F. E. HOWARD.

ANTIFRICTION HINGE.

APPLICATION FILED SEPT. 8, 1921.

1,435,907. Patented Nov. 14, 1922.

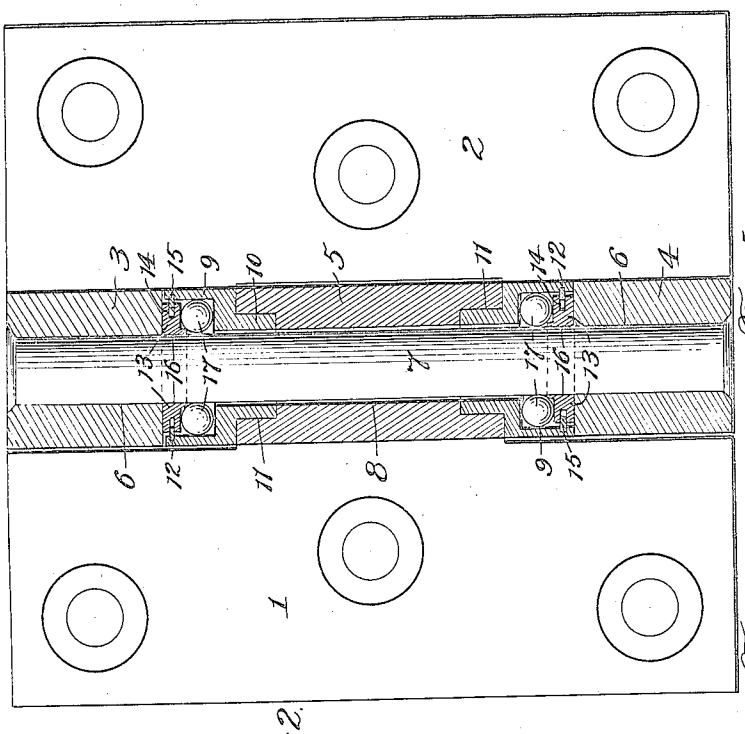


Fig. 2.

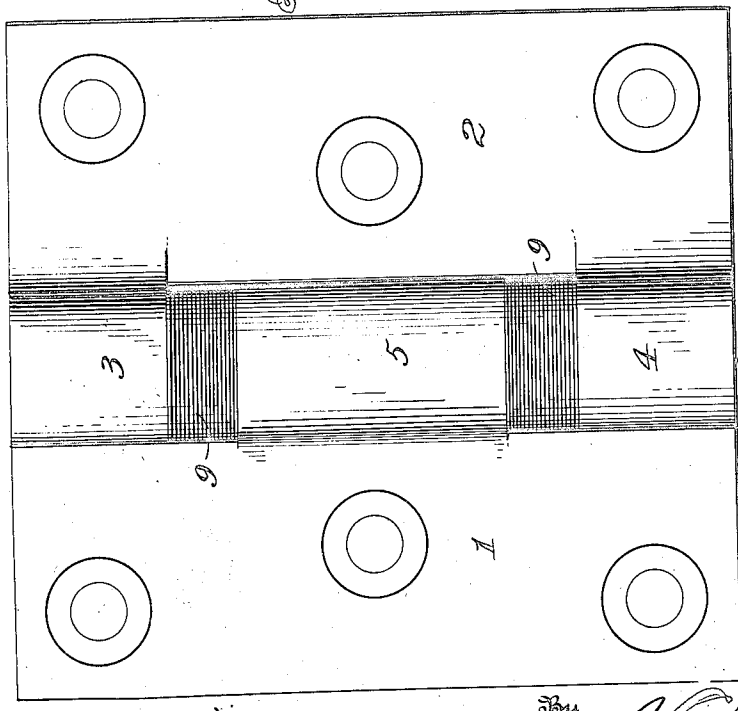


Fig. 1.

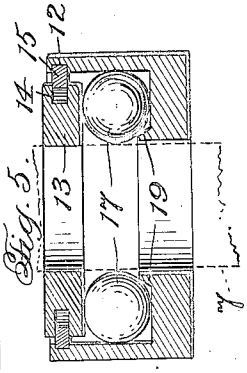


Fig. 5.

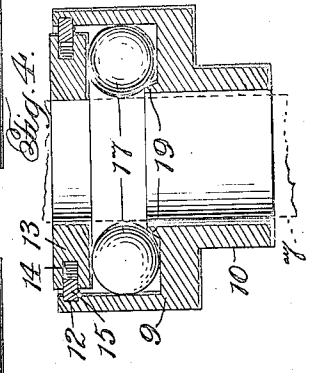


Fig. 4.

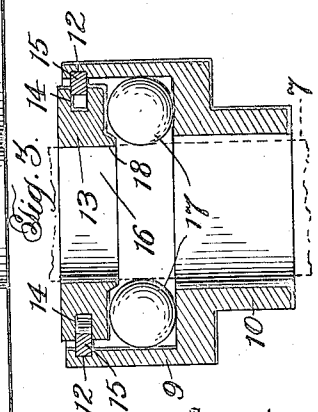


Fig. 3.

