Oct. 7, 1930. M. H. ROBERTS 1,777,578

LOCOMOTIVE DRIVING BOX

Original Filed Jan. 3, 1927 2 Sheets-Sheet 1

Fig: 1.

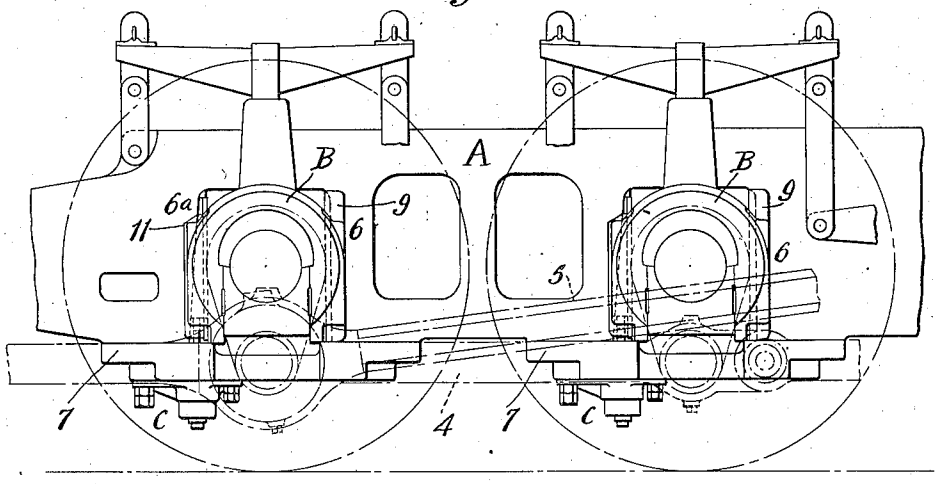

Fig: 3.

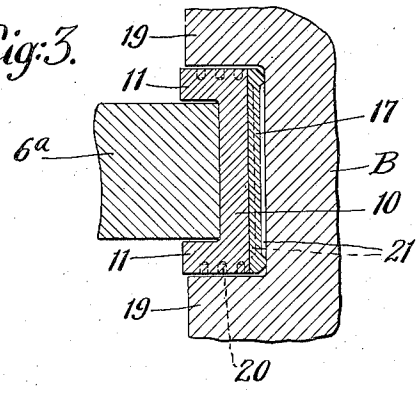

Fig: 4.

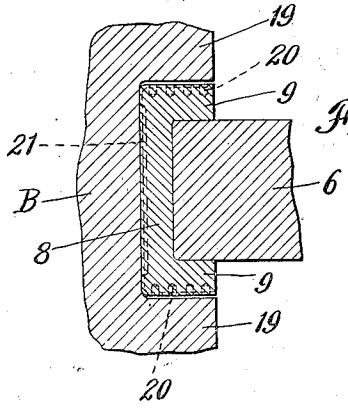

Fig: 5.

