Aug. 2, 1960 R. F. DEHN 2,947,265

CRANE

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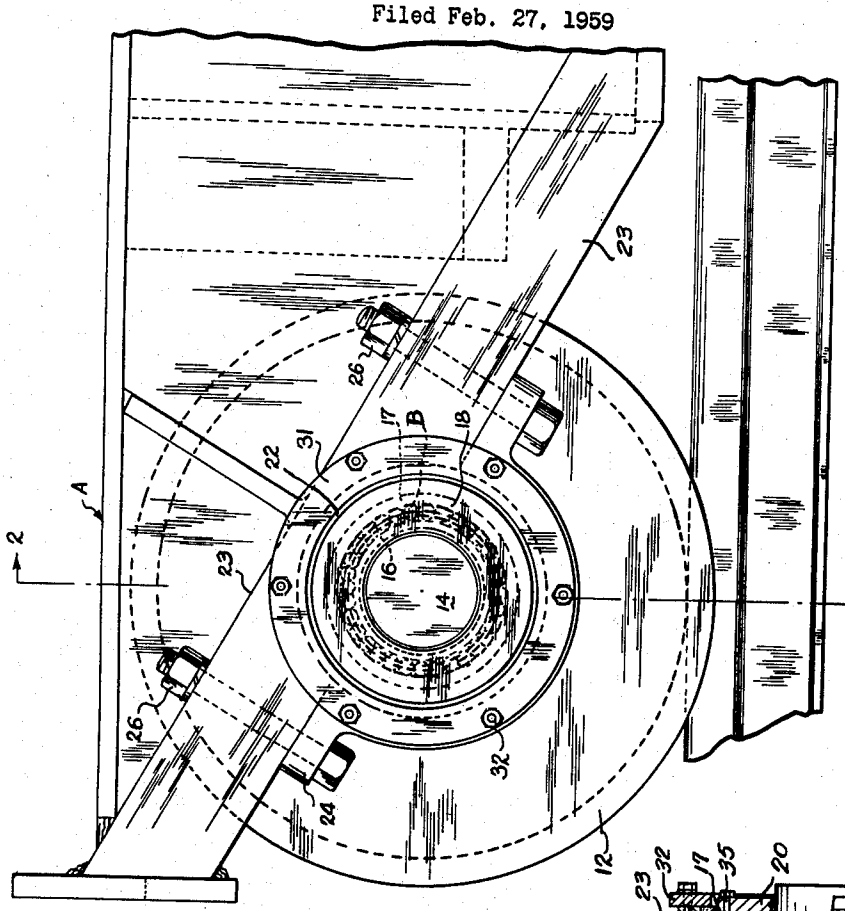


FIG. 1

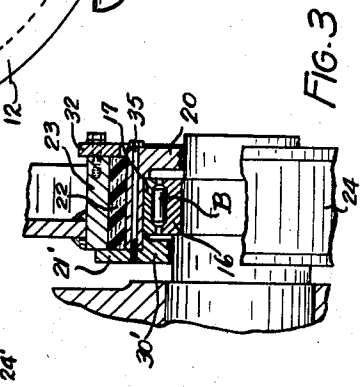


FIG. 3

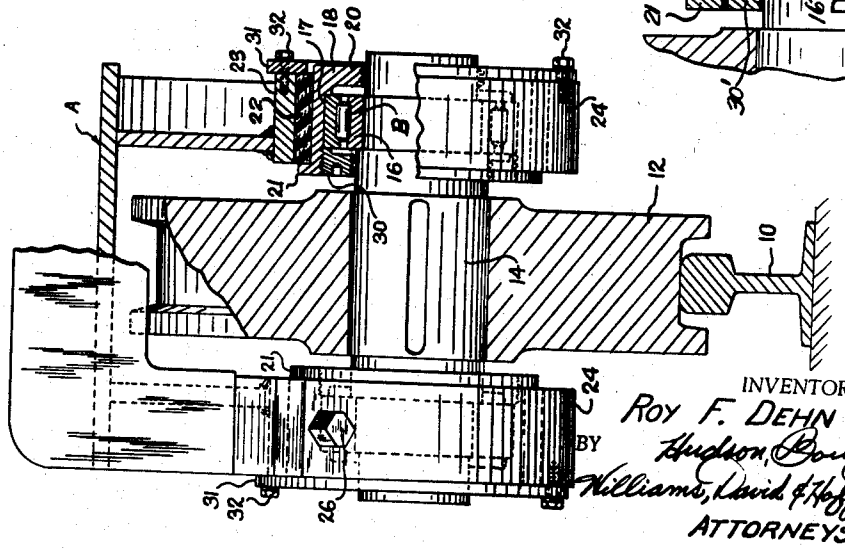


FIG. 2

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CRANE

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The present invention relates to heavy duty cranes of the type which travel along steel rails, such as, overhead traveling cranes used in steel mills and other industrial plants.

