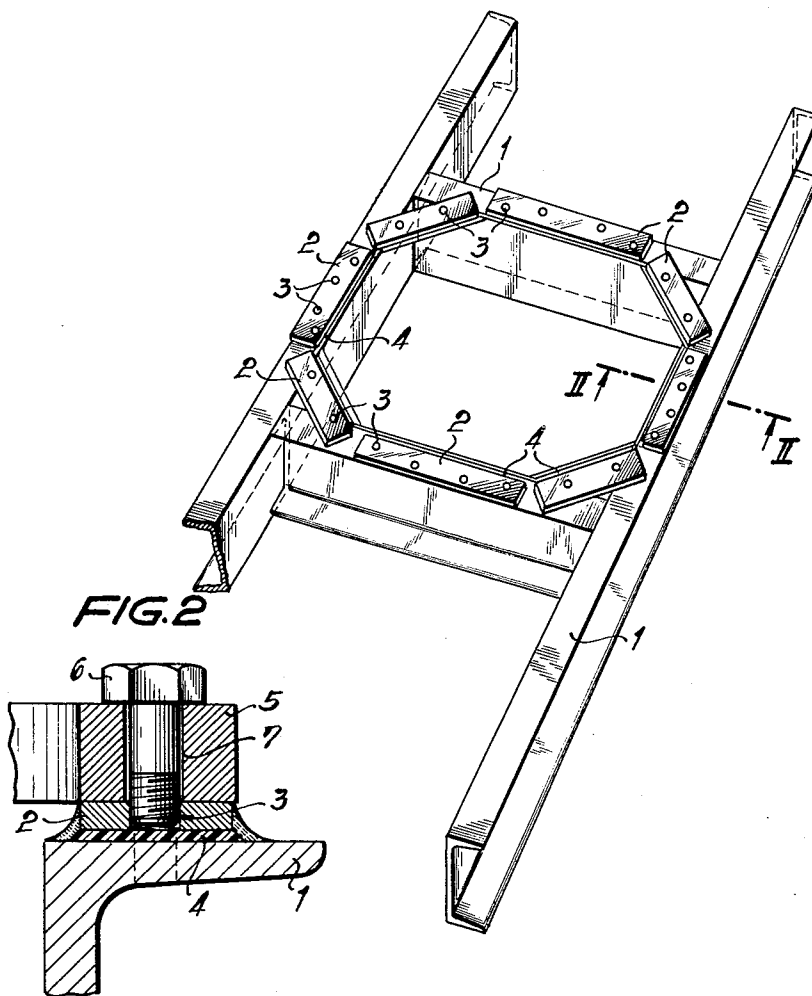


June 19, 1962

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METHOD OF MOUNTING BALL-BEARING TRACKS
FOR REVOLVING CRANES AND THE LIKE
Filed March 15, 1961

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FIG. 1



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METHOD OF MOUNTING BALL-BEARING TRACKS FOR REVOLVING CRANES AND THE LIKE

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Filed Mar. 15, 1961, Ser. No. 95,965

Claims priority, application Germany Mar. 19, 1960

8 Claims. (Cl. 248—346)

The present invention relates to a method of mounting a ball-bearing track or turntable for a revolving crane, excavator, or other heavy machinery, and to a supporting frame for such a track or turntable which is produced according to this method.

Revolving cranes, excavators, and many other machines are usually mounted on ball-bearing tracks or turntables in order to turn or swivel the entire machine very easily on an undercarriage or frame. Depending upon the size of the respective machines, these ball-bearing tracks or turntables may be of very large diameters and amount to several meters. Such a track or turntable must be mounted absolutely evenly and level at all points on its supporting frame.

It is, however, a very difficult procedure to produce such a large supporting frame with an absolutely level surface. This either requires very large machine tools or, since such machines are usually not available for this specific purpose, the ball-bearing track must be leveled by means of shims, base plates, and the like. This is, however, not only a very difficult and time-consuming procedure, but usually such a supporting structure will not stand up very long under the heavy and uneven loads and stresses to which it is subjected by the operation of the crane or other machinery. When such a supporting frame becomes uneven, the result will be that the ball-bearing track or turntable carrying the crane or other machine will become distorted and may then be turned only with difficulty, or that the balls of the ball bearing may become wedged or damaged or that they may break entirely.

It is the object of the present invention to provide a method of mounting a ball-bearing track or turntable for a revolving crane, excavator or other heavy machine on a supporting frame on which a plurality of supporting members are secured in a polygonal or circular formation in accordance with the diameter of the ball-bearing track or turntable which is to be mounted thereon. According to the invention, the upper flanges of the supporting frame are coated with a layer of a suitable embedding material which is capable of hardening, and before this layer has hardened, a number of mounting plates are applied thereon in the proper formation in accordance with the diameter of the ball-bearing track which is later to be secured thereto. These mounting plates are then pressed into the embedding layer in such a manner that the finished surfaces of the plates will be perfectly level and at all points within the same plane. After the embedding material has hardened, the ball-bearing track may be properly secured to these plates and to the flanges of the supporting frame.

