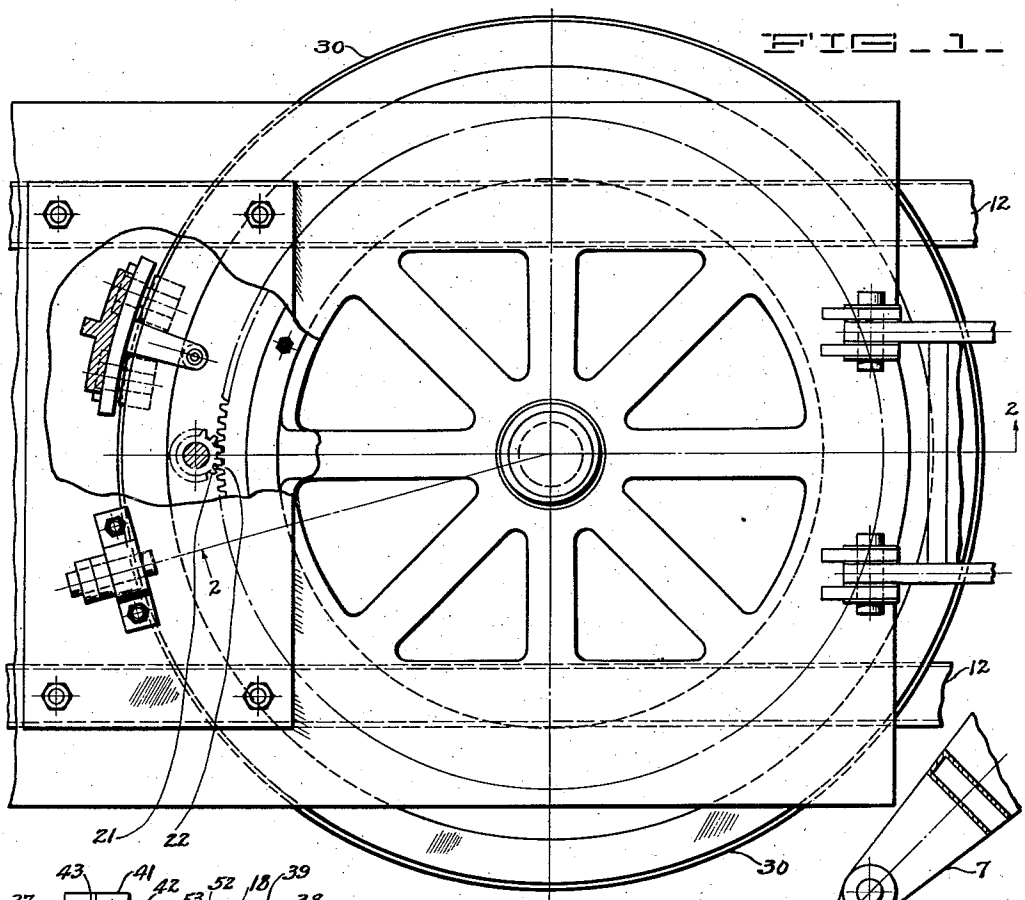
Oct. 1, 1946. J. E. DAVENPORT ET AL 2,408,378

STABILIZER ATTACHMENT FOR CRANES

Filed June 8, 1944 2 Sheets-Sheet 1

FIG. 1.