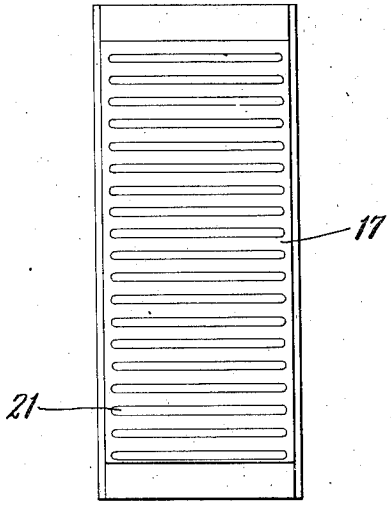

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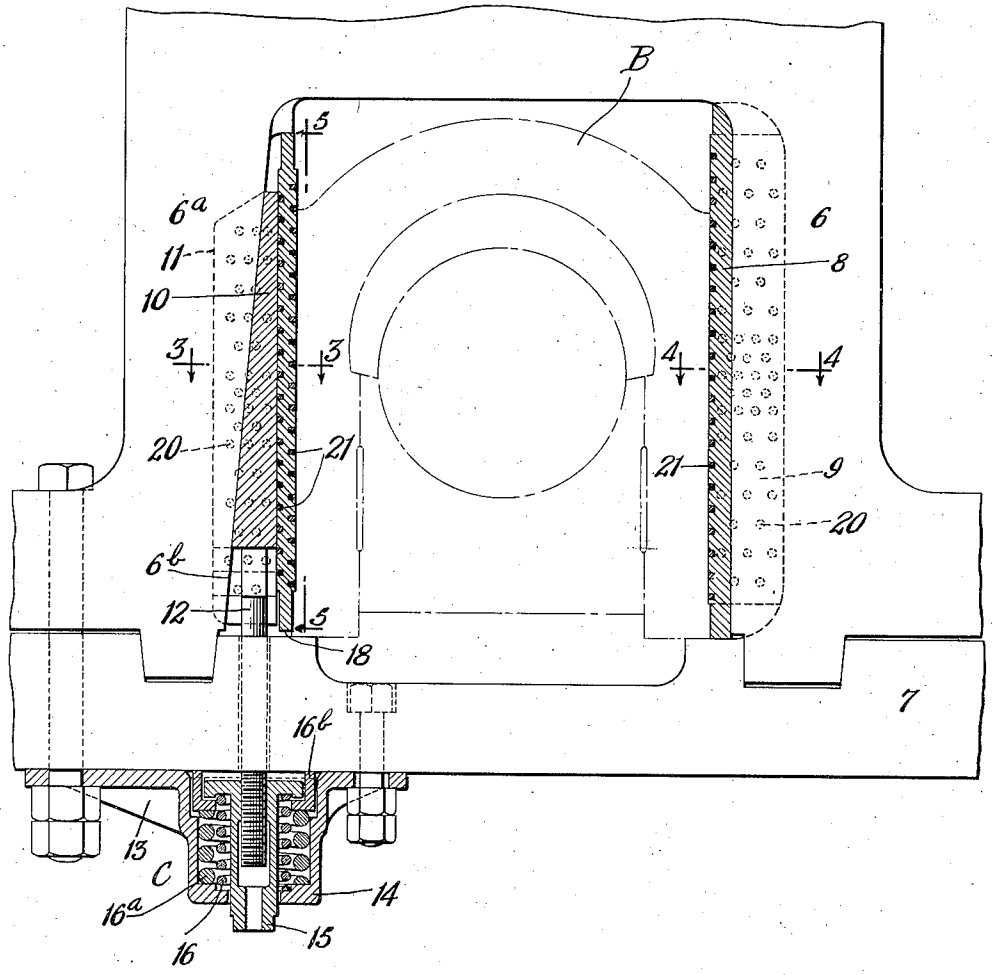
Fig. 2.



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UNITED STATES PATENT OFFICE

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LOCOMOTIVE DRIVING BOX

Continuation of application Serial No. 158,621, filed January 3, 1927. This application filed June 29, 1927. Serial No. 202,419.

This invention relates to driving boxes for locomotives, and is particularly concerned with an improved wedge construction for taking up wear.

Generally speaking, the more important objects of the invention are, first, the provision of a construction in which jamming of the parts is entirely prevented; second, the provision of a driving box and wedge mechanism which will be entirely free of pounding due to lost motion; third, the provision of a driving box in which it is unnecessary to provide for periodic lubrication of the parts; fourth, the provision of means for making possible a very great reduction in the size of the automatic adjusting parts for the wedge, such, for example, as the spring; fifth, the provision of a construction in which the wedge is not subjected to abnormally heavy downward thrusts, and, consequently, one in which the wedge supporting parts are very much less liable to become broken in service; sixth, the provision of a construction which will have a much longer period of life than heretofore possible in devices of this kind; and seventh, the provision of means whereby it is possible to take care of what little wear does take place by simply repositioning one of the parts without the necessity for making any replacements except at very long intervals.

The present application is in the nature of a continuation of and a substitution for my application Serial No. 158,621, filed January 3, 1927.

