F. A. DIECKMAN.

ADJUSTMENT DEVICE FOR LOCOMOTIVE BEARING BOXES.

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1,012,610.

Patented Dec. 26, 1911.

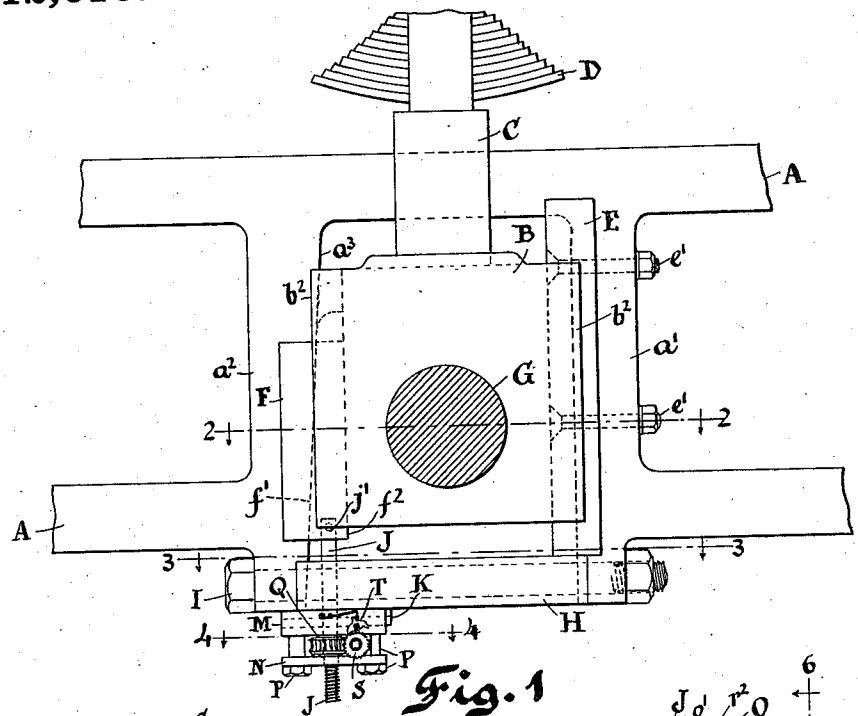

Fig. 1

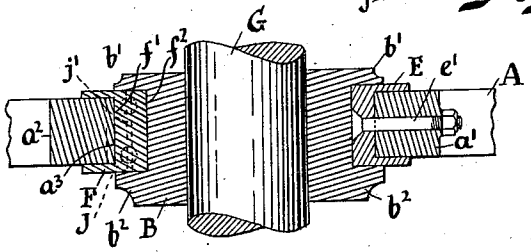

Fig. 2

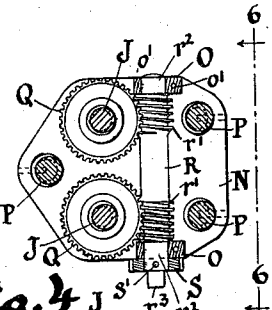

Fig. 4

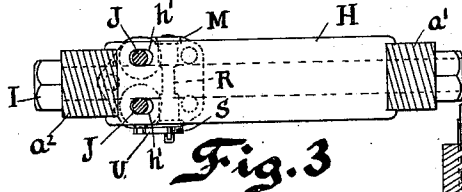

Fig. 3

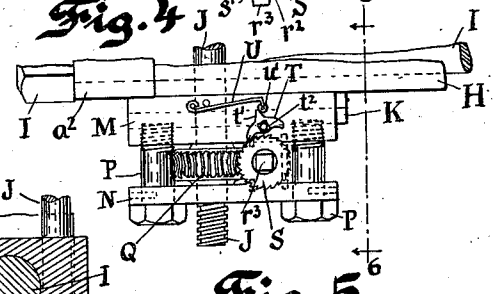

Fig. 5

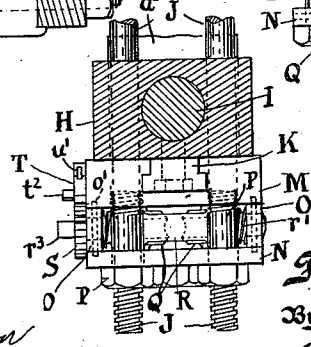

Fig. 6

Witnesses

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ADJUSTMENT DEVICE FOR LOCOMOTIVE BEARING-BOXES.

