W. W. WORSWICK.

Car-Axle Box.

No. 213,082. Patented Mar. 11, 1879.

Fig. 1.

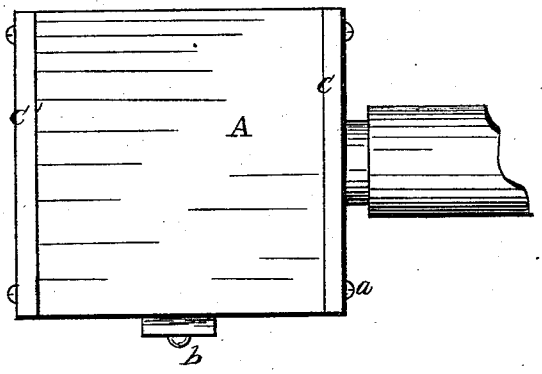


Fig. 2.

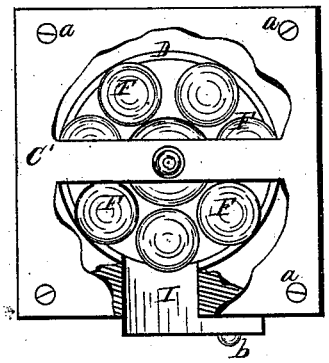


Fig. 3.

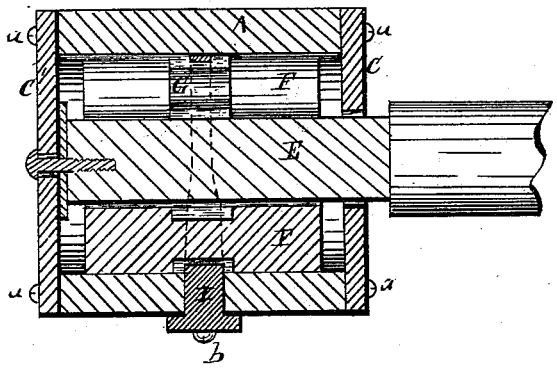


Fig. 4.

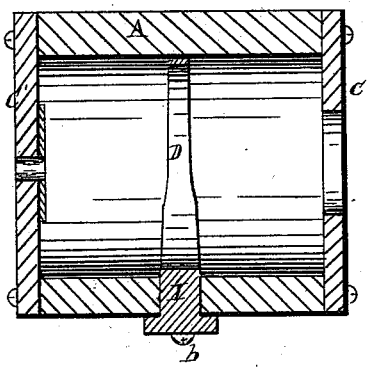
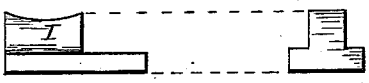


Fig. 5.



Witnesses.

W. H. Slate

J. T. Sargent

Inventor.

W. W. Worswick

per Bonnigen & Co

Attys.

UNITED STATES PATENT OFFICE.

WILLIAM W. WORSWICK, OF CLEVELAND, OHIO.

IMPROVEMENT IN CAR-AXLE BOXES.

Specification forming part of Letters Patent No. **213,082**, dated March 11, 1879; application filed January 27, 1879.

To all whom it may concern:

Be it known that I, WILLIAM WALTER WORSWICK, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and Improved Axle-Box for Railway-Cars, &c.; and I do hereby declare that the following is a full, clear, and complete description thereof, reference being had to the accompanying drawings, making a part of the same.

The nature of this invention relates to axle-journal boxes for railway-cars, &c., the object of which is to prevent the axle from undue wearing by causing the same to run upon anti-friction rollers arranged in the box around the axle-journal. Said rollers are guided in their movement around the axle-journal, and caused to maintain a central bearing relation to the axle-journal, by an annular rib or projection secured to the inner surface of the axle-box at about the central part. The said annular rib is adapted to fit loosely in a corresponding annular groove around each of the rollers, whereby they are restrained from undue lateral movement, and from impinging against the ends of the box, as aforesaid.

The peculiar shape of the rib is such as to guide the rollers so that they may have a central bearing upon the journal, thereby dispensing with the use of rings for holding and guiding the rollers usually employed in this class of journal-boxes.

The following is a more full description of the invention.

Figure 1 is an outside view of the axle-box. Fig. 2 is an end view, partly in section. Fig. 3 is a vertical section of the box, rollers, and axle. Fig. 4 is a vertical section of the box. Fig. 5 is a detached portion of the central rib.

Like letters of reference refer to like parts in the several views.

The journal-box alluded to above consists of the shell A, which may be of the shape shown, or of such modification thereof as will best adapt it to the place and purpose for which it is intended.

C C′ are the plates covering the ends of the box. The plates are secured thereto by bolts *a*, or otherwise. Circumferentially, and midway between the ends of the box, is secured an annular rib or ring, D.

In Fig. 2 a part of the end plate of the box is shown as broken away, that the annular rib may be seen. Said rib is wider at the lower side of the box than at the upper, as will be seen in Fig. 4, which represents one-half of the annular rib when the said rib is cut through its diameter from top to bottom. The dotted lines in Fig. 3 indicate a half-section of the rib when cut in the same direction. The purpose of constructing the rib variable in width will presently be shown.

