PATENT SPECIFICATION

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429,193

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PROVISIONAL SPECIFICATION

Improvements in Railway Motor Wagons

I, GEORGE CONSTANTINESCO, British subject, of Oxen House, Torver, Coniston, Lancashire, do hereby declare the nature of this invention to be as follows:—

The present invention relates to a new method and means for propelling railway motor wagons, locomotives and like vehicles driven by internal combustion engines, steam or electric motors.

In my specification No. 415,808, I have described a method and means to drive such vehicles by using an auxiliary axle carrying rubber tyred wheels in contact with the rails or in contact with the steel tyres of the supporting wheels of the vehicle for the purpose of propelling the vehicle.

The present invention consists in employing an auxiliary driving axle carrying one or more wheels provided with tyres of rubber or other suitable material and means for forcing them into contact with drums attached to one or more of the supporting wheels of the vehicle.

The invention further consists in varying the pressure of contact between the rubber tyred wheels and the drums to suit varying conditions of grip and load to be overcome in such a way that the drive occurs always with approximately the minimum of pressure between the surfaces in contact.

The invention further consists in controlling the pressure of contact by devices operated by the relative slip between the surfaces in contact by using either hand controlled or automatically controlled apparatus as described in my former specifications previously referred to. For such purpose the differential operating devices described will be operated respectively by the rubber tyred wheel and by the steel tyred wheel or axle which is driven by the drum in contact with the rubber tyred wheel.

Instead of rubber tyred driving wheels other high friction and resilient fabrics may be used.

Preferably the auxiliary axle is located in the vertical plan passing through the axle which connects the supporting steel tyred wheels of the vehicle and carries the driven drums.

In a modification I drive two adjacent supporting axles of the vehicle by an auxiliary axle located in a vertical plane midway between the adjacent supporting axles in such manner that one rubber tyred wheel is in contact with two drums one on each supporting axle. In this case the bearing boxes of the adjacent supporting axles are connected with tie rods which take the horizontal thrust produced by the pressures of contact; alternatively such boxes may be guided in vertical guides which take the horizontal thrust. The driven drums may be provided with internally expanding brakes.

In order to keep the drums free from moisture which might reduce the coefficient of friction, they may be cleaned by wipers, or dried by a blast of exhaust gases, compressed air or flame projection directed on to the contacting surface. Such drums can also be protected from snow or rain by suitably arranged shields supported preferably from the frame holding the auxiliary axle.

It will be seen that this invention provides for the effective drive of a railway vehicle by the use of wheels having tyres of rubber or other suitable material subjected to moderate pressures and protected from shocks due to the passage of the vehicle over crossings and rail joints, and at the same time avoids the slipping of the said rubber tyre when the rails are wet, greasy or icebound. This increases to a great extent the usefulness of the auxiliary axle for propelling much heavier railcars than would be practicable if the rubber tyred wheels were in direct contact with the rails.

All the advantages of well cushioned transmission organs are retained, with the advantage of being able to use much wider surfaces of contact as the width of the drums can be made as large as desired. In order to reduce the inertia effects due to the mass of the drums, these drums are preferably made of light steel pressings bolted directly on the innerside of the steel tyred supporting wheels. The drums can be fitted outside the steel tyred wheels, in

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such case the bearing boxes being on the inside as in locomotive practice.

It is obvious that the auxiliary axle need not be provided with a differential as in the majority of cases the supporting wheels of railway vehicles are rigidly fixed on their axles. In lieu of a differential on the auxiliary axle I may use a reversing gear of the bevel type in its place.

In order to reduce to a minimum the wear of the rubber tyres I may arrange the loading device which provides the pressure of contact in such a way as to move completely out of contact the driving surfaces when the driving engine is shut off or reduced to idling speed.

In this way the vehicle will be free-wheeling and the whole driving mechanism will not be driven round by the movement of the vehicle.

The compressed air method of loading the auxiliary axle mentioned in my specification previously referred to is preferably employed in the case of railway vehicles as it dispenses with the use of any other form of springs between the frame supporting auxiliary axle and the vehicle frame.