How the foregoing, together with such other objects as are incident to my invention, or may appear hereinafter, are obtained, is illustrated in a preferred form in the accompanying drawings, wherein—

Fig. 1 is a side elevation of a portion of the frame and running gear of a locomotive having my invention applied thereto.

Fig. 2 is an enlarged and more detailed view of the driving box and surrounding structure with certain parts shown in section.

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2.

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 2, and

Fig. 5 is a face view of the floating plate used in my invention taken as indicated by the line 5—5 of Fig. 2.

Referring now to the drawings, the reference character A indicates the main frame of a locomotive which is provided with pedestal jaws 6 and 6^a between which the driving boxes B are mounted for vertical movement. Pedestal binders 7 secure the jaws together and retain the boxes in the jaws. A main rod 5 and a side rod 4 are shown in dot and dash lines in Fig. 1.

As will be seen in Fig. 2, there is provided at one side of the box a shoe 8 having flanges 9 adapted to engage the pedestal jaw 6. The jaw 6^a at the other side of the box is provided with the customary inclined face 6^b which flares outwardly from top to bottom. Between the tapered face 6^b and the driving box I arrange the adjusting shoe or wedge 10 and a parallel sided floating plate member 17. The wedge has its face adjacent the jaw 6^a tapered to correspond to the tapered face 6^b on the jaw, and at the sides the wedge is provided with flanges 11 for engaging the sides of the jaw 6^a. (See Fig. 3.)

The wedge is of the automatically adjustable type and is provided with the wedge bolt 12 projecting downwardly through the pedestal binder 7 into a supporting mechanism indicated as a whole by the reference character C. This mechanism comprises the bracket 13 having the depending cup-like portion 14. An adjusting nut member 15 is threaded on the lower end of the bolt 12 and projects down through an opening in the bottom of the cup portion 14. By means of this nut member 15 it is possible to adjust the tension on the spring 16 which reacts between the head of the nut member and the bottom of the cup 14. A second and heavier spring 16^a may be employed, if desired, and where such is used, as illustrated herein, I prefer to arrange the parts so that it will come into play only after the spring 16 has been partially compressed. To this end I provide the shouldered ring 16^b between the upper end of the spring 16^a and the under face of the pedestal binder 7. The head of the bolt member 15 is arranged to overhang a

shoulder on the ring 16[b] but with a space between as shown.

The plate member 17 is made slightly shorter than the vertical distance between the pedestal binder and the top of the box in order to provide the clearance indicated at 18 in Fig. 2. The plate, therefore, is free to float to a limited extent for a purpose which will appear more clearly hereinafter.

All of the relatively moving surfaces at the sides of the box B are lubricated as follows: The surfaces of the flanges 9 and 11 of the shoe 8 and the wedge 10 which come next to the box flanges 19, are provided with inserts 20 of some soft anti-friction material, such as Babbitt metal, or the lubricating material known to the trade as "Lubrite." The face of the shoe 8 next to the box B and both faces of the floating plate member 17 are provided with similar inserts 21. All of these inserts of soft metal have a relatively low coefficient of friction and they may be applied in a number of ways. For instance, they may be spun on the parts, or, as shown in the drawings, the faces to be impregnated may be formed with small depressions into which the anti-friction metal is pressed. The whole surface may be covered or only a portion thereof, as shown, and, in the latter case, lubrication is accomplished by virtue of the fact that small particles of soft metal are distributed over the entire area by the continuous rubbing of the parts incident to the vertical movement of the box in the pedestal jaws. Other lubrication becomes entirely unnecessary.

It is important to notice that the faces of the wedge which come next to the jaw 6[a] are not provided with lubricating material so that the coefficient of friction between the wedge and the jaw remains high as compared with that which exists at the faces where the anti-friction material is used. This is important for it is the intention to prevent all downward motion of the wedge except under the influence of heat, as pointed out below, and if the friction is comparatively high at this point, such end will be substantially furthered. Furthermore, the greater the friction the less powerful need be the springs for supporting the wedge.