E is the car axle or journal, around which are arranged the rollers F. In each of said rollers is a groove, G, Fig. 3, a little wider than the widest part of the annular rib received therein.

It will be observed that the rollers are shorter than the length of the box, so much so that in their lateral movement they cannot impinge against the end plates of the box, being prevented from so doing by the annular rib during the time they are free on the lower side of the box, and not supporting the weight of the car.

In the drawings the end of the axle is shown as secured by a screw to the end plate of the axle-box. This, however, is not essential. The screw may be omitted and the axle allowed to be free in the midst of the rollers.

Cars when in motion have more or less lateral movement, the force of which at times is very great. This lateral movement causes the ends of the axle to impinge against the end plates, upon which the said ends rub, producing a large amount of friction and consequent wearing of the parts. The lateral movement of the axle carries with it the roller, and if the lateral movement of the axle be considerable, the ends of the rollers will thereby be forced against the end plates of the axle-box, which will prevent them from turning, producing undue strain and wearing of the axle, and causing the rollers to twist. This is often the result in the axle-boxes in ordinary use, the rollers of which are forced against the ends of the box by the end-thrust of the axle. To prevent this fault of the ordinary axle-box, a certain amount of end-play (more or less) is allowed for the axle.

The length of the rollers is so proportioned in respect to the distance allowed for the said

end-play of the axle that when the rollers have a position on the axle as to be equally distant from the end and shoulder thereof, or, rather, equally distant from the ends of the axle-box, as shown in Fig. 3, then the end-thrust of the axle will not be sufficient to carry the ends of the rollers to the end of the box or the groove G against the annular rib—that is to say, the end of the axle will impinge upon the end plate of the box before the ends of the rollers can reach it; hence there can be no contact of the ends of the rollers with the end plate or the said grooves with the rib D.

The force of the lateral thrust of the axle is expended upon the end plate, and not upon the rollers, which will, therefore, continue to revolve upon the axle-journal in their revolutionary movement over it, at which time they are bearing the weight of the car. As a consequence of the end-thrust of the axle, the rollers will be carried or moved more or less endwise in the box by it. The narrowness of the upper part of the annular rib will allow of such lateral movement of the upper rollers without the shoulders of the grooves coming against the said annular rib; hence there will be no chafing of the sides of the rib and the shoulders of the grooves.

When the upper rollers are displaced laterally from their more central position by the end-thrust of the axle, they are again made to assume a central position, as shown in Fig. 3, by the wider part of the annular rib; and as the rollers in succession roll from the top of the journal around to the under side, where they no longer bear the weight of the car, they are moved to their central position by the widening of the rib acting upon the shoulders of the grooves, so that each roller in succession comes to the upper side of the axle-journal at or about the middle of it, as shown in said Fig. 3, thereby receiving the weight of the car while in a central position to the axle-box, which they could not assume were it not for the annular rib; but, on the contrary, the rollers would return from the under to the upper side of the axle-box in such lateral displacement as they may have received by the end-thrust of the axle, and which may have forced them hard against the end of the box and prevented them from rolling, thereby producing a large amount of friction on the end plates of the box and upon the face of the journal by the twisting and clogging of the rollers.

It will be seen in Fig. 2 that the uppermost rollers do not touch each other. Therefore no resistance is made by them to their separate rotary movement, though revolving in opposite directions.

From the above description of the journal-box it will be obvious that the series of rollers surrounding the axle requires no rings to hold them in proper position, and that no swaying of the car can force them against the ends of the axle-box, causing them to twist across the axle or cut into it by ceasing to rotate.

The rollers are inserted in the box around the axle as follows: In the lower side of the box is an opening cutting through the annular rib, thereby removing a segment of it in length sufficient to allow the end of a roller to pass through. In the above-said opening is fitted a plug, I, Fig. 2, a detached view of which is shown in Fig. 5. The upper end or surface of the plug is a segment adapted to fit the section cut out from the rib; hence, when the plug is inserted in the opening, there will be an unbroken continuation of the rib, as shown in the drawings. When the axle is inserted in the box, so many of the rollers are placed in around it as will pass between it and the rib. The rest of the rollers are then pushed in around the axle by passing them through the segmental space in the rib formed by withdrawing the plug from the opening. When the rollers are all in, the plug is inserted, thereby filling up the space through which the rollers had been passed. The plug is secured therein by any suitable means. In this way all the rollers are easily and readily inserted in the axle-box around the journal. The end plate, C′, is then placed on and properly secured.

By this construction and arrangement of a journal-box little or no oil is required, and the journal will have an easy and free play without the chafing and cutting of the journal and twisting and clogging of said rollers.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A journal-box provided internally with an annular rib of different width, in combination with a series of rollers having circumferential grooves adapted to receive the said rib and encircling the rollers, substantially as described.

2. In car axle journal-boxes, the combination of the case or shell A, provided with an interior annular rib, differing in width and adapted to the grooves of the rollers therein, plug I, forming a segment of said rib, rollers F, and journal, substantially as and for the purpose set forth.

WILLIAM WALTER WORSWICK.

Witnesses:
J. H. BURRIDGE,
W. H. BURRIDGE.