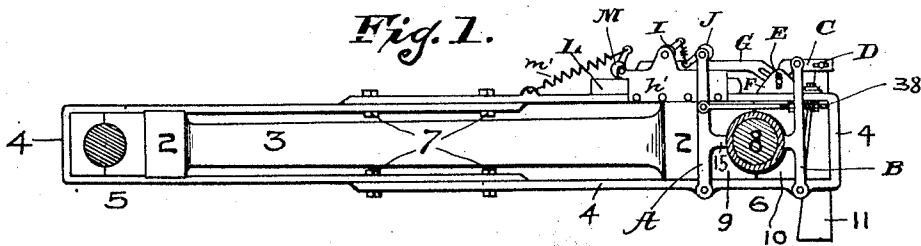


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2 SHEETS—SHEET 1.



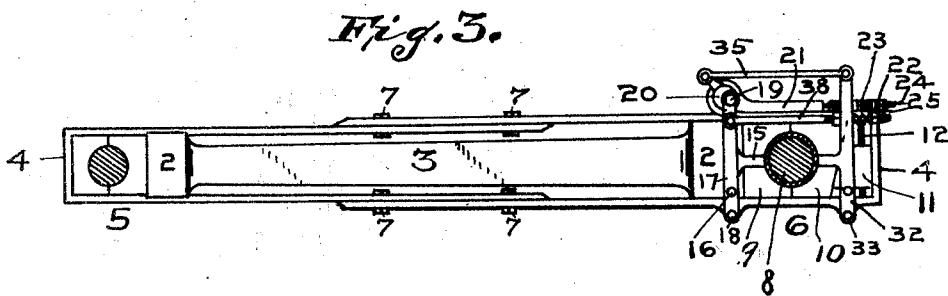
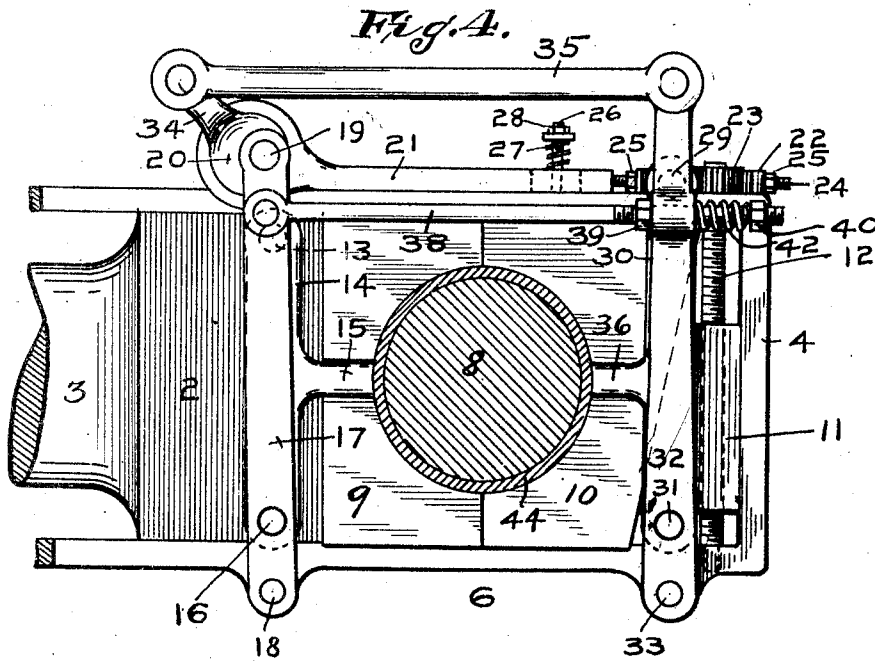
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J. T. HAY.
 AUTOMATIC TAKE-UP FOR JOURNAL BOXES.
 APPLICATION FILED OCT. 16, 1911.

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Patented Apr. 15, 1913.

2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

JOHN T. HAY, OF DARKE COUNTY, OHIO.

AUTOMATIC TAKE-UP FOR JOURNAL-BOXES.

1,058,862.

Specification of Letters Patent.

Patented Apr. 15, 1913.

Application filed October 16, 1911. Serial No. 655,013.

