Filed April 30, 1932

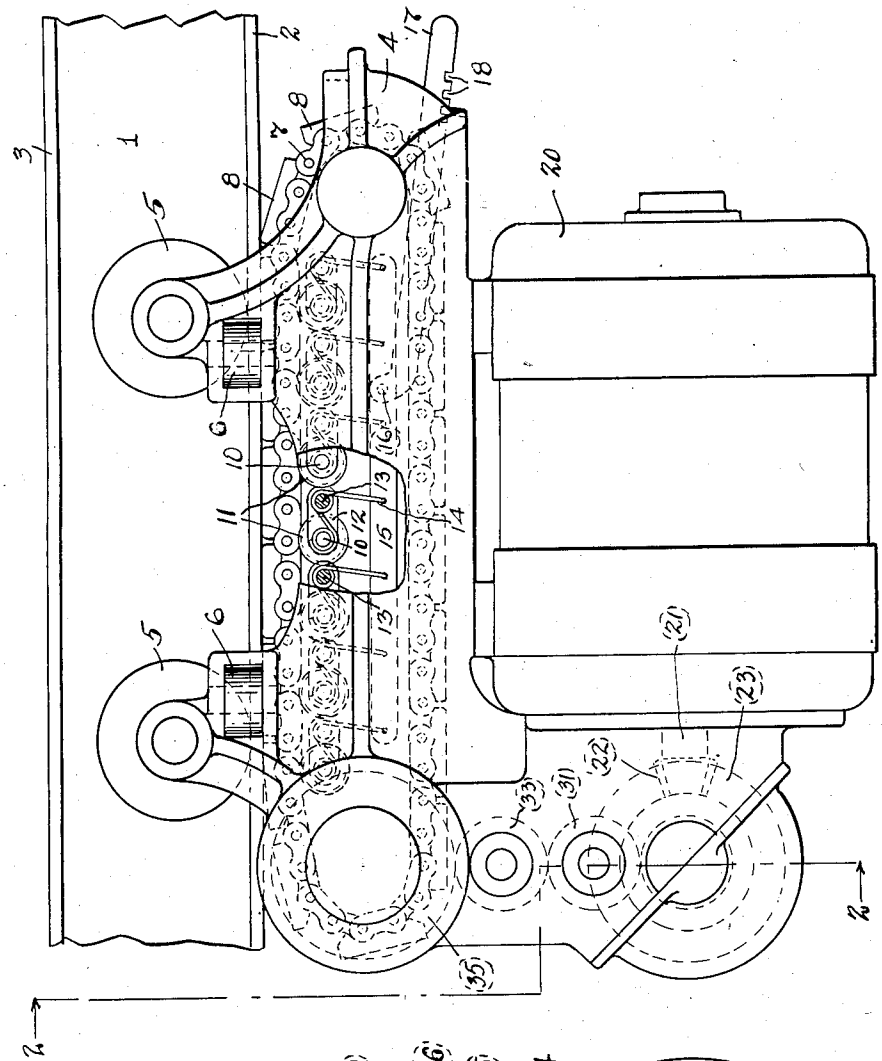


Fig. 1.

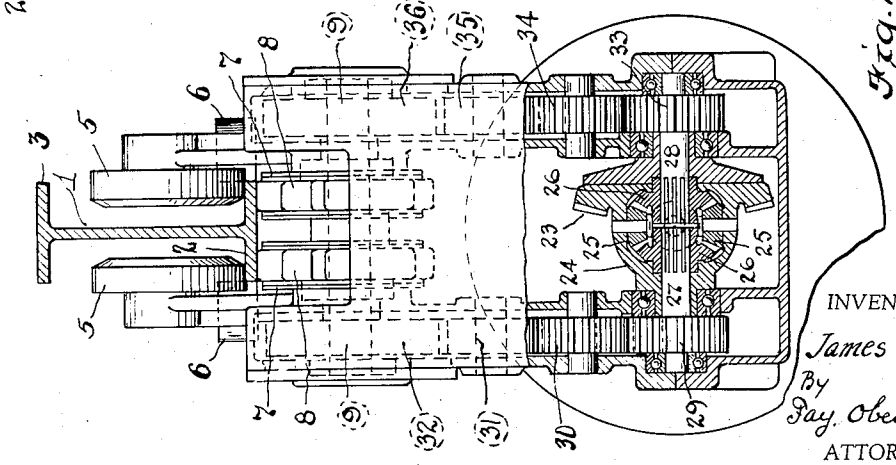


Fig. 2.