It is sufficient if one member, say the piston of the loading device, impinges on the vehicle frame and the other member, the cylinder, impinges on the auxiliary axle frame, the compressed air between piston and cylinder taking up all the relative vertical movements which take place between the vehicle frame and the supporting axle which carries the steel tyred wheels.

In order to increase the grip between the rubber tyred wheels and the driving drums I may arrange two rubber tyred wheels to contact with one single drum.

In a modification, one or more pairs of steel tyred wheels on the same side of the vehicle are provided with sprocket wheels or drums over which wide chains or belts are slackly mounted and wheels having tyres of rubber or other suitable material are pressed into driving contact with the said chains or belts.

Dated the 27th day of November, 1933.

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COMPLETE SPECIFICATION

Improvements in Railway Motor Wagons

I, GEORGE CONSTANTINESCO, British subject, of Oxen House, Torver, Coniston, Lancashire, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The present invention relates to a new method and means for propelling railway motor wagons, locomotives and like vehicles driven by internal combustion engines, steam or electric motors, such for example as road vehicles, agricultural tractors and the like.

In my specification No. 415,808 I have described a method and means to drive such vehicles by using an auxiliary axle carrying rubber tyred wheels in contact with the rails or in contact with the steel tyres of the supporting wheels of the vehicle for the purpose of propelling the vehicle.

The present invention consists in employing one or more auxiliary driving axles carrying one or more wheels provided with tyres of rubber or other suitable material, means for forcing them into contact with drums attached to one or more of the supporting wheels of the vehicle, and means controlled by the slip of one of the wheels for automatically varying the pressure of contact between the rubber tyred wheels and the drums to suit varying conditions of grip and load to be overcome in such a way that the drive occurs always with approximately the minimum of pressure between the surfaces in contact.

The invention further consists in controlling the pressure of contact by devices operated by the relative slip between the surfaces in contact by automatically controlled apparatus as described in my former specification previously referred to. For such purpose the differential operacting devices described will be operated respectively by the rubber tyred wheel and by the steel tyred wheel or axle which is driven by the drum in contact with the rubber tyred wheel.

Instead of rubber tyred driving wheels other high friction and resilient fabrics may be used.

The invention is illustrated diagrammatically in the accompanying drawing in which:—

Figure 1 is a side elevation;

Figure 2 a rear elevation of the arrangement shown in Figure 1;

Figure 3 a detail view of a modification of part of the arrangement shown in Figures 1 and 2 and to a larger scale;

Figure 4 is a diagrammatic side elevation of a modified form of the arrangement shown in Figures 1 and 2; whilst,

Figure 5 is a detail view of a further modification.

Referring to the arrangement shown in Figures 1 and 2, 1 represents the main frame of the vehicle from which is suspended in the usual manner an axle 2 to which are fixed the usual supporting wheels 3 of the vehicle. Pivotally mounted as at 4 on the main frame 1 is a unit 5 which comprises an engine 6 and an auxiliary driving axle 7 carrying wheels 8 provided with tyres of rubber or other suitable material. The unit 5 is provided with rearwardly extending portions 9 having a pin 10 to which is connected a piston rod 11 of a piston 12 working within a cylinder 13. The cylinder 13 is mounted upon a cross member 14 of the main frame 1.

Attached to the supporting wheels 3 of the vehicle are drums 15 into contact with which the wheels 8 are adapted to be brought automatically by varying the pressure of fluid supplied to the piston 12, in order to drive the vehicle.

The pressure of contact between the wheels 8 and the drums 15 can be controlled by devices operated by the relative slip between the surfaces in contact by using differential operating devices such as described in my former specification referred to above, in which case the differential devices will be operated respectively by the rubber tyred wheels 8 and by the steel tyred wheels 3 or axle 2 which is driven by the drums 15.

In order to keep the drums free from moisture which might reduce the co-efficient of friction, they may be cleaned by wipers, or dried by a blast of exhaust gases, compressed air or flame projection directed on to the contacting surface. Such drums can also be protected from snow or rain by suitably arranged shields supported preferably from the frame holding the auxiliary axle.