1,012,610. Specification of Letters Patent. Patented Dec. 26, 1911.

Application filed August 28, 1911. Serial No. 646,442.

To all whom it may concern:

Be it known that I, FRED A. DIECKMAN, of Manitowoc, Wisconsin, have invented an Adjustment Device for Locomotive Bearing-Boxes, of which the following is a specification.

This invention relates to locomotives, and in particular to the adjustment of the main bearings of the driving-axles thereof.

According to the usual construction, the driving-wheel axles are journaled in journal-boxes, which have a vertical reciprocating motion in pedestals of the locomotive-frame. Owing to the reaction of the force applied to the crank, there is great lateral wear upon these journal-boxes and the inner faces of the pedestals, which necessitates a compensating device, and this is commonly applied in the form of a taper bushing, termed a wedge, on one side of the pedestal, and between it and the journal-box, which forms a bearing-face for the latter, and by moving up or down can take up the wear and prevent rattling or pounding of the box. This wedge is, in the usual arrangement, made to be set in a higher or lower position by means of one or two screw-stems attached to its lower end and locked in position by two nuts, which are jammed upon opposite sides of the binder-bar, which connects the two sides of the bottom of the pedestal. It is the means of adjustment and setting of the wedge that I aim to improve by the present invention.

The described means for setting the wedge is defective for two reasons: In the first place, on account of the constant vibration the jam-nuts are continually working loose, thus allowing the wedge to come down and the driving-box to pound in its pedestal. It is a well-known fact that a loose driving-box is very injurious to the machinery of the locomotive, causing excessive strain on the rods and rapid wear of the bearings, and is a frequent cause of broken frames; besides, the valve-gear and the proper distribution of steam in the cylinders may be seriously affected. The other defect referred to is the difficulty of readjusting the wedge. This is not only a very dirty job, but also when on the road a very dangerous and almost impossible one, as it cannot be done without getting under the locomotives, and this is so unsafe when on the road, that it is forbidden to enginemen, and yet it is occasionally necessary to prevent serious consequences. The wedge has generally to be set up in the round house, where it can not be tried to see whether it is correctly set or not, and if it be set the least bit too tight, it may result in a jam, that is to say in the driving-box sticking in the pedestal, which may also result in a bent or broken frame. It is generally conceded that the best results would be obtained if engineers were able to do the work of adjusting wedges while the engine is in service, as a closer and more satisfactory adjustment can thus be obtained, and moreover if the driving-box shows any tendency to stick in the pedestal, the engine can be stopped and the wedge readjusted, so as to slightly increase the play.

It is the object of the present invention to provide a device for setting and holding the wedge, which will dispense with the necessity of frequent resetting by making it impossible for the wedge to work loose, and which will enable the wedge to be set in a few minutes from the outside of the locomotive by means of a wrench or like device.

In general it consists of an arrangement of gearing having a rotatable stem parallel to the driving axle, and the end of which is adapted to manipulation through the aperture between the spokes of the driving-wheel, whereby it can be operated with a wrench.

My device also comprises means on said stem such as a ratchet- or star-wheel, whereby the stem is held in whatever position it is set in.

My invention further comprises the constructions and combinations which will be hereinafter described and are particularly set forth in my claims.

The exact nature of my invention will best be understood by a consideration of the most improved form thereof, which I have shown in the accompanying drawings, wherein—

Figure 1 is a front elevation of a locomotive driving-box and its housings showing my wedge-setting attachment mounted thereon; Fig. 2 is a plan-section thereof on the plane 2; Fig. 3 is a plan-section thereof on the plane 3; Fig. 4 is a plan-section through my setting attachment on the plane 4; Fig. 5 is a front elevation of the attachment; and Fig. 6 is an end-view of the

same, the binder being shown in section on the plane 6. The scale of Figs. 4, 5 and 6 is double that of the other figures.

