PATENT SPECIFICATION

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PROVISIONAL SPECIFICATION

Improvements in or relating to Pivot Centres for Articulated Locomotives and like Vehicles

We, BEYER, PEACOCK AND COMPANY LIMITED, a British Company, of Gorton, Manchester 18, Lancaster, and JAMES HADFIELD, a British Subject, of "The White House", Pinfold Lane, Romiley, in the County of Chester, do hereby declare the nature of this invention to be as follows:—

This invention relates to articulated locomotives and like vehicles, that is to say vehicles in which articulated or pivotal joints are used and is concerned with the pivotal centre pieces or "pivot centres" of such vehicles.

The primary object of this invention is the provision of improved means whereby wear of the pivotal centre pieces and slack due to wear may be taken up without the necessity of frequent renewal of the wearing surfaces.

In articulated locomotives and like vehicles it has previously been proposed to provide for the pivot centres renewable wearing blocks adapted to be adjusted by wedges acting at right angles to the axes of the pivots.

In practice it is found that in articulated locomotives and like vehicles such devices are difficult to operate inasmuch as they are usually of necessity located in positions which are difficult of access and moreover they require the assistance of external forces of considerable magnitude, usually in the form of additional locomotive power, with which to slide the male and female parts of the ~~pivotal~~ centres over each other into the appropriate positions such as will enable the wedges to be adjusted in order to take up the slack.

The present invention obviates these difficulties by providing means whereby the adjustments can easily be made from positions which are freely accessible and also by providing means whereby mechanical advantage can be obtained sufficiently high to magnify a reasonable manual effort into a force of sufficient magnitude to overcome the frictional resistance to sliding movement between the horizontal faces of the male and female parts of the pivot centre which arise from the vertical loads permanently carried on these faces irrespective of whether or not the articulated locomotive or like vehicle is at work.

The provision of means to obtain this high mechanical advantage enables the required adjustments to be made with a minimum amount of effort on the part of the operator and without the assistance of the large external forces previously required when adjusting the pivot centres of articulated locomotives and like vehicles.

For example, according to this invention wedges are provided in line with the axes of the pivots to take up the wear on the adjusting blocks which may be placed at the inner or outer ends of the pivots or in other suitable positions. Such vertical wedges will be tightened by means of bolts and adjusting nuts, the external peripheries of the adjusting nuts being shaped to form worm, bevel, spur or other type of gearing. The adjusting nuts may be revolved simultaneously through suitable coupling means and shafting or other devices from any position which is easily accessible and conveniently located, and the dimensions of the gears will be so arranged as to provide a mechanical advantage of the required magnitude.

Alternatively, adjustment may be effected automatically by providing springs contrived to apply pressure to the wedges so that the slack caused by wear will be automatically taken up by movement of the wedges. In such cases the wedges may be arranged in any suitable position either in line with or at right angles to the axes of the pivots.

The invention is applicable to pivot centres for articulated locomotives and like vehicles irrespective of whether the

[Price 2/-]

male pivot is located above the female pivot or the female pivot is located above the male pivot.

Dated this 18th day of April, 1947.
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For the Applicants.

COMPLETE SPECIFICATION

Improvements in or relating to Pivot Centres for Articulated Locomotives and like Vehicles

We, BEYER, PEACOCK AND COMPANY LIMITED, a British Company, of Gorton, Manchester 18, Lancaster, and JAMES HADFIELD, a British Subject, of "The White House", Pinfold Lane, Romiley, Chester, 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:—

This invention relates to articulated locomotives and like vehicles, that is to say vehicles in which articulated or pivotal joints are used and is concerned with the pivotal centre pieces or "pivot centres" of such vehicles.

In articulated locomotives and like vehicles experience has shown that difficulties are experienced in adjusting for wear of the pivotal centres.

The primary object of the present invention is to meet these difficulties.

In seeking to meet this difficulty it has previously been proposed to provide for the pivot centres renewable wearing blocks adapted to be adjusted by wedges acting at right angles to the pivots.