In service, the operation of the parts is as follows: Referring particularly to Fig. 2, should the box B move downwardly, the motion will occur either between the box and the adjacent face of the plate 17 or between the plate 17 and the adjacent face of the wedge 10, but in no case will a downward movement of the box operate to force the wedge 10 downwardly against the pressure of the adjusting spring 16, the reason for this being that the coefficient of friction between the jaw 6[a] and the adjacent face of the wedge, plus the effect of the spring 16, represents a considerably greater force than would ever be exerted by a downward movement of the box B acting through the highly lubricated surfaces between the box B and the plate 17 and between the plate 17 and the adjacent face of the wedge. In former arrangements, such, for example, as that illustrated in the McDaniel Patent, No. 958,270, where a double wedge construction was used, the above action could never take place, the tendency being for the box to move the wedge 10 downwardly along the tapered face 6[b], which, of course, would immediately make possible an increase in the distance between the face of the shoe 8 and the inside face of the member to which the plate 17 corresponds. As a consequence, the box would be loose in the jaws 6—6[a], and pounding would result. In attempting to overcome the difficulty just pointed out, it has been the custom to employ a very heavy spring 16 of excessive stiffness because of the limited space available for its application.

On the contrary, with my invention, the size of the spring can be materially reduced, all that it is necessary for the spring to be capable of doing being to resist the downward thrust of the piston through the main rod 5, plus any tendency there may be for the floating plate to cause downward movement of the adjusting wedge 10. By thus making possible a reduction in the size and stiffness of the spring, its useful life can be greatly increased, and there will be considerably less tendency for the spring to be broken, as sometimes occurs in present practice under the combined effect of a downward movement of the driving box and a thrust on the crank pin from the driving rod.

With my improved arrangement, practically the entire wear will occur between the box B and the adjacent face of the floating plate 17, and this wear will accumulate on the plate itself. This is because the plate is capable of but a very limited motion since the space 18 is preferably made only about 3/16 of an inch. The wear, therefore, on the wedge side of the plate will be negligible, but on the box side it will be greater because the box is free to move upwardly and downwardly in the jaws 6—6[a] over a substantially larger area. I have, therefore, constructed the plate so that it can be reversed after the inserts 21 on one side are practically worn away. The plate also is capable of use with either end up, so that in assembling the parts, it is quite impossible for a careless workman to put them together in the wrong way.

It should be noted that the feature of reversibility just referred to could be equally well applied to a floating plate of the general character herein disclosed even though the present method of lubrication were not employed.

While the device described will prevent downward movement of the wedge under all

normal movements incident to operation, yet the supporting springs are not so powerful as to prevent whatever slight downward motion of the wedge may be necessary under the influence of a certain degree of expansion which develops as a result of the heat generated during periods of long continued use.

I claim:—

1. In a locomotive driving box, a floating plate interposed between the relatively moving surfaces at the side of the box, the surfaces of said plate having a relatively low coefficient of friction.

2. The combination of a locomotive frame having a pair of pedestal jaws, a driving box mounted for vertical movement in the jaws, a compensating wedge between the box and one of the pedestal jaws and a floating plate interposed between the box and the wedge, said plate having a relatively low coefficient of friction.

3. As an article of manufacture, a floating plate for insertion at the side of a locomotive driving box, said plate having a low coefficient of friction.

4. As an article of manufacture, a floating plate for insertion at the side of a locomotive driving box, the faces of said plate having inserts of a material having a relatively low coefficient of friction.

5. As an article of manufacture, a floating plate for insertion at the side of a locomotive driving box having its surfaces impregnated with an anti-friction material.

6. In a locomotive, the combination of a pedestal jaw, a driving box, a compensating wedge, means for urging said wedge upwardly between said jaw and said box, and a floating plate interposed between said wedge and said box, said plate having a low coefficient of friction.

7. In a locomotive, the combination of a pedestal jaw, a driving box, an automatically adjustable wear compensating wedge between said box and said jaw, and a floating plate between said box and said wedge, the surfaces of said plate having a relatively low coefficient of friction.

8. An automatic adjustable wedge construction for a locomotive driving box, including the usual wedge, the surface at the box side of the wedge having a coefficient of friction sufficiently low to eliminate the necessity for periodic applications of oil or grease and the surface at the pedestal side of the wedge having a relatively high coefficient of friction.

