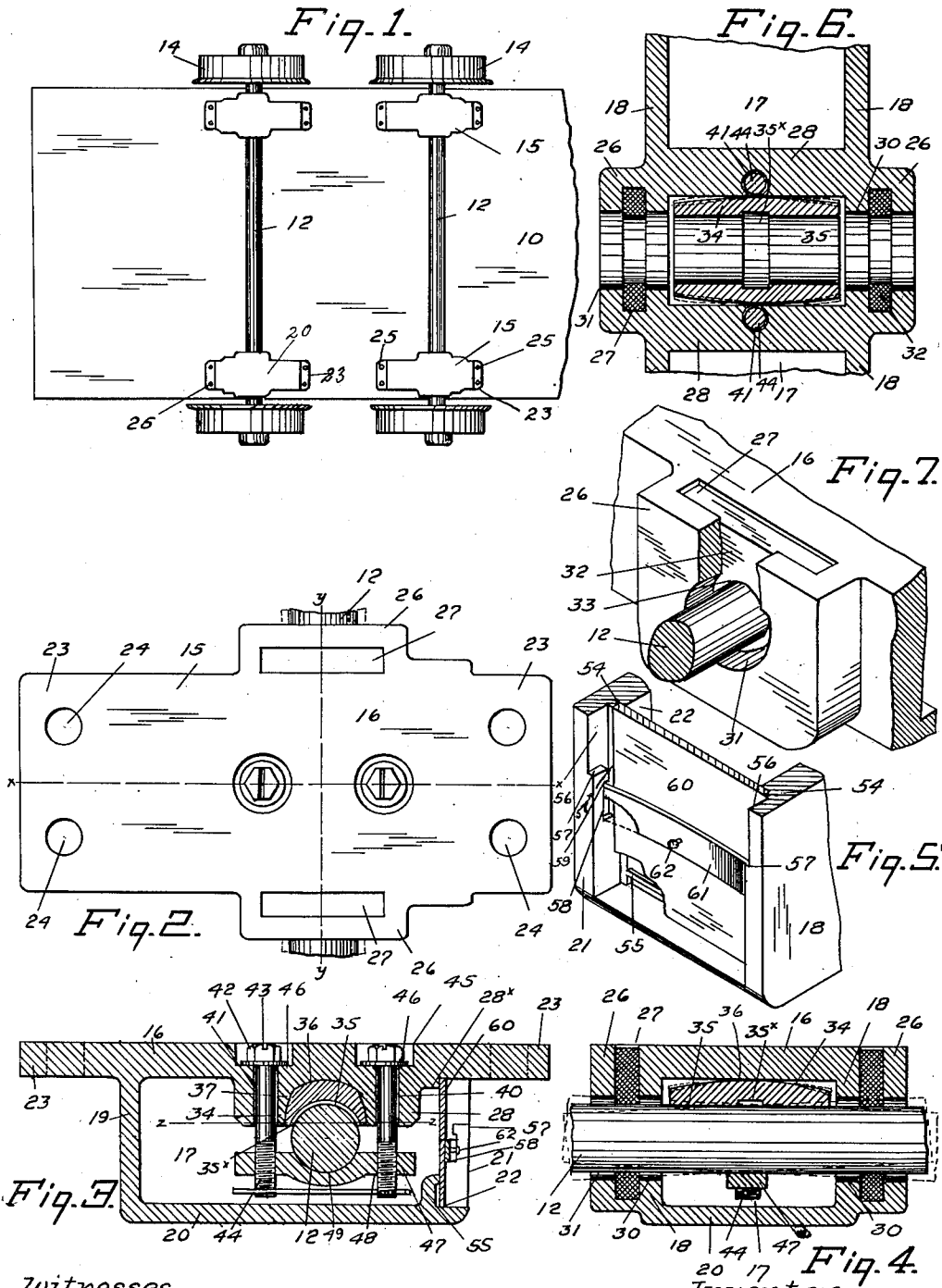


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CAR AXLE BOX.
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Patented June 3, 1913.



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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN R. STEPHENS, a citizen of the United States of America, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Car-Axle Boxes; and I do hereby declare that the following is a full, clear, and exact description of the invention, such as will enable others to make and use the same, reference being had to the accompanying drawings, forming a part of this specification.

The object of the invention, primarily, is to provide a proper adjustment of the bearings of a car body to compensate for wear in the bearings. Second: to provide an adjustable, non-binding suspension means for the axle. Third: to provide a non-bearing surface or relief in the bearing centrally thereto not essentially requiring lubrication. Fourth: to provide for the lubrication of the axles and bearings within the boxes.