In practice it is found that devices at present employed are difficult to operate inasmuch as they are usually of necessity located in positions which are difficult of access and moreover they require the assistance of external forces of considerable magnitude, usually in the form of additional locomotive power, with which to lift the male and female parts of the pivot centres over each other into the appropriate positions such as will enable access to be obtained to the wedges to be adjusted in order to take up the slack.

To obviate this difficulty in accordance with the present invention hand operated force amplifying power transmission mechanism is provided for moving the wedge and thereby adjusting the wearing block, said mechanism being adapted to be actuated from a readily accessible position remote from said wedge. This power transmission has a mechanical advantage sufficiently high to magnify a reasonable manual effort into a force of sufficient magnitude to overcome the frictional resistance to sliding movement between the horizontal faces of the male and female parts of the pivot centre which arise from the vertical loads permanently carried on these faces irrespective of whether or not the articulated locomotive or like vehicle is at work.

The provision of means to obtain this high mechanical advantage enables the required adjustments to be made with a minimum amount of effort on the part of the operator and without the assistance of the large external forces previously require when adjusting the pivot centres of articulated locomotives and like vehicles.

In order that the invention may be more readily understood, reference is hereby made to the accompanying drawings, wherein:—

Figure 1 is a vertical section showing one example of an articulation system constructed according to the invention;

Figure 2 is a vertical section on the line A—A of Figure 1;

Figure 3 is a sectional plan on the line B—B of Figure 1;

Figure 4 is a plan view of Figure 2;

Figures 5 and 6 are diagrams in elevation and plan of a modification; and Figures 7 and 8 are sectional and elevational diagrams of a further modification; and

Figure 9 is a view of an optional modification.

Referring to these drawings the numeral 1 designates the male member of the pivot centre and 2—3 designates the female member which embraces it and is constructed in two parts, one of which constitutes an adjustable wearing block 3, a gap 2*a* being left to permit the necessary movement to effect the required adjustment for wear.

The adjustable block 3 is mounted in a casing member 4 of the framework and its edge face 3*b* is inclined as shown. In a side extension 4*a* of the casing member 4 an adjustable wedge 5 is housed, this wedge 5 having an inclined face 5*a* corresponding to and in co-operative engagement with the inclined face 3*b* of the adjustable block 3. Wedge actuating rods 6 pass upwardly and loosely through holes in the wedge 5 and nuts or

heads 6*a* are provided upon which the wedge 5 is supported, a flanged saddle-bracket 7 engaging the undersides of the heads 6*a*. These rods 6 pass through guided bearings 4*b* in bosses 4*c* in the diaphragm or platform 4*a* of the structural framework and their upper extremities extend into guides 7*a* in plugs 7*b* mounted in the top wall of the framework. At positions intermediate their ends the rods 6 are screw threaded as indicated at 6*b* and nut devices 8 in the form of gear wheels with internally screwed bosses, are in screwed relation on said rods and are located between the bottoms of the plugs 7*b* and the bosses 4*c* upstanding from the diaphragm or platform 4*d* of the framework.

In the arrangement shown in Figures 1 to 4 these gear wheels 8 have worm teeth and are meshed with an actuating worm screw 9 supported in bearings 10 in the structural framework and in a bearing 11 in the wall of wing 4*e* extending from the framework. The outer extremity of the spindle of this actuating screw 9 is provided with an operating handle 12 conveniently located for operation. In operation rotation of this actuating screw 9 effects rotation of the gear wheels 8, which, co-acting with the screw threads 6*b*, cause axial movement of the wedge actuating rods 6 so that the wedge 5 can be caused to co-operate with the adjustable bearing block 3 and thus any desired adjustment to compensate for wear between the male and female members of the pivot centre can be effected at will.