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UNITED STATES PATENT OFFICE.

FRANK E. HOWARD, OF HARTFORD, CONNECTICUT, ASSIGNOR TO JAMES L. HOWARD & CO., OF HARTFORD, CONNECTICUT.

ANTIFRICTION HINGE.

Application filed September 8, 1921. Serial No. 499,313.

To all whom it may concern:

Be it known that I, FRANK E. HOWARD, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Antifriction Hinges, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to hinges, and more particularly to anti-friction hinges.

Heretofore anti-friction hinges have been constructed with the ball races of considerably larger diameter than the barrel or knuckles of the hinge, which precluded the attachment of such hinges to flat surfaces met with in railway car work and particularly in steel railway cars, due to the fact that the races projected beyond the back surface of the leaves of the hinge and would therefore be crushed before the leaves could be seated on the flat surface.

Also, in most of these hinges, no provision was made for taking lateral or horizontal stresses on anti-friction devices, and the hinge was constructed with the pintle or butt pin necessarily fitted so closely that they would frequently corrode and freeze together so tightly as to cause either the leaves or pin to break.

It is therefore the principal object of this invention, not only to avoid the difficulties inherent in these previous hinges, but also to provide a hinge in which both vertical and horizontal stresses are taken care of on anti-friction devices, and thus also the freezing of the pintle to the knuckles is obviated.

It is a further object of this invention to provide a hinge having a compact anti-friction washer inserted between the knuckles whose diameter is no greater than the diameter of the barrel, whereby the hinge may be employed on flat steel construction without producing any binding or without crushing the ball races.

Still another object of the invention is the provision of a novel form of anti-friction device, so attached to one portion of the hinge barrel that when the pintle is withdrawn and the leaves separated, the anti-friction device will not become displaced or lost, but will always remain in position so that the knuckles may be aligned without fear of displacement of the anti-friction means, and so that the hinge pintle may be readily inserted.

Further objects of the invention will appear as the following description is read in connection with the accompanying drawings, which form a part of this application, and in which—

Figure 1 is an elevation of the hinge.

Fig. 2 is a vertical sectional view taken through the barrel, showing the preferred form of the invention.

Fig. 3 is an enlarged detailed section showing one form of the anti-friction bearing.

Fig. 4 is a similar view showing another form of anti-friction bearing.

Fig. 5 is a similar section of a modified form.

In the preferred embodiment of the invention, as illustrated in Figs. 1 to 4 inclusive, 1 and 2 represent the separate leaves of the hinge, the latter of which is provided with a pair of spaced knuckles 3 and 4, and the former of which is provided with a central knuckle 5 arranged to fit between the knuckles 3 and 4, as shown, so as to be aligned therewith.

The knuckles 3 and 4 have central longitudinal apertures 6 adapted to receive the pivot pintle 7 and the knuckle 5 is also centrally and longitudinally apertured as at 8, to receive the pintle 7, but the aperture 8 is of a somewhat larger diameter than the apertures 6 which fit the pintle, in order that the internal walls of the knuckles 5 may be entirely free of the pintle.

Fitted between the adjoining ends of the knuckles 3 and 5 and 4 and 5, are anti-friction devices, each of which consists of a cup 9, whose exterior diameter is the same as the exterior diameter of the knuckles, or more broadly speaking, the barrel of the hinge. This cup, as shown in Figs. 2 to 4 inclusive. is provided with a tubular extension 10 of reduced diameter, which fits in a corresponding socket 11, formed in the barrel 5, and whose walls are concentric with the walls of the bore 8.

The inner wall of the cup at the point adjacent to the outer end thereof, is provided with an annular groove 12, and seated within the cup, is a cone member 13, having a corresponding groove 14, in its periphery. These grooves 12 and 14 are arranged to receive a split spring locking washer 15,

which, when perfectly engaged with the grooves prevents displacement of the cone.

The bore 16 of the cone is substantially the same internal diameter as the pintle 7, while the opening of the tubular extension 10 is of slightly larger diameter, so that no portion of the cup 9 contacts with the pintle.

Interposed between the cup 9 and the cone 13 are a series of anti-friction balls 17 which are held against inward displacement by an annular flange 18, projecting inwardly from the cone 13 or by a similar annular flange 19, projecting inwardly from the cup 9 as shown in Fig. 4.

As clearly shown in Figs. 2, 3 and 4, the cone 13 projects slightly beyond the end of the cup so as to rest upon its adjacent knuckles 3 and 4 and the cups which are attached to the knuckle 5 are entirely free of the pintle, anti-friction engagement being had with the pintle by means of the anti-friction balls 17.

In practice, the cones 13 turns with the pintle and with the knuckles 3 and 4, rotating upon the anti-friction balls which produce a working fit between the pintle and the cups so as to take up any lateral as well as vertical stresses.