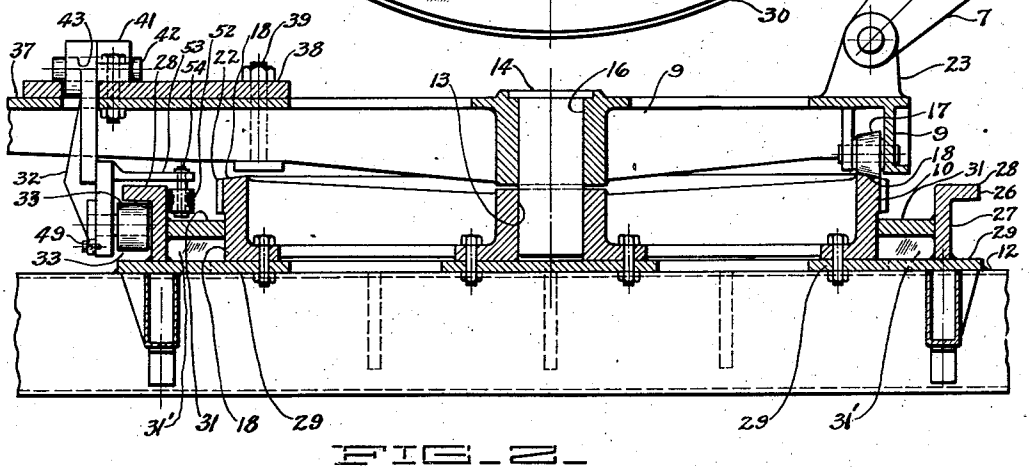


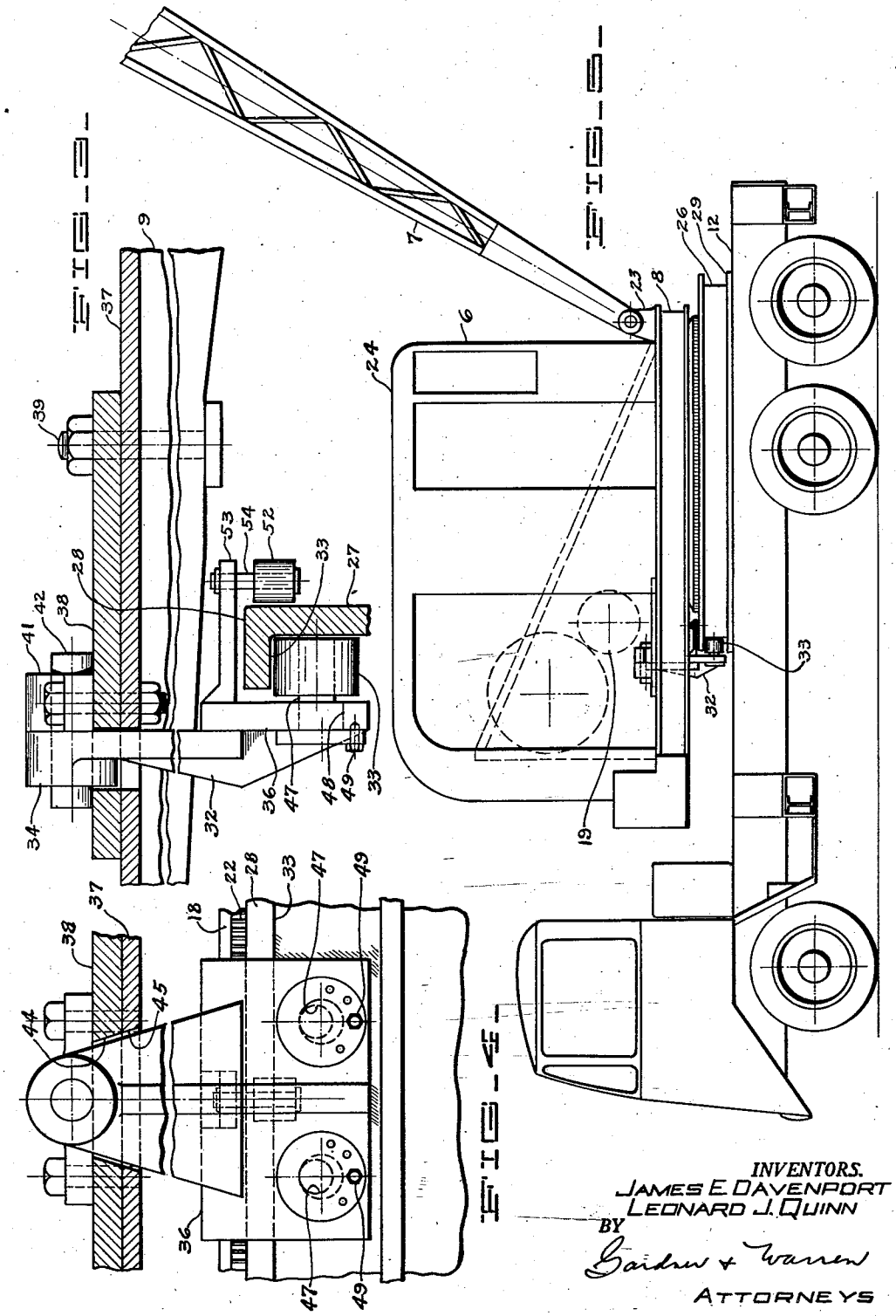
FIG. 2.