The invention consists in the novel construction and combination of parts, such as will be first fully described and then specifically pointed out in the claims.

In the drawings: Figure 1, is a bottom view of a car, showing the car wheels and axles, and the novel boxings for the rotary axles, secured to the bottom of the car. Fig. 2, is a plan view, in detail, of one of the boxings, showing portions of the axle, and the positions of play of the axle in dotted lines. Fig. 3, is a vertical, sectional view of the boxing, taken on the line *x, x*, on Fig. 2. Fig. 4, is a vertical, sectional view, taken on the line *y, y*, on Fig. 2. Fig. 5, is a view, in perspective, of the front, end of one of the boxes, with the top plate removed showing the cover in place. Fig. 6, is a horizontal, sectional view of a broken portion of one of the boxes, taken upon the line *z, z*, on Fig. 3, and looking upward, showing the upper rocking bearing for the car axle, the enlarged openings for the axles and the recesses for the pads. Fig. 7, is a detail view, in perspective, taken from one side of the box, showing the extension, the enlarged opening for the axle, and the pocket for the pad, a portion of the boxing being broken away to show the pad extending around the axle.

Similar numerals of reference indicate corresponding parts in all the figures of the drawing.

Referring to the drawings, 10 indicates the bottom or bed of the car, 12, the rotary axles, 14 the car wheels, and 15 the novel boxes for the rotary axles, which as seen in the drawing are located in pairs, in opposite positions, adjacent to the longitudinal portions of the bottom 10, and a short distance from a line extending transversely to the bottom 10, and equi-distant from its ends.

The boxes 15 are hollow castings, each consisting of an upper plate 16, rectangular in shape, beneath which plate is a lubricating receptacle or chamber 17, the sides 18, and inner end 19 extend downwardly a considerable distance, and are integrally a part of the plate 16. With said side and ends of the box is connected a bottom 20, integral therewith. The outer end 21, of the box is provided with an opening 22, the full width and height of the chamber 17. From the line of the outer surface of the ends 19 and 21, of the box, portions of the top plate 16, are extended longitudinally a corresponding distance forming flanges 23, to the box, which are perforated at 24, for the securing bolts 25, by means of which the plates 16, forming the top of the boxes, are secured longitudinally to the bottom of the car, in pairs and opposite each other, and one pair reversed in position in respect to the other, with the ends 21 having the openings 22, outward in position. Upon the outer surfaces of the box are cast the extensions 26, which extend lengthwise the box about one-half the length of the sides 18, and downwardly from the line of the upper surface of the top plate 16, nearly to the line of the lower surface of the bottom 20. (See Figs. 4 and 7). These extensions extend outwardly a short distance, and are located in position on the sides 18, of the box, a slight distance in the direction of the end 21, of the box, from a line extending transversely through the box intermediate the ends 19 and 21, for convenience, as further explained. In these extensions 26 are recesses or pockets 27, varying in width and nearly the length of said extensions, and which extend downwardly to within a short distance of the lower portions of said extensions.

Within the lubricating chamber 17, and extending downwardly a short distance from the line of the inner surface of the top plate 16, are parallel ribs 28, extending transversely to the box and integral with

said plate, and spaced apart a considerable distance from each other from lines extending transversely through the box, and passing through the portions of the extensions 26, at the ends of recesses 27. In the side 18, of the box, between lines extending through the ribs 28, and equi-distant from the inner surfaces of the top plate 16, and bottom plate 20, are the transverse openings 30, and through the sides of extensions 26 are registering openings 31, through which pass the rotary axles 12, these openings 30 and 31 being of like size, but larger in circumference than said axles. In the recesses or pockets 27 are elastic pads 32, made from felt or like material, which fit closely within the pocket and extend downwardly to the bottom of said recess or pocket 27. In said pads 32 are openings 33, which are smaller in circumference than the openings 31 and 32, in the box 15, and of the exact circumference of the axles, so that when the axles are forced through the openings 33, in the pads, a close contact of the surfaces of the opening 33 is obtained, the flexibility of the pad permitting the universal movements of the axles in the openings in the boxes.