The embedding material to be used according to the invention consists of a hardening plastic, for example, polyester, which is reinforced with metallic fillers, for example, cast-iron or other metal powder, small steel chips, or the like.

In order to secure the mounting plates in the proper position to the supporting frame, these plates are first temporarily mounted by means of bolts on the lower side of an auxiliary leveling ring which is machined and finished on both sides and may be reused as often as desired for similar installations. After a layer of the

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mentioned embedding material has been applied upon the surface of the upper flanges of the supporting frame, and before this material has hardened, the leveling ring with the mounting plates connected thereto is placed upon the embedding layer and pressed into the same in such a manner that the surface of the leveling ring is absolutely level. After the embedding material has hardened, the mounting plates are secured to the supporting frame, for example, by being welded thereon along their sides, whereupon the leveling ring is unbolted and removed from the mounting plates.

By proceeding according to this method, it will be insured that the upper surface of the mounting plates will be perfectly plane and level, and that during the subsequent operation of the crane or other machine the ball-bearing track or turntable of this machine which is secured to these mounting plates will never tilt, become distorted or yield in any other way. The new method of producing the supporting frame has the further, very important advantage that it is very simple and economical since it does not require any special machinery and since the auxiliary leveling rings may be frequently used.

The above-mentioned as well as additional features and advantages of the present invention will become further apparent from the following detailed description thereof which is to be read with reference to the accompanying sheet of drawings, in which—

FIGURE 1 shows a perspective top view of a supporting frame according to the invention; while

FIGURE 2 shows an enlarged cross section taken along line II—II of FIGURE 1.

The supporting frame for receiving a ball-bearing track or turntable, not shown, for a revolving crane or a similar machine consists generally of a plurality of beams 1 of a U or double T-shaped cross section which are welded together to a polygonal shape. In the finished condition, rectangular or segmentally shaped mounting plates 2 are secured upon the upper flanges of beams 1 in a polygonal or substantially annular arrangement. These mounting plates 2 as well as the upper flanges of beams 1 underneath the same are provided with bores 3 which subsequently serve for receiving bolts for securing the stationary part of the ball-bearing track. A supporting frame of this kind which is subjected to very high mechanical stresses must have mounting plates 2 with absolutely plane and level upper surfaces so that the ball-bearing track may be properly secured thereon.

It is a fact, well-known in this art, that it is very difficult to provide supporting frames for ball-bearing tracks or turntables for revolving cranes, excavators, or the like, which are made of individual beams 1 which are welded together, with a sufficiently level surface. This is due partly to the distortions caused by welding and partly to manufacturing inaccuracies in the shape and dimensions of the beams of which the supporting frame is assembled. A special mechanical leveling or finishing treatment of the supporting frame is therefore always required.

In order to carry out this leveling treatment as easily and quickly as possible, the present invention provides a special leveling ring 5 which is finished on both outer sides so as to have absolutely plane surfaces. This ring 5 which may be reused for as many frame installations as desired is made of a diameter equal to the diameter of the ball-bearing track. It is provided along its periphery with a number of bores 7 which are spaced from each other at a distance corresponding to the distance between the bolts by means of which the ball-bearing track is to be later secured. Into these bores 7, bolts 6 are inserted and screwed into the tapped bores 3 in the mounting plates 2 so that the latter will be fixed in the proper final position on the lower side of ring 5. Mounting plates 2

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are preferably factory-made so as to be of an equal thickness and to have finished outer surfaces.

After the mounting plates 2 are secured to leveling ring 5, a layer 4 of a suitable embedding material is applied upon the upper flanges of beams 1. Before this embedding material 4 starts to set, the mounting plates 2 on ring 5 are applied thereon and pressed into the embedding material so that the upper surface of ring 5 will be absolutely level. Any unevenness on the surface of frame 1 will thus be leveled by being filled out by the embedding material 4.

After the embedding material 4 has hardened, any excess thereof is removed mechanically, whereupon the individual mounting plates 2 are additionally connected to beams 1, for example, by welding them thereto along the sides, as indicated in FIGURE 2. It is for this purpose only necessary to attach the mounting plates 2 by spot welding to insure that they will remain in the proper position on beams 1.