9. In a locomotive, the combination of a pedestal jaw, a driving box, and a wedge between the jaw and the box having anti-friction material at its box side only, the said material having a coefficient of friction sufficiently low to eliminate the necessity for periodic applications of oil or grease.

10. In a locomotive, the combination of a pedestal jaw, a driving box having flanges embracing the jaw, a wedge member adjacent the jaw, a floating plate member between wedge and box, and flanges on one of said members extending back between the jaw and the box flanges, and anti-friction material at the wearing faces of plate and flanges.

11. In a locomotive, the combination of a pedestal jaw, a driving box, a wedge with an unlubricated face against the jaw, and a self-lubricated floating plate between the wedge and the box.

12. In a locomotive, the combination of a pedestal jaw, a driving box, a wedge with an unlubricated face against the jaw, and a parallel sided floating plate between wedge and box, said plate having a low coefficient of friction.

13. In a locomotive, the combination of a pedestal jaw, a driving box, a wedge with an unlubricated face against the jaw, means for urging said wedge upwardly, and a self-lubricated floating plate between the wedge and the box.

14. In a locomotive, the combination of a pedestal jaw, a driving box, a wedge against the jaw, a spring for urging said wedge upwardly, and a parallel sided floating plate between wedge and box, said plate having a comparatively low coefficient of friction.

15. In a locomotive, the combination of a pedestal jaw, a driving box, a wedge against the jaw, means for urging the wedge upwardly with a pressure in excess of the normal resultant downward thrust, and a parallel sided floating plate between wedge and box, said plate having a comparatively low coefficient of friction.

16. In a locomotive, the combination of a pedestal jaw, a driving box, a wedge against the jaw, and a parallel sided reversible floating plate between wedge and box.

17. In a locomotive, the combination of a pedestal jaw, a driving box, a wedge against the jaw, and a parallel-sided, reversible or invertible floating plate between wedge and box.

18. As a new article of manufacture, the floating plate of claim 16 provided with wearing faces having a low coefficient of friction.

19. As a new article of manufacture, the floating plate of claim 17 provided with wearing faces having a low coefficient of friction.

20. In a locomotive, the combination of a pedestal jaw, a driving box, a plate between said jaw and said box, and lubricating material carried by the plate for reducing the coefficient of friction to a point sufficiently low to eliminate the necessity for periodic applications of oil or grease.

21. A pedestal shoe for locomotive driving boxes impregnated with lubricating material which reduces the coefficient of friction to a point sufficiently low to eliminate

the necessity for periodic applications of oil or grease.

22. In a locomotive, pedestal jaws, a driving box mounted therein, and lubricating material carried by wearing surfaces for reducing the coefficient of friction to a point sufficiently low to eliminate the necessity for periodic applications of oil or grease.

23. In a locomotive, the combination of a pedestal jaw, a wedge having flanges embracing the jaw, a driving box having flanges embracing the wedge flanges, and lubricating material carried by wearing surfaces between the wedge flanges and the box flanges for reducing the coefficient of friction to a point sufficiently low to eliminate the necessity for periodic applications of oil or grease.

24. In a locomotive, the combination of a pedestal jaw, a wedge having flanges embracing the jaw, a driving box having flanges embracing the wedge flanges, and lubricating material carried by wearing surfaces between the wedge and the box for reducing the coefficient of friction to a point sufficiently low to eliminate the necessity for periodic applications of oil or grease.

25. In a locomotive, the combination of a pedestal jaw, a shoe having flanges embracing the jaw, a driving box having flanges embracing the shoe flanges, and lubricating material carried by wearing surfaces between shoe flanges and box flanges for reducing the coefficient of friction to a point sufficiently low to eliminate the necessity for periodic applications of oil or grease.

26. As an article of manufacture, a floating plate for insertion at the side of a locomotive driving box, said plate being impregnated with lubricating material which reduces the coefficient of friction to a point sufficiently low to eliminate the necessity for periodic application of oil or grease.

In testimony whereof I have hereunto signed my name.

MONTAGUE H. ROBERTS.