To all whom it may concern:

Be it known that I, JOHN T. HAY, a citizen of the United States, residing in the county of Darke and State of Ohio, have invented certain new and useful Improvements in Automatic Take-Ups for Journal-Boxes, of which the following is a specification.

The object of this invention is to provide automatic means for so adjusting the boxes of a journal toward a shaft or pin revolvably mounted therein, as to take up all wear and objectionable looseness as same develops, and to provide automatic means for separating the boxes of a journal when its shaft or pin becomes expanded and tight by overheating.

It is well known that the amount of appreciable wear on different journal boxes varies for the same amount of use, whereby one box of a pair will wear faster than its mate and the object of my invention is to provide an automatic regulation between the parts of my adjusting mechanism which will compensate for and equalize the differences in wear between the boxes of a journal.

A further object of my invention is to connect the stirrups at each end of a connecting-rod together whereby the journal-boxes at both ends will all be adjusted from one end of the rod, the automatic adjustment of the journal-boxes at one end adjusting the boxes at the other end of the rod, and whereby my device will automatically adjust itself to the unequal wear of any journal box at either or both of said ends.

I accomplish the above objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1, is a view in side elevation of a connecting-rod embodying my invention. Fig. 2 is a view on a larger scale of one end of the same rod which is illustrated in Fig. 1. Fig. 3 is a view similar to Fig. 1, of a modified construction, and Fig. 4, is a view on a larger scale of the modified form shown in Fig. 3.

Like characters of reference indicate like parts throughout the several views of the drawings.

3 is a connecting-rod having stirrups 4 at each end which pass around two-part journal-boxes 5 and 6 to support said boxes and hold them in operative position at their respective ends of the rod. The stems of the stirrups 4, instead of being bolted in the usual way to the enlarged ends 2 of the rods,

slide loosely in suitable channels of said enlargements and are extended until the stems of the opposing stirrups meet and lap each other, and they are then rigidly secured together by means of the bolts 7. The two stirrups might have their stems integrally united instead of being in separate lapped pieces bolted together as shown. As the two stirrups are thus connected and are free to slide longitudinally, the longitudinal movement of one will correspondingly move the other. Consequently, when the journal-boxes at the ends of the connecting-rod become loose by wear, the tightening of a set at one end will exert a pressure against the stirrup at that end to move it, and the movement will be transmitted to the other stirrup so moving it as to tighten its boxes. As each of the four boxes thus to be kept tight may wear at a different rate from the others a device to keep them tight must be capable of a variable speed, some parts of the mechanism acting faster than other parts in order to keep up with the rate of wear which it more directly controls and the device must be capable of equalizing and distributing this unequal action.

I have shown as my invention such an automatic mechanism and have shown it as applied to the journals of a connecting rod, for which it is well adapted, but it is also applicable to all journals having one or more movable box members and I therefore do not desire to be limited in the application of my device, but wish it to be understood that I here show and describe it as applied to a connecting rod, for purposes of illustration only.

Referring to the drawings, and particularly the Fig. 2, 8 is a pin or shaft mounted in a bearing comprising the two brasses or box halves 9 and 10. The outer end of the outer box member 10 is oblique to the longitudinal dimensions of the connecting-rod, as shown, and operating in conjunction therewith is a tapering key 11. Liners *x* may be inserted at the ends of the boxes, in the usual manner, as shown, to fill out excess space.

Secured by pivot 18 to the lower stem of the stirrup 4 is a lever A, having an extension 15 which bears against the shaft 8, and pivoted at 33 to the lower strap of stirrup 4 is lever B having an extension 36 which bears against the shaft 8 at a point diametrically opposite the said bearing 15 from lever A. The two levers A and

B are connected by a rod 38, which is pivoted at one end to the lever A and has its opposite end extended through a suitable opening in the lever B. This last end of the rod 38 is screw-threaded to receive a nut 39 by which the approach of levers A and B toward each other may be regulated and the journals allowed to run loose or tight to suit the requirements of different journals, but never so tight as to leave no oil space between the shaft and the journal members; and on the outer end of the rod 38 is a nut 40. Between the nut 40 and lever B is a spirally wound spring 42 which, acting through the rod 38, draws the levers A and B toward each other and keeps their extensions 15 and 36 in contact with the shaft 8.