The reference letters refer each to the same part in each figure of the drawings.

Describing first the locomotive parts, which are present independently of my attachment, A designates the locomotive frame, a portion of which is formed into a pedestal by the upright bars a', a^2, between which reciprocates the driving-box B. Surmounting this box is the saddle C, which transmits the weight of the frame to the box through the leaf-spring D in the usual manner. This is a conventional construction which varies in different locomotives and is independent of my attachment. To provide for wear on the pedestal faces there are provided the two flanged bushings E and F, the former of which is fixed in position by two bolts e' to the pedestal-bar a'. The other bushing F is made with a taper-face f' which has the same slope as the inner face a^3 of the pedestal bar a^2; whereby its active or wearing-face f^2 is always parallel to that of the bushing E and to the bearing-box, but can be moved in or out by moving the bushing F up or down; this bushing is therefore termed the wedge. The bearing-box B is provided with flanges b' b^2, which embrace the side-faces of the bushings E and F, and said box contains the journal of the driving-axle G.

Between the lower ends of the pedestal bars a' and a^2 extends a bar or block H which is termed the binder, said binder being secured in place in various ways, as for example by means of a bolt I. The wedge F has mounted on its lower end and extending vertically downward two screw-stems J which are prevented from rotating by a transverse pin j' or in other suitable manner. These stems pass through holes h' in the binder, said holes being elongated to form slots so as to permit the lateral movement of the stems J, which occurs when the wedge F is moved up or down. These screw-stems are in the usual construction secured to the binder by a pair of nuts above and below the latter, but which are omitted in my construction.

According to my construction there is secured to the lower face of the binder, or formed integrally therewith, if desired, a parallel-sided block K of T-shaped cross-section which acts as a slideway for another block M having a channel of similar section in its upper face. This latter block M forms one member of a sliding-frame which I shall here term the gear-cage, and which consists in addition to the block M, of a plate N, two upright blocks O and three connecting-bolts P. Said gear-cage has apertures through which the threaded-ends of the stems J pass, and between the two members M and N are mounted on said stems a pair of worm-wheel nuts Q, said nuts being threaded internally so as to engage with the threads of the stems J and having on their peripheries worm-teeth which are engaged by a pair of worms r' on a cylindrical-shaft R, said stem having journals r^2 on its ends turning in apertures in the blocks O. Said blocks are secured in place by dowel-pins o' to the members M and N.

The front end of the shaft R is extended beyond the front bearing-block O and receives a ratchet-wheel S fixed thereto by a diametral pin s' or in other suitable fashion. In front of the ratchet-wheel the shaft is extended in the form of a squared-end r^3 to which a wrench can be applied.

The teeth of the ratchet-wheel S are arranged to be engaged by either end of a double-ended pawl T pivoted upon the front of the block M, one end of said pawl being held in engagement of said teeth by means of a leaf-spring U carrying on its end a roller u' which presses laterally against one side or the other of an upright cam-tooth t' on the pawl. It will be seen that the action of the spring U is to hold against the ratchet-wheel which ever end of the pawl is down, and the latter can be easily shifted from one side to the other by overcoming the force of the spring. This can be done by means of a squared boss t^2 on the face of the pawl, which can be operated by a socket-wrench to reverse it as occasion demands.

In operation the engine is brought to a stand in such position that a socket-wrench can be inserted between the spokes of the driving-wheel and engaged with the squared end r^3 of the stem, R. On rotating this stem the wedge T will be moved up or down according to the direction of rotation of the stem. The teeth of the ratchet-wheel S are in such direction that the free rotation when the pawl is in the position of the drawing will set the wedge up; thus after being so set it is prevented from coming down of itself and positively maintained in its position. The wedge can be let down by first reversing the pawl so that the right-hand end in the drawing strikes against the ratchet-teeth. This end, it will be noticed, is not hooked, so that it does not prevent reverse motion of the teeth, but merely strikes against them and acts frictionally to prevent free motion of the ratchet-wheel, and also enables the operator to count the number of teeth which pass the pawl so that he will know how far it is being turned. If the operator should forget to turn the pawl back after he has finished letting down the wedge, the friction of the right-hand end upon the ratchet-wheel will still be sufficient to prevent its moving under ordinary circum-