It will be seen that this invention provides for the effective drive of a railway vehicle by the use of wheels having tyres of rubber or other suitable material subjected to moderate pressures and protected from shocks due to the passage of the vehicle over crossings and rail joints, and at the same time avoids the slipping of the said rubber tyres when the rails are wet, greasy or icebound. This increases to a great extent the usefulness of the auxiliary axle for propelling much heavier railcars than would be practicable if the rubber tyred wheels were in direct contact with the rails.

All the advantages of well cushioned transmission organs are retained, with the advantage of being able to use much wider surfaces of contact as the width of the drums can be made as large as desired. In order to reduce the inertia effects due to the mass of the drums, these drums are preferably made of light steel pressings bolted directly on the innerside of the steel tyred supporting wheels. The drums can be fitted outside the steel tyred wheels, in such case the bearing boxes being on the inside as in locomotive practice.

It is obvious that the auxiliary axle need not be provided with a differential as in the majority of cases the supporting wheels of railway vehicles are rigidly fixed on their axles. In lieu of a differential on the auxiliary axle I may use a reversing gear of the bevel type in its place.

In order to reduce to a minimum the wear of the rubber tyres I may employ a double acting piston such as shown in Figure 3 so that the driving wheels 8 may be moved completely out of contact with the drums 15 when the engine is shut off or reduced to idling speed. In this way the vehicle will be free-wheeling and the whole driving mechanism will not be driven round by the movement of the vehicle.

The compressed air method of loading the auxiliary axle mentioned in my specification previously referred to is preferably employed in the case of railway vehicles as it dispenses with the use of any other form of springs between the frame supporting the auxiliary axle and the vehicle frame.

As will be seen in Figures 1 and 2, the piston 12 in this case acts upon the auxiliary axle frame, that is to say, the rearwardly extending portion 9, whilst the cylinder 13 is carried by the vehicle frame 1, the compressed air between the piston and the cylinder taking up all the relative vertical movements which take place between the vehicle frame 1 and the supporting axle 2 which carries the steel tyred wheels 3.

In order to increase the grip between the rubber tyred wheels 8 and the driving drums 15 I may employ the arrangement shown in Figure 4. In this arrangement the piston rod 11 is, as before, connected to the rearwardly extending portion 9 which carries two gear boxes 16 driven through transmission 17 from the engine 6, the gear boxes 16 each driving an auxiliary axle 18 on which rubber tyred wheels 19 are mounted so that two rubber

tyred wheels 19 are provided to contact with each single driving drum 15. The unit 5 is pivoted at 20 to a link 21 pivoted to the main frame 1 of the vehicle. 22 are stops limiting the amount of floating movement of the unit 5.

In the arrangement shown in Figure 5 instead of driving the vehicle through direct contact between the rubber tyred wheels 19 and the drums 15 the wheels 19 are interconnected by a belt 23 which in turn drives the drums 15. It will of course be appreciated that in place of this arrangement a pair of steel wheels 3 having drums 15 could be employed, which drums are interconnected by a belt which is driven through a single rubber tyred wheel 19.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. In a railway or road vehicle the provision of an auxiliary driving axle carrying one or more wheels provided with tyres of rubber or other suitable material, means for forcing them into contact with drums attached to one or more of the supporting wheels of the vehicle, and means controlled by the slip of one of the wheels for automatically varying the pressure of contact between the auxiliary wheels and the drums to suit varying conditions of grip and load to be overcome in such a manner that the drive occurs always with approximately the minimum of pressure between the surfaces in contact.

2. A railway or road vehicle as claimed in claim 1 in which the pressure of contact between the driving surface is controlled by devices operated by the relative slip between the surfaces in contact through automatically controlled apparatus as described in my former specification No. 415,808.

3. A railway or road vehicle according to either of the preceding claims in which, in order to increase the grip between the driving surfaces, two auxiliary axles having rubber tyred wheels are provided in contact with one single drum.

4. A railway or like vehicle as claimed in claim 3 in which the rubber tyred wheels drive the drum through the intermediary of a belt.

5. A railway or road vehicle substantially as described with reference to the accompanying drawing.

Dated this 23rd day of October, 1934.