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TRAMRAIL TRACTOR

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12 Claims. (Cl. 105—30)

The present invention relates to self-propelled vehicles for conveying systems, and more particularly for overhead or monorail conveying systems. In my copending application Serial No. 598,008, filed March 10, 1932 for Monorail systems, I have described and set forth the construction of one type of endless tractor adapted for use with a monorail conveyor. The present invention embodies certain novel improvements over the subject matter of said application, the most important of which is the provision of endless tracks positioned so as to engage with the bottom of the flange of the monorail. The advantages of such positioning of the tracks are to be found in the fact that first, there is presented a smooth uniform traction surface free from rivet and bolt heads which are most likely to damage or jamb the tracks; second, inasmuch as the under side of the rail is usually the cleanest and free from dirt and grease, there results an increased efficiency of frictional engaging surface; and, third, a substantially uniform tractional engagement is insured at all times when the tractor is traversing both straight and curved sections of the rail. Another advantage of the present novel construction resides in the fact that it is possible to use a conveyor rail having a smaller width web. Objects and advantages additional to those enumerated shall become apparent as the following description proceeds. To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawing and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawing:

Fig. 1 is a side elevational view of a tram rail tractor constructed according to the principles of my invention; and Fig. 2 is an end view of Fig. 1, partly in section, and taken substantially upon the line 2—2 thereof.

Referring now more particularly to the drawing, I have shown an overhead conveying rail which may be in the form of an I-beam having the web 1 and flanges 2 and 3. This overhead rail may also be in the form of an inverted T-beam having a smaller width web section. The tractor which is adapted to traverse the monorail is composed of a frame indicated generally by the numeral 4. The frame carries a number of wheels 5, which, in the present case, are four in number and are adapted to ride upon the upper side of the lower flange 2. Likewise, a plurality of rollers 6 are also carried by the frame at points adjacent the wheels 5 and provide means for lateral bearing points along the edges of the flange 2. A pair of endless chains 7 are mounted longitudinally of the frame 4 and carry a plurality of rectangular rubber feet or pads 8 which are adapted to have frictional engagement with the under side of the flange 2. These chains are carried at each end by suitable sprocket wheels, which, in the present case, have not been illustrated in order to avoid confusion. These sprockets, in turn, are adapted to rotate upon suitable shafts journaled in the frame 4, such as the shafts 9 shown in Fig. 2.

The intermediate run of the top side of the endless chain 7 is supported upon a plurality of small transverse shafts 10 and pulleys 11 which, in turn, are movably supported by the link arms 12. The other end of the link arms 12 are secured to the fixed shafts 13. A length of spring wires 14 attached at one end to the shafts 10 is coiled about the fixed shafts 13 and has its other end secured to the common connecting bar 15. The connecting bar 15 is, in turn, connected by means of the pivot pin 16 to the control arm 17 which extends through one end of the frame 4. A plurality of serrations 18 which are adapted to register with a suitable projection in the frame provide means for adjustably maintaining the position of the control bar 17. It will thus be seen that by virtue of regulating the position of the control bar 17 and correspondingly of the connecting bar 15, it will be in position to accordingly regulate the amount of resilient force tending to urge the intermediate run of the tracks 7 into engagement with the under side of the flange 2.