stances. The direction of the ratchet-teeth will be a clear indication to the operator which way to turn it to move the wedge up, so that he cannot become confused as to direction. Enginemen are in this way enabled to keep the wedges up snug according to the requirements of each individual engine, and the danger of getting the wedges up too tight, and consequent sticking of the driving-box, is eliminated, since it is a matter of a few moments to stop the engine on the first sign of sticking or pounding, and turn the ratchet-wheel through one or two teeth. If, moreover, the wedge is already stuck, the gearing provides a reduction sufficiently powerful for pulling it down by means of a wrench. The arrangement is such as to provide also an extremely fine and accurate adjustment. Finally, what is of much importance to this general application, my arrangement can be attached to existing locomotives without any change whatever in their design, as it is merely necessary to remove the binder in order to fit my invention to it.

I wish it understood that my invention is not limited to the use of all the above described features and constructions, for some may be omitted and others may be varied or modified in various ways, as will readily occur to those skilled in the art. For example, only one stem J is essential to the principle of my invention, and the special form of pawl or even the entire pawl or ratchet-wheel might conceivably be omitted or replaced by equivalent devices.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. Means for adjusting bearing-boxes comprising, in combination with the box and sliding-wedge, a rotatable shaft at right-angles to the movement of the wedge, gearing connecting said shaft and said wedge whereby the rotation of said shaft produces longitudinal movement of said wedge, and means for rotating said shaft.

2. Means for adjusting bearing-boxes comprising, in combination with the box and sliding-wedge, a laterally sliding gear-cage, a stem mounted on said wedge and passing through said gear-cage, gearing carried by said gear-cage and engaging said stem, and means for rotating said gearing whereby said wedge is moved longitudinally.

3. Means for adjusting bearing-boxes comprising, in combination with the box and sliding-wedge, a laterally sliding gear-cage, a stem mounted on said wedge and passing through said gear-cage, gearing carried by said gear-cage and engaging said stem, said gearing including a rotatable shaft at right-angles to said stem, and means for rotating said shaft whereby said wedge is moved longitudinally.

4. Means for adjusting bearing-boxes comprising, in combination with the box and sliding-wedge, a screw-stem mounted on said wedge parallel to its longitudinal direction of movement, a nut engaging the thread thereof and confined against longitudinal motion, and a rotatable shaft geared to said nut whereby the latter is rotated.

5. Means for adjusting bearing-boxes comprising, in combination with the box and sliding-wedge, a screw-stem mounted on said wedge parallel to its longitudinal direction of movement, a worm-wheel nut engaging the threads of said stem and confined against longitudinal motion, and a rotatable shaft carrying a worm which engages the periphery of said worm-wheel nut.

6. Means for adjusting bearing-boxes comprising, in combination with the box and sliding-wedge, a screw-stem mounted on said wedge parallel to its longitudinal direction of movement, a gear-cage mounted to slide at right-angles to said stem and through which said stem passes, a nut turning on said stem within said cage and confined against longitudinal movement, and gearing in said cage engaging and adapted to rotate said nut, said gearing being rotatable manually from one side of said gear-cage.

7. Means for adjusting bearing-boxes comprising, in combination with the box and sliding-wedge, a rotatable shaft at right-angles to the longitudinal movement of said wedge and having means on one end thereof for rotating it, gearing connecting said shaft with said wedge whereby the latter is adjustable longitudinally by the rotation of said shaft, and a ratchet-device mounted on said stem for holding it in the position in which it is set.

8. Means for adjusting bearing-boxes comprising, in combination with the box and sliding-wedge, a rotatable shaft at right-angles to the longitudinal movement of said wedge and having means on one end thereof for rotating it, gearing connecting said shaft with said wedge whereby the latter is adjustable longitudinally by the rotation of said shaft, a ratchet-wheel mounted on said shaft, and a reversible pawl spring-pressed against said ratchet-wheel.