In the modified form shown in Fig. 5, the tubular extension which fits into the bore 11 of the knuckle 5 is dispensed with, and the cup rests directly upon the end of the knuckle 5 and the cone upon the knuckles 3 and 4. In this construction, however, as in the former construction, the diameter of the cup is the same as the barrel and the balls form a working fit between the cup and the pivot pintle.

While I have shown a tight pin butt, it is obvious that the invention may be just as readily applied to loose pin butts, or loose joint butts, or to hinges having on each leaf a plurality of knuckles, and I do not wish to be limited in any respect to the construction shown, which is only illustrative of a working embodiment of the broad invention, set forth in the appended claims.

What I claim and desire to secure by Letters Patent is:

1. In a hinge, the combination with separate leaves, having pintle receiving knuckles and connecting pintle passed therethrough, of an anti-friction device interposed between the knuckles of opposite leaves and carried by one of them, embodying in part anti-friction balls contacting with the pintle and forming a working fit between the anti-friction device and the pintle.

2. In a hinge, the combination with separate leaves, having apertured receiving knuckles, and a pintle connecting said knuckles, of an anti-friction device interposed between opposed knuckles of the leaves and carried by one of them and having a diameter no greater than the diameter of the knuckles, and embodying anti-friction balls directly engageable with the pintle and forming a working fit between the anti-friction device and the pintle.

3. In a hinge, the combination with separate leaves having engaged knuckles, and a pintle passing through the knuckles connecting the leaves, the bore through one of the knuckles being greater than the diameter of the pintle so as to be out of contact therewith, an anti-friction device interposed between opposed knuckles of the separate leaves and carried by one of them, and embodying in part anti-friction balls directly engaged with the pintle and forming a working fit between the anti-friction device and the pintle.

4. In a hinge, the combination with separate leaves having engaging knuckles and a pintle connecting the same, of an anti-friction device carried by one of the knuckles and having a diameter no greater than the knuckle, said anti-friction device comprising a cup and cone, and interposed anti-friction balls forming a working fit between the cup and pintle.

5. In a hinge, the combination with separate leaves having engaging knuckles and a pintle connecting said knuckles, of an anti-friction device interposed between opposed knuckles of the separate leaves and carried by and removable as a unit with the knuckle of one of the leaves.

6. In a hinge, the combination with separate leaves having engaging knuckles forming a barrel, and a pintle passed through the barrel and connecting the leaves, of an anti-friction device interposed between the ends of opposed knuckles of the separate leaves, said anti-friction device carried by the knuckle of one of the leaves and removable from the other knuckles as a unit therewith, and embodying in part anti-friction balls directly engageable with the pintle.

7. In a hinge, the combination with separate leaves having apertured knuckles forming a barrel, and a pintle passed through the barrel and connecting the leaves, of anti-friction devices interposed between opposed ends of the knuckles of separate leaves and of equal diameter with the barrel, said anti-friction devices embodying cups carried by one of the knuckles, cones engageable with the opposed knuckle and interposed balls forming a working fit between the cups and the pintle.

8. In a hinge, the combination with separate leaves having apertured knuckles forming a barrel, and a pintle passed through the barrel and connecting the leaves, of anti-friction devices interposed between opposed ends of the knuckles of separate

leaves and of equal diameter with the barrel, said anti-friction devices embodying cups carried by one of the knuckles, cones engageable with the opposed knuckle and interposed balls forming a working fit between the cups and the pintle, together with means for preventing displacement of the cones when the knuckles are separated.

9. In a hinge, the combination with separate leaves having engaging knuckles forming a barrel, and a pintle passed through the barrel and connecting the knuckles, of an anti-friction device interposed between opposed ends of the knuckles of said leaves, said anti-friction device comprising a cup of equal or no greater diameter than the barrel, a cone revolvably mounted in the cup, means for preventing displacement of the cone from the cup, balls interposed between the cup and cone, and forming a working fit between the cup and the pintle, and means for preventing inward displacement of the balls when the anti-friction device is removed from the hinge.

10. In a hinge, the combination with separate leaves having engaging knuckles forming a barrel, and a pintle passed through the barrel and connecting the knuckles, of an anti-friction device interposed between opposed ends of the knuckles of said leaves, said anti-friction device comprising a cup of equal or no greater diameter than the barrel, a cone revolvably mounted in the cup, said cone and cup having grooves, a split spring washer sprung into said grooves and arranged to prevent displacement of the cone when the anti-friction device is removed from the hinge, and means for preventing inward displacement of the balls when the anti-friction device is removed from the hinge.

11. An anti-friction device for hinges comprising an internally grooved cup, an externally grooved cone, anti-friction balls interposed between the cone and the cup and a split spring washer bridging the space between the cone and cup and fitting into the groove in each, to lock the cone against axial displacement in the cup.

In testimony whereof I affix my signature in the presence of two witnesses.

FRANK E. HOWARD.

Witnesses:
JENNIE T. REDFIELD,
HAROLD R. COE.