This application is a continuation-in-part of my copending application, Serial No. 754,009, filed August 8, 1958, now abandoned.

The rail wheel bearings of heavy duty cranes that travel along rails are subject to very heavy loads since they must carry not only the crane but its load. The rail joints of the track upon which the crane travels are also often uneven, which subjects the rail wheel bearings to extreme shocks adding to the wear of the bearings and their ultimate destruction.

In the event the crane is electrified, that is, equipped with electric travel and/or hoist motors, etc., the rail wheel bearings usually carry some, if not all, of the current required to operate the motors. This is true in most instances even though a parallel circuit is provided.

The principal object of the present invention is the provision of a new and novel crane of the character referred to, comprising resilient members, preferably formed of electric insulating material, interposed between the rail wheel bearings and the wheel housings in such a manner that they can expand in an axial direction while being compressed vertically.

The invention resides in certain novel constructions and arrangements of parts, and further objects and advantages of the invention will appear from the following description of the preferred embodiment and a modification thereof, described with reference to the accompanying drawings, which form a part of this specification, and in which like reference characters designate corresponding parts throughout the several views, and wherein—

Fig. 1 is a fragmentary elevational view of one end of a crane bridge truck embodying the present invention,

Fig. 2 is a fragmentary sectional view with portions in elevation approximately on a line 2—2 of Fig. 1, and

Fig. 3 is a view similar to Fig. 2, but showing a modified construction.

Although the illustrative embodiments of the invention are hereinafter described in detail, it is to be understood that the invention is not limited to the construction and arrangement of the parts shown and described, but is capable of being otherwise embodied and of being practiced and carried out in various ways. It is also to be understood that the phraseology or terminology employed is for the purpose of description and not of limitation, and there is no intention to limit the claims beyond the requirements of the prior art.

Referring to the drawings, the reference character A designates generally a bridge truck of a heavy duty overhead traveling crane of the type used in steel mills and other industrial plants. Cranes of the general type referred to are well known in the industry and are generally similar to the cranes shown in my prior patents, Nos. 2,629,505 and 2,646,892, issued February 24, 1953,

and July 28, 1953, respectively. The particular construction of the crane, other than as hereinafter mentoned, per se forms no part of the present invention and is not shown and described in detail.

The crane is supported for movement along an overhead runway comprising spaced rails 10, only one of which is shown. Opposite ends of the crane bridge are carried by the trucks A movably supported on the runway rails 10 by the crane runway or truck wheels 12, two or more of which are employed at each end of the bridge.

The truck frame member A shown is made up of welded steel plates, and each of the wheels 12 is supported therein by an individual shaft member 14 to which it is keyed. The shafts or shaft members 14 each extends to opposite sides of the wheel to which it is connected and each shaft is rotatably supported in the frame member or frame A by two roller type antifriction bearings designated generally by the reference character B, one at either side of the wheel. The inner race 16 of each bearing is secured to the shaft 14 and the outer race 17 of each bearing is secured to a cylindrical shaped member or housing 18 having an inwardly projecting flange 20 adjacent the end remote from the wheel and an outwardly projecting flange 21 adjacent the other end. The housings 18 are generally cylindrical and are supported in the frame A by rubber member 22 made of shock absorbent electrical insulating material surrounding the housings and interposed therebetween and the frame A. In the embodiment shown the members 18 are located in semi-cylindrical recesses formed in members or parts 23 of the frame proper and are retained in position therein by cap members 24. The cap-like members 24 are detachably connected to their respective members 23 by bolts 26.

The inner races 16 of the bearings B are fixedly secured to their respective ends in the shafts 14 projecting outwardly from opposite sides of the wheels 12 by being forced over reduced sections of the shaft and the outer races 17 of the bearings are fixedly secured within their respective housings 18 in a suitable manner. In the embodiment shown in Figs. 1 and 2, rings 30 threaded into ends of the housings 18 adjacent to the wheels 12 assist in retaining the parts assembled and are provided with suitable seals for protecting the bearings. Packing rings interposed between the inner circumference of the flanges 20 and the portions of the shafts 14 surrounded thereby similar to those within the rings 30 prevent the escape of oil from and the entrance of dirt into the bearings without interfering with the free rotation of the wheels 12 in the frame A.

The resilient members 22 surrounding the housings 18 are interposed between the flanges 21 on the ends of the housings 18 adjacent to the wheels 12 and ring-like cover plates or retainers 31, detachably secured by cap screws 32 to the members 23 of the frame A. In the embodiment shown in Figs. 1 and 2, the flanges 21 are spaced radially inwardly from the inside walls of the members 23 and the members 31 are spaced radially outwardly from the exterior of the housings 18, the construction being such that the housings 18 are supported in the members 23 and in turn the frame A solely by the resilient members 22 and that the resilient members 22 may expand in both axial directions while being compressed by the weight of the crane.