It is to be understood that other forms of gearing for effecting synchronous actuation of the wedge actuating rods 6 can be adopted. For example in Figures 5 and 6 there is indicated a method where the gear wheels 8 are provided with ordinary pinion teeth, and gear wheels 13, meshing with said gear wheels 8, are employed and operated by a hand wheel 14, and in Figures 7 and 8 an arrangement is indicated where the screw threading of the spindle 9 is replaced by bevel wheels 15 keyed on said spindle 9, and meshing with bevel wheels 16 in screwed relation on the wedge actuating rods 6, said bevel wheels 16 taking the place of the gear wheels 8. It will be understood that in both these cases the rods 6 must have facility for axial movement and a power ratio factor which will render the hand operation effective to overcome the resistance to be met.

A further modification is illustrated in Figure 9, which also forms the subject of copending Application Number 29211/49.

In this case a compression spring 17 is interposed between the heads of the plugs 7*b* and the bosses 4*c*. If the spring is sufficiently strong to draw up the wedge automatically as wear occurs no further provision for compensating for wear would be necessary but by providing the plugs 7*b* with screw threads engaging screw threads on the rods 6 positive adjustments can be effected from time to time if necessary, by manually screwing said plugs 7*b* so that they engage the bosses 4*c*. It will be seen that the plugs 7*b* are at an accessible position.

It is to be understood that all the arrangements hereinbefore described are equally applicable to pivot centres of articulated locomotives and like vehicles irrespective of whether the male member is located above the female member or *vice versa*.

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

1. A pivot centre for articulated locomotives or other vehicles, having an adjustable wearing block adapted to be secured in position by a wedge, wherein hand operated force amplifying power transmission mechanism is provided for moving the wedge and thereby adjusting the wearing block, said mechanism being adapted to be actuated from a readily accessible position remote from said wedge.

2. A pivot centre according to claim 1, wherein said transmission mechanism is of such a character that when it is no longer operated it is capable of maintaining said wedge at the adjusted position.

3. A pivot centre according to claim 1 or 2, and comprising a male and female member, the adjustable wearing block forming part of the female member and partially embracing the male member, wherein said wearing block has an inclined outer face and the wedge has an inclined inner face engaging with said inclined outer face of the wearing block.

4. A pivot centre according to any of the preceding claims, wherein the movement of the wedge to effect the adjustment is in a direction parallel to the pivot axis.

5. A pivot centre according to claims 3 and 4, wherein said inclined outer face of the wearing block overlies the inclined face of the wedge and adjustment for taking up wear is effected by upward movement of the wedge.

6. A pivot centre according to any of the preceding claims, wherein said

heads 6*a* are provided upon which the wedge 5 is supported, a flanged saddle-bracket 7 engaging the undersides of the heads 6*a*. These rods 6 pass through guided bearings 4*b* in bosses 4*c* in the diaphragm or platform 4*a* of the structural framework and their upper extremities extend into guides 7*a* in plugs 7*b* mounted in the top wall of the framework. At positions intermediate their ends the rods 6 are screw threaded as indicated at 6*b* and nut devices 8 in the form of gear wheels with internally screwed bosses, are in screwed relation on said rods and are located between the bottoms of the plugs 7*b* and the bosses 4*c* upstanding from the diaphragm or platform 4*d* of the framework.

In the arrangement shown in Figures 1 to 4 these gear wheels 8 have worm teeth and are meshed with an actuating worm screw 9 supported in bearings 10 in the structural framework and in a bearing 11 in the wall of wing 4*c* extending from the framework. The outer extremity of the spindle of this actuating screw 9 is provided with an operating handle 12 conveniently located for operation. In operation rotation of this actuating screw 9 effects rotation of the gear wheels 8, which, co-acting with the screw threads 6*b*, cause axial movement of the wedge actuating rods 6 so that the wedge 5 can be caused to co-operate with the adjustable bearing block 3 and thus any desired adjustment to compensate for wear between the male and female members of the pivot centre can be effected at will.