Thereupon, bolts 6 are loosened and leveling ring 5 is removed from the mounting plates 2. Since the bores 3 in plates 2 are already in their proper final position, it is only necessary to drill them out to the diameter of the mounting bolts of the ball-bearing track which are later to be inserted, and also to drill through the layer of embedding material 4 below and through the flanges of beams 1. After the ball-bearing track is bolted on, it will be solidly connected to the supporting frame by means of mounting plates 2 and the hardened embedding material 4, and it will rest absolutely plane and level on the frame.

As already indicated, it is also possible, instead of applying rectangular mounting plates 2 in a polygonal arrangement, to provide segmentally shaped plates which may be assembled to form a complete ring. If a ball-bearing track of a smaller diameter is to be mounted, it is also possible to apply a fully machined and finished mounting ring of a single piece of material which is then pressed into the layer of embedding material 4. In this case, it will not be necessary to use a leveling ring 5.

The embedding material 4 preferably consists of a suitable plastic, for example, polyester, which is adapted to harden quickly and very solidly. It is advisable to reinforce this embedding material with suitable fillers, preferably of a metallic type, for example, cast-iron powder or other metal powder, small steel chips, or the like.

After hardening, this embedding material 4 has a very high compressive strength, and any squeezed out excess may then be easily filed, ground or chipped off. It hardens to such an extent that no material can be subsequently squeezed out by the weight under which the mounting plates 2 press upon the layer 4 of embedding material on flanges 1 during the later operation of the machinery which is mounted on the ball-bearing track, and this is true even though the layer 4 may at different points be of different thicknesses or only very thin in accordance with the uneven surfaces of frame 1 which are leveled out by this layer.

Although my invention has been illustrated and described with reference to the preferred embodiments thereof, I wish to have it understood that it is in no way limited to the details of such embodiments, but is capable of numerous modifications within the scope of the appended claims.

Having thus fully disclosed my invention, what I claim is:

1. A method of mounting a ball-bearing track or turntable of a revolving crane, excavator, or other machine on a supporting frame composed of beams secured to each other in a polygonal shape substantially in accordance with the diameter of the ball-bearing track to be mounted thereon, comprising the steps of applying a layer of a hardening embedding material upon the upper surfaces of the supporting frame, placing a plurality of

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mounting plates for subsequently supporting the ball-bearing track upon the embedding layer before said layer hardens and in the proper position in accordance with the diameter of the ball-bearing track, and then pressing said mounting plates into the embedding layer to a depth so that the finished upper surfaces of said plates will be absolutely level and disposed at all points within the same plane.

2. A method as defined in claim 1, in which said embedding material consists of a suitable hardening plastic with reinforcing metallic fillers therein.

3. A method of mounting a ball-bearing track or turntable of a revolving crane, excavator, or other machine on a supporting frame composed of beams secured to each other in a polygonal shape substantially in accordance with the diameter of the ball-bearing track to be mounted thereon, comprising the steps of temporarily securing a plurality of mounting plates by means of bolts to the lower side of an auxiliary leveling ring which is finished on both sides, and in the correct final position of said mounting plates relative to each other and in accordance with the diameter of the ball-bearing track to be later secured thereto, then applying a layer of a hardening embedding material upon the upper surfaces of the supporting frame, then placing said mounting plates while mounted on said leveling ring upon the embedding layer before said layer hardens, then exerting a pressure upon said leveling ring so as to press said mounting plates into said embedding layer to a depth so that the upper surface of said ring will be absolutely level and the finished upper surfaces of said plates will be disposed at all points within the same plane, and then unbolting and removing the leveling ring from said mounting plates after said embedding layer has hardened.

4. A method as defined in claim 3, further comprising the step of drilling out the bores in the mounting plates previously containing the bolts for attaching said plates to the leveling ring, and also drilling through the hardened embedding layer and through parts of the supporting frame so as to form bores for the subsequent insertion of mounting bolts for securing the ball-bearing track to said supporting frame.

5. A method as defined in claim 3, further comprising the step of additionally securing said mounting plates to the upper parts of said supporting frame by welding said plates at their sides to said frame after said embedding layer has hardened and before said leveling ring is unbolted and removed from said mounting plates.

6. A supporting frame for a ball-bearing track or turntable of a revolving crane, excavator, or other machine, comprising a plurality of beams secured to each other in a polygonal shape substantially in accordance with the diameter of the ball-bearing track to be mounted thereon, a layer of a hardened embedding material adhering to the upper surfaces of said beams, and a plurality of flat mounting plates at least partly embedded in said layer so that the upper surfaces of all of said mounting plates are level and disposed at all points within the same plane.

7. A supporting frame as defined in claim 6, in which said embedding layer consists of a suitable plastic containing reinforcing metallic fillers.

8. A supporting frame as defined in claim 6, further comprising means for additionally securing said embedded mounting plates to the upper parts of said beams, said means comprising welds on the sides of said mounting plates.

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