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STABILIZER ATTACHMENT FOR CRANES

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6 Claims. (Cl. 212—70)

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The invention relates to cranes of the type in which the boom and operating machinery are mounted on a turntable supported on a fixed base or on a carrier such as a motor truck, and relates more particularly to an improved means for distributing the strain of the load carried by the boom.

An object of the invention is to provide a means of the character described which will remove a large portion of the strain on the turntable center-pin, and transfer the excess strain of the load independently of the pin directly to the base or carrier frame in all positions of the turntable.

Another object of the invention is to provide a means of the character described which will involve a minimum of parts, will leave the conventional parts of the crane and carrier freely accessible, and permit the ready removal and replacement of such parts when necessary.

A further object of the invention is to provide a means of the character described which is in the form of an attachment which may be readily applied to cranes of practically all types and models, without requiring extensive alterations.

The invention possesses other objects and features of advantage, some of which, with foregoing, will be set forth in the following description of the preferred form of the invention which is illustrated in the drawings accompanying and forming part of the specification. It is to be understood, however, that variations in the showing made by the said drawings and description may be adopted within the scope of the invention as set forth in the claims.

Referring to said drawings:

Figure 1 is a plan view of the turntable portion of a motor truck crane equipped with the stabilizer means of our invention, a part of the structure being removed to disclose the hidden members.

Figure 2 is a vertical sectional view of the mechanism illustrated in Figure 1, the plane of the section being generally indicated by the line 2—2 of Figure 1.

Figure 3 is an enlarged view corresponding to Figure 2, but showing only part of the structure.

Figure 4 is a transverse sectional view of the mechanism shown in Figure 3.

Figure 5 is a side elevation of a complete crane-motor truck showing the stabilizer means of our invention applied thereto.

As will be understood, the stabilizer means of our invention is particularly designed for use with cranes of the type in which the boom is

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mounted on a turntable supported on a carrier such as a motor truck or tractor. In the embodiment of the invention illustrated in the drawings, the crane is incorporated in a motor truck 6 and includes a boom 7 supported on a turntable 8 which is rotatable about a vertical axis and mounted on the truck, the boom being pivotally connected to the turntable for swinging about a horizontal axis.

The turntable as here shown comprises an upper rotatable member 9 and a lower supporting member 10 upon which the upper member is carried, the lower member being fixed to and supported on the sills 12 of the truck chassis, and having provided centrally therein a journal or bearing 13 in which is held the center-pin 14 which projects from a central bearing 16 forming a part of the upper member 9. The weight of the member 9 is communicated to the lower member by means of conical rollers 17 carried by the member 9 adjacent the periphery thereof and engaging the upper side of a bull-ring 18 which forms part of the member 10. Rotation of the member 9 is effected by means of a suitable power unit 19 carried upon the member and operating to drive a pinion 21 which meshes with gear teeth 22 provided around the bull-ring 18.

Brackets 23 on the member 9 and to which the boom is pivoted are positioned close to an edge of the member, and the operating machinery including the power unit 19 is positioned on the member directly opposite such brackets at the other side of the center-pin 14. Also positioned on the upper member 9 and for the most part located on the portion of the member more remote from the boom pivot, is a cab 24 which encloses the machinery and controls and provides a protective enclosure for the operator. With this conventional arrangement, a certain amount of counterbalance is provided to partly offset the weight and load of the boom.

As may be perceived, notwithstanding the counter-balancing effect of the parts as aforesaid, the strain occasioned by the loads carried by the boom, is imposed for the most part on the center-pin, and although this pin is usually made of relatively large diameter, all too frequently due to the very heavy and continued strains, the pin will become fractured or broken and occasion considerable injury as well as loss of time in replacement.

In accordance with our invention, when the load carried by the boom is such that the member 9 of the turntable will tend to tilt to a degree which would impose a severe strain on the

pin or its immediate support, the strain of the load will be communicated for a large part directly from the member 9 to the frame of the carrier without involving the pin and its said support. This pin strain relieving arrangement will be operating automatically in all positions of the turntable.