The axle bearing 34 consists of an independent rocking plate or casting, of suitable material, such as brass, located within the lubricating chamber of each box and extending transversely thereto, between the ribs 28, on the inner surface of the top 16, upon which it has a rolling contact and to within slight distances of the inner surfaces of the sides 18, of the box. In the lower surface of the rocking plate 34 is a transverse groove 35, which extends over a segment portion of the car axle, and in which groove, at a point intermediate the ends of said plate 34, is a longitudinal depression 35*, which forms a non-bearing surface, and therefore a relief at that point, and not essentially requiring lubrication. The upper surface of the bearing plate 34 is cut away or inclined from point 36, intermediate its ends, outwardly in opposite directions, and inwardly. From the point 36, or vertical axis of said bearing 36, which is of some width and forms the bearing point of the plate on the inner surface of the top plate 16, as seen in Fig. 3, the sides 37, of said plate are curved outwardly in cross section, in a slight degree.

Through the upper surface of the top plate 16, of the box and the ribs 28, upon a line extending longitudinally through the box 15, equi-distant from the sides 18, extend the vertical bolt openings 40, in which are inserted the bolts 41, which are provided with heads 42, nicked at 43, and the lower ends of the bolts screw-threaded at 44, the bolts being slightly smaller than the opening 40 to afford a swinging movement of

the bolts in the opening and the plate 16, being counter-sunk at 45, around said openings 40, to receive a washer 46, around the bolt and beneath the head 42.

Beneath the axle 12, in the box, is a narrow, adjustable swinging plate or stirrup 47, extending in position transversely to the bearing 34, in the ends of which are screw-threaded openings 48, and in which are fitted the lower screw-threaded ends 44, of the bolts 41. In the central portion of the plate or stirrup 47, is a depression 49, in the arc of a circle, which receives the lower surface of the rotary axle 12, the stirrup serving to support the axle, and which in turn supports the bearings in position when the weight of the car is thrown upon it.

In the sides of the opening 22, in the end 21, of the box 15, a short distance inwardly from the outer surfaces of said end are vertical rabbets or jambs 54, extending from the inner surface of the top 16, to the inner surface of the bottom 20, of the box. Upon the inner surface of said bottom a slight distance inwardly from the line of the inner side of jambs 54, is an upwardly-extended plate or casting 55, integral with the bottom 20, and extending from the inner surface of one side 18, of the box to the inner surface of the other side 18, its upper end being curved outwardly in a very slight degree, the height of the plate or casting 55, as seen is less than the height from the inner surface of the bottom 20, to the axle 12, the plate 55 serving to afford with the sides and end 19, of the box, a reservoir for the lubricating oil in excess of the amount required for lubrication, and at the same time afford a space above the plate 55, for the repair or adjustment of the axle bearings.

The inner surfaces 56, of the upper portions of the sides to the openings 22 extending from the line of the inner surface of the top plate 16 downwardly about one-third the distance toward bottom 20, and outwardly from the line of the outer sides of jambs 54, to the end 21, of the box, are cut away the depth of said jambs, leaving a shoulder 57, and in said surfaces directly beneath said shoulder, a slight distance are notches 58, the inner surfaces of the shoulder being cut away at 57*, to provide openings leading to said notches.

60 indicates the cover or lid closing the opening 22, to the chamber 17, in the jambs 54, and 21, of the box 15, and which consists of a thin flat plate, extending in width from the inner surface of one jamb 54, in one side 18, of the box, to the inner surface of the other side of the box, and from the inner surface of the bottom 20, to the inner surface of plate 16 in height.

Upon the outer surface of the cover 60 is a spring-locking plate 61, slightly longer

than the width of the cover 60, the ends of which spring-plate are curved or spring outwardly, as seen in Fig. 5, and placed in position subsequent to the fitting of the cover to the opening 22, in the end of the box, as further described. In the spring plate 61, at a point intermediate its ends is an attachment, such as a knob 62, to which may be connected any releasing device best adapted to press upon and release the ends of the spring plate from the notches 58, and not necessary to illustrate.

The chamber 17, of the axle box 15, is filled with woolwaste and lubricating oil introduced within the bottom of the chamber, when cover 60 is removed, the waste absorbing the oil, and from which the distribution to the axle bearings is effected in the usual manner, the pads 32, on the axle, and the cover 60 preventing the escape of the oil from the chamber 17. When the cover 60 is inserted in position to close the opening in the end of the box, it is placed directly within the jambs 54, to which it is fitted. The spring-locking plate, which is now held nearly straight, is placed against the outer surface of the cover 60, and moved downwardly until the ends pass the shoulder 57, and come opposite the notches 58, when the ends are permitted to spring outwardly and enter the notches 58, the central portion of the spring plate bearing forcibly against the cover 60, to hold the same in place, the upper, inner surface of the cover having a close engagement with a portion 28*, of the rib 28, adjacent to the opening for the cover, and which extends to the line of the inner sides of said jambs 54 (see Fig. 3).