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Fig. 1.

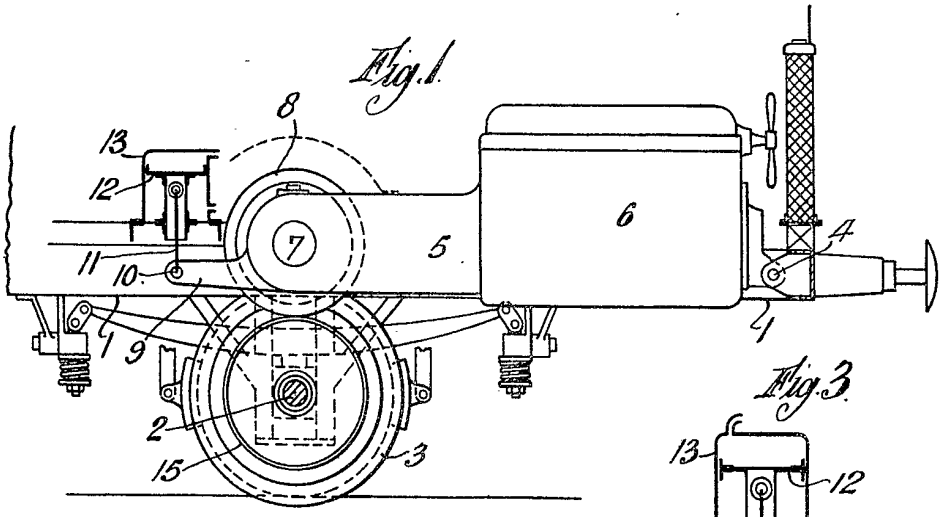


Fig. 3.

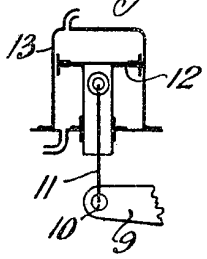


Fig. 2.

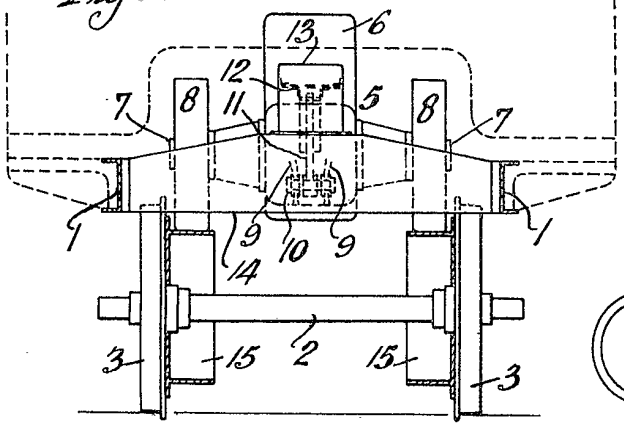


Fig. 5.

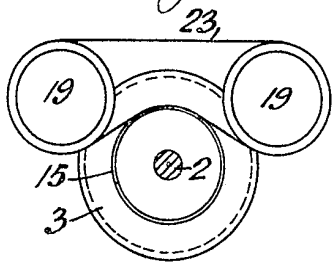
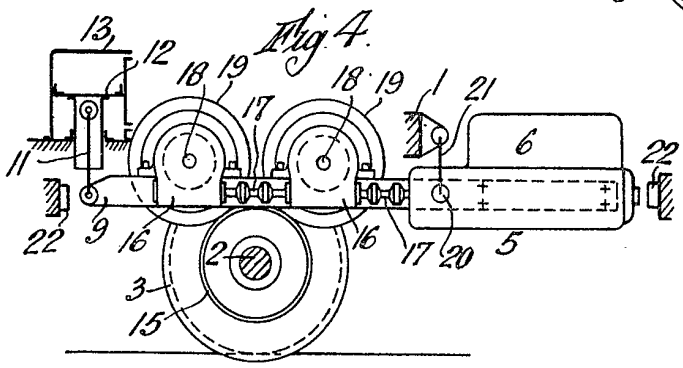


Fig. 4.



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