Pivotally mounted on the upper end of the lever B is a bent lever C having its outer arm provided with a longitudinal slot *d* to receive a pin D from the tapering key 11. The inner and downwardly bent end of the lever C has a longitudinal slot *c* to receive a transverse pin E. Standards F secured to the upper stem of stirrup 4 has vertical slots *f* through which the pin E also passes, and the projecting ends of the pin are provided with enlargements or heads, as shown in Fig. 2, to prevent the longitudinal withdrawal of the pin from said slots. An upward movement of the pin E in slots *f* and *c* will transmit any pressure and movement from the pin E to lever C near to the fulcrum of said lever thereby shortening the bent arm of lever C and correspondingly increasing the travel of the outer arm of said lever. The attached key 11 will be raised with a correspondingly greater speed. When the pin E is lowered in said slots *f* and *c* the bent arm of lever C will be correspondingly lengthened causing the outer arm to move a less distance. The raising and lowering of pin E in the slots *f* and *c* is accomplished by the longitudinal movement of a bar G having a bent end in which is an oblique slot *g* through which the pin E also passes in the manner shown in Fig. 2. The bent end of the bar G rests upon the base of standard F and is slotted to loosely receive a bolt *e* which will hold the end of the bar down and at the same time allow it to slide past bolt *e*. The bolt *e* and other rubbing parts associated with bar G are kept sufficiently tight to prevent movement of the bar G in the direction of the arrow by inertia.

The bar G rests upon a table *h* having sides *h'* extending down and secured to the upper stem of the stirrup 4. The sides *h'* are extended upwardly to form ears H between which a cam I is mounted to bear against the bar G. Mounted at the top of lever A is a cam J which also bears against the top of the bar G. Both cams I and J are adapted to permit the bar G to move toward pin E and to prevent the movement

of said bar in the opposite direction. The cam I has an arm extension *i* and the cam J has a like arm extension *j*, both arms being on adjacent sides of their cams, and the two arms are joined together by means of a coiled spring K, the tension of which, acting through said arms, holds the two cams I and J in contact with the bar G. The construction however will permit the oscillatory movement of lever A away from lever B without taking the bar G with it, and it will also be noted that the action of cam I at such times will positively prevent the movement of bar G with the lever A. But upon the return movement of lever A the cam J will lock the bar G to the lever A causing said bar to move with lever A toward pin E and it will then be noted that the action of cam I will permit this movement of the bar G toward the pin E. It will thus be seen that the bar G is capable of adjustment longitudinally toward the pin E but cannot be moved in the opposite direction.

Slidably mounted upon the upper stem of stirrup 4 below the table *h* is a bar L. A cam M is mounted on the table *h* and bears against the bar L in a manner to lock the bar against movement toward the pin E but permitting it to move in the opposite direction. The cam M has an arm *m* to which a spring *m'* is connected at one end, the other end of the spring being made fast to the upper stem of stirrup 4 as shown in Fig. 1. The bar L has a vertical slot through it, through which the lever A passes, the slot being of sufficient length to permit a limited oscillatory movement of lever A, and mounted in a suitable socket in the bar L and entering the slot and bearing against the lever A is a spring N of less strength than the spring 42 on the rod 38. The tension of the spring N will be regulated by a set-screw *n*.

As the shaft 8 will generally be of soft iron or steel which will wear readily, I prefer to shrink a collar 44 of hardened steel around it for the extensions 15 and 36 to bear against.

The operation of my invention is as follows: Assuming that the journals 5 and 6 at both ends of the connecting rod have been made tight against their respective shafts or pins by the introduction of liners *x*, if necessary, and that a bearing at either end 5 or 6 of the connecting rod has since become loose by wear, which, because of the stirrup connections loosens the journals at both ends of the rod; then, by the alternate push and pull of the connecting rod against the shafts at each revolution of the crank, the levers A and B tied together by the spring-tightened rod 38 will oscillate, and the bar G, by the action of cams I and J will be moved toward the pin E, raising the latter. This has a tendency to swing the lever C around