In operation the boxes are applied as shown, to a four-wheel truck, without springs. In running upon an uneven track, these trucks are frequently supported on three of the wheels only, particularly when these cars are employed for removing coal from mines, the axle near the fourth wheel having a tendency to fall downwardly in the axle box until the latter wheel rests upon the track and binds the axle in the opposite bearing, which my invention obviates. The rocking motion of the axles in the bearing at opposite ends of each axle and the swinging portion of the stirrup, insures a constant and proper alinement of the bearings with each other, regardless of the distortion of the bed of the car, due to unevenness of track or loading, while the axles preserve their rigidity, the bed may be laterally or vertically sprung or distorted, without causing binding. When the car is pulled through mud, or from any horizontal strain at the end of the bearings, the play or swing of the bolts 41, in the larger openings 40, for said bolts, permits the bearings to close against the ribs 28, and the force of the strain effectually resisted by these ribs, with-

out undue strain on the bolts, or stirrup. The purpose of the stirrup 47 is to support the axles under the vertical center of each bearing, the position and form of the stirrup, together with the play of the bolts 41, in the openings 40, being such that the rocking motion of the bearings will not cause binding of the axle against either the bearing or the stirrup 47. The axle thus supported by the stirrup in its turn holds the bearing to its position on the axle box. Nevertheless, some slight play must be left between the stirrup and the axle, in order to prevent binding, and this is effected by the adjustment of the stirrup 47, on the bolts 41. The position of the stirrup immediately beneath the vertical center of the bearing enables the play of the axle to be limited to a minimum, without causing binding, and any other position would be less effective.

It is obvious that the oil soaked waste presses against the axle on both sides of the stirrup and maintains the supply of oil to those parts which are not immediately over the stirrup, since the bearing projects considerably beyond the line of the sides of the stirrup at each end.

In order to take up any discrepancy between the upper bearing 34, and the stirrup 47, the ends of the spring-plate 61 are pushed inwardly, and released from the notches 58, and the cover 60 removed. Access may then be had to bolts 41, the wire lock 52, removed, and a slight turning movement applied to the bolts to raise or lower the stirrup, according to the distance of movement of the bolts. The locking wire is then replaced, and the cover 60 secured in position in the jambs 54.

The pads 32 fit closely to the axles, the natural elasticity being sufficient to enable them to follow closely the play of the axles, and at the same time preventing the escape of the oil and the ingress of dirt.

Nothing heretofore that I am aware of has been devised to afford a support beneath the car for the axle, which, while supporting the axle from beneath, acts conjointly with an oscillating upper bearing that will permit the body of car to "hump" with the obvious inwardly rocking movement of the upper bearing, and at the same time will adjust itself to this inwardly-drawing movement from beneath the axle.

I am aware that a ball and socket bearing has been employed in which the ball is an integral part of the axle, but such a device neither admits of the "humping" of the bed of a car nor the play of the bearing longitudinally with the axle, nor a yielding movement co-acting with the forward and rearward play of the upper brasses or bearing. These advantages of my invention in their application to cars for coal mines are found to be of an absolute necessity in the

practical operation of the cars over the uneven tracks, while the old forms of axle bearings meet destruction.

The invention is applicable to vehicles of various descriptions, either for conveyances, such as are movable over track rails, or the surfaces of roads, and such modifications may be employed as are within the scope of the appended claims.

10 Having fully described my invention, what I now claim as new and desire to secure by Letters Patent is.

1. The combination with a car axle box, an upper rocking bearing for the axle extending longitudinally therewith and adapted to bear upon and having a rolling contact with the upper, inner surface of the box, and an independent lower swinging axle support extending at right angles to and beneath said axle, and adapted to adjust itself in position independently of the rocking position of the upper bearing.

2. The combination with a car axle box, an upper rocking bearing for the axle extending longitudinally therewith and adapted to bear upon and having a rolling contact with the upper, inner surface of the box, a plate or stirrup extending at right

angles to and beneath the axle, and swinging suspension means for said plate connected with the axle box and adapted to permit the independency of the rocking movement of the upper bearing.

3. In a lubricating car axle box, a rocking axle bearing extending longitudinally therewith and adapted to bear upon the upper, inner surface of the box, parallel ribs on said inner surface of the box spaced apart, and between which ribs said bearing is adapted to rock forwardly and rearwardly, by rolling contact with the rib against which it is pressed said box having openings in the upper portion thereof and swinging suspension bolts smaller in circumference than said openings and supported therein, and a narrow supporting plate for the axle adjustably connected with the lower ends of said bolts and adapted to adjust itself in position independently of the rocking movements of said upper bearings.

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