9. Means for adjusting bearing-boxes comprising, in combination with the box and sliding-wedge, a rotatable shaft at right-angles to the longitudinal movement of said wedge and having means on one end thereof for rotating it, gearing connecting said shaft with said wedge whereby the latter is adjusted longitudinally by the rotation of said shaft, a ratchet-wheel mounted on said shaft, a double-ended pawl each end of which is adapted to press upon said ratchet-wheel and one end of which is adapted to engage the teeth thereof so as to prevent the

backward movement of said wheel and the other end of which is adapted to engage the teeth of said wheel so as to permit the backward movement thereof, and means for holding either end of said pawl against said ratchet-wheel.

10. Means for adjusting bearing-boxes comprising, in combination with the box and sliding-wedge, a rotatable shaft at right-angles to the longitudinal movement of said wedge and having means on one end thereof for rotating it, gearing connecting said shaft with said wedge whereby the latter is adjustable longitudinally by the rotation of said shaft, a ratchet-wheel mounted on said shaft, and a pawl having an end adapted to engage the teeth of said ratchet-wheel and having a spring actuating it and adapted to hold it in either of two positions in one of which said end is removed from said ratchet-wheel.

11. Means for adjusting bearing-boxes comprising, in combination with the box and sliding-wedge, a screw-stem mounted on said wedge parallel to its longitudinal direction of movement, a gear-cage mounted to slide laterally and through which said stem passes, a worm-wheel nut mounted in said gear-cage and engaging the threads of said stem, a worm-shaft at right-angles to said stem and having a worm engaging said worm-wheel nut, means for rotating said shaft, a ratchet-device mounted on said shaft and a reversible pawl engaging with said ratchet-device.

12. In a locomotive, the combination with a vertically sliding driving-box, an adjusting-wedge having a vertical movement, a pedestal in which said box slides, and a binder connecting the lower ends of said pedestal, of a screw-stem mounted on the lower end of said wedge parallel to its longitudinal direction of movement, a slideway mounted on the bottom face of said binder, a gear-cage engaging said slideway and having therefore a lateral sliding movement with respect to said binder, a worm-wheel nut confined in said gear-cage and engaging the threads of said screw-stem, a worm-shaft parallel to the driving-axle and having a worm engaging said worm-wheel nut, means for rotating said worm-shaft, and means for holding it against rotation.

13. In a locomotive, the combination with a vertically sliding driving-box, an adjusting-wedge having a vertical movement, a pedestal in which said box slides, and a binder connecting the lower ends of said pedestal, of a screw-stem mounted on the lower end of said wedge parallel to its longitudinal direction of movement, a slideway mounted on the bottom face of said binder, a gear-cage engaging said slideway and having therefore a lateral sliding movement with respect to said binder, a worm-wheel nut confined in said gear-cage and engaging the threads of said screw-stem, a worm-shaft parallel to the driving-axle and having a worm engaging said worm-wheel nut, the front end of said worm-shaft being adapted for engagement by a wrench or like device for rotating it, and a ratchet-device mounted on said worm-shaft and acting to check its rotative movement.

14. In a locomotive, the combination with a vertically moving driving-box, a pedestal therefor, a binder connecting the lower ends of said pedestal, and an adjustment-wedge between one side of said box and said pedestal and having a vertically sliding adjustment-movement; of a pair of vertical screw-stems mounted on the lower end of said wedge and passing through holes in said binder, a slideway carried by said binder, a gear-cage having a lateral sliding-movement upon said slideway, a pair of worm-wheel nuts confined by said gear-cage and engaging the threads of said stems, a worm-shaft parallel to the driving-shaft and carrying a pair of worms engaging said worm-wheel nuts, said worm-shaft being rotatably mounted in said gear-cage and having its front end squared to adapt it to be turned by a wrench or like device, a ratchet-wheel keyed upon said shaft at the front of said gear-cage, a double-ended reversible pawl either end of which is adapted to engage the teeth of said ratchet-wheel, and a spring adapted to hold either end of said pawl against said ratchet-wheel, substantially as described.

In witness whereof, I have hereunto set my hand in the presence of two witnesses.

FRED A. DIECKMAN.

Witnesses:
EVANGELINE KAZILEH,
WALTER M. JOYCE.