It is to be understood that other forms of gearing for effecting synchronous actuation of the wedge actuating rods 6 can be adopted. For example in Figures 5 and 6 there is indicated a method where the gear wheels 8 are provided with ordinary pinion teeth, and gear wheels 13, meshing with said gear wheels 8, are employed and operated by a hand wheel 14, and in Figures 7 and 8 an arrangement is indicated where the screw threading of the spindle 9 is replaced by bevel wheels 15 keyed on said spindle 9, and meshing with bevel wheels 16 in screwed relation on the wedge actuating rods 6, said bevel wheels 16 taking the place of the gear wheels 8. It will be understood that in both these cases the rods 6 must have facility for axial movement and a power ratio factor which will render the hand operation effective to overcome the resistance to be met.

A further modification is illustrated in Figure 9, which also forms the subject of copending Application Number 29211/49.

In this case a compression spring 17 is interposed between the heads of the plugs 7*b* and the bosses 4*c*. If the spring is sufficiently strong to draw up the wedge automatically as wear occurs no further provision for compensating for wear would be necessary but by providing the plugs 7*b* with screw threads engaging screw threads on the rods 6 positive adjustments can be effected from time to time if necessary, by manually screwing said plugs 7*b* so that they engage the bosses 4*c*. It will be seen that the plugs 7*b* are at an accessible position.

It is to be understood that all the arrangements hereinbefore described are equally applicable to pivot centres of articulated locomotives and like vehicles irrespective of whether the male member is located above the female member or *vice versa*.

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

1. A pivot centre for articulated locomotives or other vehicles, having an adjustable wearing block adapted to be secured in position by a wedge, wherein hand operated force amplifying power transmission mechanism is provided for moving the wedge and thereby adjusting the wearing block, said mechanism being adapted to be actuated from a readily accessible position remote from said wedge.

2. A pivot centre according to claim 1, wherein said transmission mechanism is of such a character that when it is no longer operated it is capable of maintaining said wedge at the adjusted position.

3. A pivot centre according to claim 1 or 2, and comprising a male and female member, the adjustable wearing block forming part of the female member and partially embracing the male member, wherein said wearing block has an inclined outer face and the wedge has an inclined inner face engaging with said inclined outer face of the wearing block.

4. A pivot centre according to any of the preceding claims, wherein the movement of the wedge to effect the adjustment is in a direction parallel to the pivot axis.

5. A pivot centre according to claims 3 and 4, wherein said inclined outer face of the wearing block overlies the inclined face of the wedge and adjustment for taking up wear is effected by upward movement of the wedge.

6. A pivot centre according to any of the preceding claims, wherein said

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power transmision mechanism comprises an actuating rod or rods coupled to the wedge, a nut or nuts in screwed relation on said rod or rods, and means for rotating said nut or nuts and thereby moving said rod or rods longitudinally and adjusting the wedge.

7. A pivot centre according to claim 6, wherein said nut or nuts is or are provided with worm teeth and is or are rotated by means of a rotatable transmission shaft provided with worm threads engaging with said worm teeth.

A pivot centre according to claim 6, wherein said nut or nuts is or are provided with bevel gear teeth and is or are rotated by means of a rotatable transmission shaft having a bevel gear wheel or wheels mounted thereon and in mesh with said bevel gear teeth.

9. A pivot centre according to claim 6, wherein said nut or nuts is or are provided with pinion gear teeth and is or are rotated by means of a rotatable transmission shaft geared to said pinion gear teeth.

10. A pivot centre according to any of claims 1 to 5, wherein spring means are also provided for biasing said wedge in the direction to move the wearing block for taking up wear, so that wear is taken up automatically.

11. A pivot centre according to claim 10, wherein an actuating rod or rods is or are coupled to the wedge and said rod or rods is or are biased axially by means of a coil spring or springs embracing said rod or rods, said (or each) coil spring being in compression between a fixed part and a nut in screwed relation on the rod and located at an accessible position, whereby by adjusting said nut the stress of the spring can be adjusted, the arrangement further being such that, by adjusting the nut beyond a given point in the spring-stressing direction, said nut engages a fixed part and thereby positively moves the rod axially, so that said wearing block can be positively adjusted if the spring or springs should be insufficient.

12. A pivot centre for articulated locomotives or other vehicles, substantially as herein described with reference to the accompanying drawings.

Dated this 25th day of August, 1947.

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