the pivot c' to lower the outer arm of the lever and lower the wedge 11. But this is immediately overcome by the swing of lever B toward shaft 8, toward which it is also drawn by spring 42 on rod 38, and at this inward movement of the lever B the pin E becomes the pivot around which the lever C swings, and the resulting upper swing of the latter raises and tightens the wedge 11. The above oscillations of the levers A, B and C, will only continue until the pin E has reached a point where it will raise the key 11 fast enough to take up all wear. When this occurs the levers A, B and C cease oscillating but will move only in the required direction to raise the key 11 sufficiently to take up the wear. The proper movement of the key is determined automatically as above described by raising the pin E but when the right position of pin E is thus once found, the operation of levers A, B, and C will continue to raise key 11 as long as the relative rate of wear on the several boxes remains unchanged. Should this again vary, the oscillatory movement of said levers and corresponding movement of bar G to raise pin E will again occur. The oscillatory movement of levers A, B, and C is occasioned by a wear on the journal boxes at a faster rate than the key 11 is moved to take it up. The tightness of the boxes will be regulated by the tension of spring 42, as regulated by nuts 39 and 40.

Should the journals become too tight, as by the over heating of their shafts, the lever B will be moved outwardly by the expansion of the shaft, thereby lowering the wedge 11 and loosening the boxes. By the cooling of the shaft and its resulting shrinkage, the lever B will swing back by the action of spring 42, and the wedge 11 will be raised and the journal tightened and a normal condition retained until the journals become heated again.

The bar L can only move toward the cam M which movement will occur by the pressure against it of the lever A which will keep the spring N tight against said lever and prevent the rattling of the parts of my device and also keep the levers A and B from swinging on their pivots toward the wedge 11 by the wearing away of the journal members, thereby lowering and loosening the wedge 11 instead of causing the levers to oscillate by the action of spring N against the lever A together with the lateral movement of the shaft. This oscillatory movement projects the bar G to raise the pivotal point E to tighten the wedge by the action of the lever C. When by wear of the journal boxes the bar L has reached the limit of its longitudinal movements it will be set back by manually releasing it from its cams, and additional liners x will be added to tighten the boxes.

In the modification shown in Figs. 3 and 4 between the oblique end of the outer boxes and the adjacent end of strap 4 is a tapering block 11 through which passes a threaded bolt 12 having its ends secured in strap 4 as shown. The block 11 will be held at any given position by the bolt 12. Attached to enlargement 2 of the connecting rod by pivot 13 is a lever 14 having a lateral extension 15 which bears against the shaft 8. The other end of lever 14 is secured by pivot 16 to a lever 17. The lever 17 oscillates about a pivot 18 adjacent to the pivot 16, and its opposite end is attached to a pivot 19 mounted eccentrically of a wheel 20. The wheel 20 is mounted in a suitably enlarged end of the bar 21, and the bar 21 is slidably mounted upon the stem of the stirrup 4, as shown, and terminates opposite the wheel 20 with a rack 22. The teeth of the rack 22 engage with the teeth of a pinion 23 as mounted on the end of screw-bolt 12. The rack 22 will preferably be separated from the remainder of the bar, to which it is secured by bolt extension 24, passing longitudinally through the rack and retained between a pair of nuts 25. This provides an adjustment for the several parts in assembling them. The bar 21 is slotted longitudinally for the passage of the bolt 26 which bolt is surrounded by spring 27 held by a nut 28, all for the purpose of holding the bar against the stem 4. Secured by the pivot 29 to the upper stem of stirrup 4 is a lever 30, the lower end of which is pivotally secured at 31 to a lever 32. The lever 32 is pivoted at 33 to the lower strap of stirrup 4, and its upper end is connected by a link-bar 35 with an arm extension 34 from the wheel 20. The lever 32 has an extension 36 which bears against the shaft 8. The two levers 17 and 32 are connected by rod 38, pivoted to lever 17 and passed loosely through a suitable perforation in lever 32. This inserted end is screw-threaded to receive an inner nut 39 by which the approach toward each other of the levers 17 and 32 may be regulated, and the journals allowed to run loose or tight, and it has an outer nut 40. Between the nut 40 and the lever 32 is a spirally wound spring 42, which, acting through the rod 38, draws the levers 17 and 32 toward each other and keeps extension 15 of connected lever 14, and extension 36 of lever 30 in constant contact with the shaft 8. The operation of this modified form of my device is as follows: Any variation in the journal boxes or shaft 8 due to wear or expansion will be transmitted on one side through the extension 15 thereby swinging the lever 14 about its pivot 13. This movement is multiplied by the connection through pivot 16 of the lever 14 with the lever 17 so that the upper end of the lever 17 will be moved an appreciable distance by the slight movement of the extension 15.