The driving means for the tractor consists of an electric motor 20 which may derive its current from a suitable trolley system (not shown). The motor 20 is directly connected to the motor shaft 21 and small main pinion 22. The pinion 22, in turn, meshes with the large ring gear 23 mounted upon the differential housing 24. A pair of small pinion gears 25 carried by stub shafts in the differential housing in turn mesh with the differential ring gears 26—26. One of the ring gears 26 is splined to the shaft 27, and the other to the shaft 28. The shafts 27 and 28 are suitably journaled in roller bearings mounted in the housing of the tractor. The shaft 27 carries the gear 29 which is connected to the

large endless chain drive gear 32 by means of the gear train composed of the gears 30 and 31. Similarly, the shaft 28 which carries the gear 33 is connected through the gear train composed of the gears 34 and 35 to the other large endless chain drive gear 36. The drive gears 32 and 36 are secured to the sprockets which carry the endless chains 7—7, but are independently movable in respect to each other. It will thus be seen that the last described mechanism provides a differential drive for each of the endless tractor chains, so that undue wear will not occur when the tractor is traveling over a curved section of rail.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:

1. A tractor for monorails and the like, comprising the combination of a frame, means for supporting said frame on said monorail, a driving motor carried by said frame, and an endless track connected to said motor and adapted to engage with the flange portion of said monorail, the plane of the path of travel of said track being normal to the surface of said flange.

2. A tractor for monorails and the like, comprising the combination of a frame, means for supporting said frame on said monorail, a driving motor carried by said frame, and an endless track connected to said motor and adapted to engage with the under side of the flange portion of said monorail.

3. A tractor for monorails and the like, comprising the combination of a frame, means for supporting said frame on said monorail, a driving motor carried by said frame, an endless track connected to said motor, and a plurality of resilient pads secured to said track and extending outwardly therefrom, said pads being adapted to make frictional engagement with the flange portion of said monorail, the plane of the path of travel of said track being normal to the surface of said flange.

4. A tractor for monorails and the like, comprising the combination of a frame, means for supporting said frame on said monorail, a driving motor carried by said frame, an endless track connected to said motor, and a plurality of resilient pads secured to said track and extending outwardly therefrom, said pads being adapted to make frictional engagement with the under side of the flange portion of said monorail.

5. A tractor for monorails and the like, comprising the combination of a frame, means for supporting said frame on said monorail, a driving motor carried by said frame, a pair of endless tracks adapted to engage with the flange portion of said monorail, the plane of the path of travel of said track being normal to the surface of said flange and a differential driving connection between said tracks and said motor.

6. A tractor for monorails and the like, comprising the combination of a frame, means for supporting said frame on said monorail, a driving motor carried by said frame, a pair of endless tracks adapted to engage with the underside of the flange portion of said monorail and a differential driving connection between said tracks and said motor.

7. A tractor for monorails and the like, comprising the combination of a frame, means for supporting said frame on said monorail, a driving motor carried by said frame, a pair of endless tracks adapted to engage with the flange portion of said monorail, a differential driving connection between said tracks and said motor, and resilient means for supporting and urging the intermediate run of said tracks against said flange.

8. A tractor for monorails and the like, comprising the combination of a frame, means for supporting said frame on said monorail, a driving motor carried by said frame, a pair of endless tracks adapted to engage with the flange portion of said monorail, a differential driving connection between said tracks and said motor, resilient means for supporting and urging the intermediate run of said tracks against said flange, and means for variably adjusting the degree of resiliency of said track-supporting means.

9. In a tractor for monorails and the like, tractional engagement means for driving said tractor comprising an endless track adapted to engage with the flange of said monorail and to travel in a plane normal to the surface of said flange, and supporting means for said tractor mounted in opposed relationship to said track.

10. In a tractor for monorails and the like, the combination of tractional engagement means for driving said tractor comprising an endless track adapted to engage the under side of the flange of said monorail and wheels for supporting said tractor and contacting with the upper side of said flange.

11. A tractor for monorails and the like, comprising the combination of a frame, means for supporting said frame on said monorail, a driving motor carried by said frame, an endless track connected to said motor and adapted to engage with the flange portion of said monorail, and resilient means urging the intermediate run of said track against said flange.

12. A tractor for monorails and the like, comprising the combination of a frame, means for supporting said frame on said monorail, a driving motor carried by said frame, an endless track connected to said motor and adapted to engage with the flange portion of said monorail, the plane of the path of travel of said track being normal to the surface of said flange, and resilient means urging the intermediate run of said track against said flange.

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