In the embodiment shown in Fig. 3, the parts corresponding to the flange 21 and the ring 30 are designated by the reference characters 21′ and 30′ respectively, and are formed integral and separate from the member 17 corresponding to the member 18 of Figs. 1 and 2. These parts form a separate member which is detachably connected to the part 18 by bolts 35. The flange 21′ is of

greater diameter than the flange 21 and projects radially outwardly along side of, but preferably spaced a short distance from, the axial inner end of the member 23. The construction is such that the flange 21' will engage the part 23 of the frame A after predetermined limited movement of the wheel relative to the frame A and protect the resilient material from excessive side thrust. As previously stated, the two opposite ends of the stud shafts 14, which carry the wheels 12, are supported in the frame A in a similar manner from which it follows that the flange at the opposite side of the wheel 12 corresponding to the flange 21' shown, will limit the relative movement between the wheel and from the direction opposite to that of the flange 21' shown.

As an alternative construction, instead of having the flanges 21' project radially outwardly beyond the members 23, the members 32 could be so formed that they would project radially inwardly of the adjacent ends of the members 18 or 18' so as to limit movement of the wheels 12 relative to the frame A in the direction opposite to that in which said movement is limited by the flange 21'.

From the foregoing description of the preferred embodiments of the invention, it will be apparent that the end trucks of the crane, and in turn the crane bridge, etc., will be carried by the wheels solely through the medium of resilient members, which members are preferably made of electrical insulating material, and that the wheel bearings are not subjected to the usual shocks and wear encountered in prior art cranes.

While the preferred embodiments of the invention have been shown and described in considerable detail, the invention is not limited to the particular constructions shown; for example, resilient members may be interposed between the inner races of the wheel bearings and the axial member, or resilient members may be employed between both races and the members to which they are nonrotatably connected. It is the intention to hereby cover all adaptations, modifications and uses of the invention disclosed which come within the practice of those skilled in the art to which it relates and the scope of the appended claims.

Having described my invention, I claim:

1. In a heavy duty crane, an end truck frame member, an axle member having a rail wheel fixed thereto intermediate its ends, bearing supporting members at opposite sides of said wheel, annular anti-friction bearings at opposite sides of said wheel and interposed between said axle and said annular bearing supporting members, electrical non-conductor resilient material interposed between each of said bearing supporting members and said truck frame member, and flanges at opposite ends of said resilient material, one of said flanges at either side of said wheel being on one of said members and projecting over only a part of the end of said resilient material adjacent thereto and the other being on the other of said members.

2. In a heavy duty crane, an end truck frame provided with two spaced aligned semi-circular apertures, a pair of caps provided with semi-circular apertures, means for detachably securing said caps to said truck frame to form frame members having two aligned cylindrical apertures, an axle having opposite ends projecting through said aligned cylindrical apertures and a rail wheel fixed thereto intermediate its ends, annular bearing supporting members in said cylindrical apertures at opposite sides of said wheel, annular anti-friction bearings in said cylindrical apertures at opposite sides of said wheel and interposed between the end portions of said axle and said annular bearing supporting members, electrical non-conductor annular resilient sleeves in said cylindrical apertures at opposite sides of said wheel and interposed between each of said annular bearing supporting members and said frame members, radially projecting flanges at opposite ends of each of said resilient sleeves, one of said flanges at either side of said wheel being on one of said members and the other being on the other of said members, and one of said flanges on each side of said wheel projecting radially over only a part of the end of the resilient sleeve adjacent thereto.

3. In a heavy duty crane, an end truck frame provided with two spaced aligned semi-circular apertures, a pair of caps provided with semi-circular apertures, means for detachably securing said caps to said truck frame to form frame members having two aligned cylindrical apertures, an axle having opposite ends projecting through said aligned cylindrical apertures and a rail wheel fixed thereto intermediate its ends, annular bearing supporting members in said cylindrical apertures at opposite sides of said wheel, annular anti-friction bearings in said cylindrical apertures at opposite sides of said wheel and interposed between said end portions of said axle and said annular bearing supporting members, electrical non-conductor annular resilient sleeves in said cylindrical apertures at opposite sides of said wheel and interposed between each of said annular bearing supporting members and said frame members, radially projecting flanges at opposite ends of each of said resilient sleeves carried by said members and forming a pair of flanges at the sides of said frame members adjacent to said wheels and a pair of flanges at the sides of said frame members remote from said wheels, one pair of said flanges projecting radially over only a part of the ends of said resilient sleeves adjacent thereto and the other of said pair of said flanges projecting radially beyond the end of said resilient sleeves adjacent thereto.

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