sion 15. This movement of the upper end of lever 17 will move the bar 21 in a longitudinal direction causing the rack at its other end to rotate the cogged wheel 23, thereby rotating the shaft 12 and moving the wedge-block 11 along the oblique face of the box 10. This wedge-action of the block 11 against box 10 will crowd the latter toward shaft 8 taking up any looseness in the bearing. The action of spring 42 through its associated connections holds the extension 15 in constant contact with shaft 8. Expansion of shaft 8 due to overheating, causing the shaft to run tight in its journal will act through the similar levers at the right of shaft 8 to loosen the bearing. This expansion of shaft 8 acts through extension 36 of lever 30 to oscillate the latter, and by the connection of lever 30 with lever 32, the lever 32 will be oscillated to a multiplied degree and the movement of its upper end will be transmitted through link-bar 35 and arm 34 to the wheel 20 causing the eccentric pin 19 of said wheel, to which lever 17 is pivoted, to move the wheel 20 in a manner to impart a longitudinal movement to the bar 21 in a reverse direction from that previously described, whereby through rack 22 and pinion 23 the screw-bolt 12 will be rotated in a direction to lower the wedge block 11 and release the box 10. This loosens the journal of shaft 8 relieving the tightness which was due to the expansion of said shaft. The spring 42 acting through the various associated parts, previously described, maintains both extensions 15 and 36 in constant contact with the shaft 8, not only during the expansion but also during the contraction of said shaft, and not only will the wedge be lowered to loosen the journals, as above described, but it will be raised by a reverse action of the parts influenced by spring 42 in a manner which will be readily apparent and which therefore need not be described in detail.

The means for moving wedge 11, actuated by the variations in diameter of shaft 8 under different temperatures to tighten or loosen the journals 9 and 10 with relation to shaft 8, may be varied from that shown in the drawings without departing from the spirit of my invention, and I therefore do not desire to be limited to the particular mechanism which I have here shown and described, and

What I do claim as new and wish to secure by Letters Patent of the United States, is—

1. In a journal for rotary shafts, a plurality of box-members one of which is movable, a holder in which the box-members are mounted, a wedge in the holder to tighten

the members, means for automatically regulating the maximum approach of the box members toward the shaft, means for automatically moving the wedge at any variation from said regulated approach of the box-members toward their shaft to maintain a uniform tightness of journal, and means to prevent movement of the wedge in a direction to loosen it.

2. In a journal for rotary shafts, a plurality of box members one of which is movable and has an oblique end, a holder in which the box members are mounted, a wedge in the holder contacting with the oblique box member to hold the members from spreading apart, and means operated by the expansion and contraction of the shaft for moving the wedge to equalize the pressure of the members against the shaft.

3. In a journal for rotary shafts, a plurality of box members one of which is movable and has an oblique end, a holder in which the box members are mounted, a wedge in the holder contacting with the oblique end of the box member to hold the members from separating, means contacting with the shaft to move the wedge by the expansion and contraction of the shaft and elastic means for maintaining said contact.

4. In a journal for rotary shafts, a plurality of box members one of which is movable and has an oblique end, a holder in which the box members are mounted, a wedge in the holder contacting with the oblique box member to tighten all of the members, means for automatically regulating the maximum approach of the box-members toward the shaft, means for automatically moving the wedge at any variation from said regulated approach of the box members toward their shafts; to maintain a uniform relation between the shaft and box members, and means to prevent the movement of the wedge in a direction to-loosen it.

5. In a journal for rotary shafts, a plurality of box members one of which is movable, a holder in which the box members are mounted, a wedge in the holder to tighten all of the members, automatic means to move the wedge, and automatic means for regulating and maintaining the distance of the box members from the shaft.

In witness whereof, I have hereunto set my hand and seal at Indianapolis, Indiana, this 28th day of August, A. D. one thousand nine hundred and eleven.

JOHN T. HAY. [L. S.]

Witnesses:

F. W. WOERNER,
L. B. WOERNER.