Preferably positioned in surrounding relation to the bull-ring and concentric therewith is an annular track 26, which is mounted on and rigidly fixed to the truck frame. The track as here shown is formed with an upstanding web 27 having a horizontal flange 28 which extends outwardly therefrom. Attachment of the track to the truck frame is provided such as by welding the lower edge of the web 27 to a bed plate 29 which is affixed to the truck sills 12 and forms the supporting mounting for the turntable members. In the present embodiment the diameter of the track is designed considerably greater than the width of the carrier chassis, and in order that the side plate and sills may form a full support and anchor for the track throughout the entire circumference thereof, the plate is formed with segmental portions 30 at the sides of the sills and braced thereat by suitable ribs extending therefrom. As a means of bracing the track, a ring 31 is interposed between the web and bull-ring 18 and supported on blocks 31' which are welded to the plate 29, the ring and blocks being welded to the web, but are designed to simply fit about the outer side of ring 18. The spacer ring and blocks are positioned to lie below the teeth 22, and it will thus be clear that with this arrangement a firm reenforcement of the track is provided for with the assistance of the bull-ring, and at the same time the bull-ring may be removed without interference by the track or the reenforcing means therefor when necessary. Means are provided on the rotatable member 9 of the turntable for engaging the track in such manner that undue tilting of the member and consequent strain on the center-pin will be prevented in case of heavy boom loads. In the present embodiment such means is located on the member 9 adjacent the edge, opposite the edge at which the boom brackets 23 are located, and as here shown such means briefly comprises a plurality of hangers 32 depending from the member 9 and having rollers 33 carried thereby and positioned to engage and ride the underface 33 of the track flange 28. The hangers 32 are spaced in such manner that the rollers 33 will be disposed at accurately spaced points on the track, and preferably the spacing is such that the hangers will be approximately aligned with the brackets and equally spaced at opposite sides of a line intersecting the axes of the pinion 21 and the center-pin 14. In order to insure a firm and even engagement with the flange, each of the hangers is provided with a pair of the rollers 33 and suspended from the member 9 by a mounting 34, affording swinging of the hanger about a horizontal axis extending radially from the center-pin. As may be evident considerable force may have to be applied by way of the hangers and for this reason the body 36 of each hanger is formed of relatively heavy construction and is arranged to be carried by the member 9 in such manner that the strain imposed on the member when the rollers are forced against the flange 28, will be distributed over a large area of such member. As will be clear from Figures 3 and 4, the upper portion of the member 9 is formed with a horizontal covering or plate 37 which is designed to

serve as the floor for the cab as well as a mounting plate for the operating machinery. Upon the floor 37 at the portion at the rear of member 9, we preferably mount a large reenforcing plate 38 which extends substantially from one side edge of the floor to the other and is positioned with its middle portion overlying the track. The plate 38 is affixed to the member by means of bolts 39. Mounted upon the plate and secured in position by means such as a bearing cap 41 is a trunnion 42 which extends through a journal 43 formed in the upper portion of the body of the hanger. The hanger body is extended through registering slots 44 and 45 provided in the plate and floor, and desirably a portion of the journal is disposed in the plate slot and the trunnion positioned directly upon the plate at both sides of the slot. With the above arrangement, a sturdy and appropriately positioned hanger mounting will be provided without material alteration in the conventional crane turntable structure and at the same time the parts may be readily applied or replaced and only a slight protrusion will be required above the level of the cab floor. The rollers 33 as will be clear from Figures 3 and 4, are mounted on shafts 47, these shafts are secured to cylindrical extensions 48 arranged eccentrically of the shafts and fitted for rotation in the lower portion of the hanger body. The extensions may be turned in the body to adjust the engagement between the rollers and the flange 28, and the position of adjustment maintained by means of pins 49 engageable in retaining the rollers in proper engagement with the track and at the same time reducing the strain on the hanger body when the rollers are forcibly thrust against the flange, a roller 52 is carried on an arm 53 of the hanger body and arranged to engage the inner side of the web 27, the roller being mounted on a vertical shaft 54 and positioned over the spacer ring 31.

It will now be clear that regardless of the position of the member 9 of the turntable, a large portion of the strain of the load carried by the boom will be communicated directly to the carrier body independently of the center-pin, and thus avoiding any undue stress on the pin. It will also be clear that since the hanger rollers engage the track at a considerable distance back of the center-pin and in line with the boom brackets, the maximum resistance against tipping by the carrier will be afforded. Furthermore, not only is the means of our invention easily adapted to conventional crane unite both without material alteration or mutilation of the parts and without interference with the operation of the mechanism, but the means employed in accordance with our invention to transfer the strain from the turntable to the carrier frame provides for increased strength and reenforcement of the table and frame and assimilation of the strain by the parts most suited therefor.

We claim:

1. In a portable crane having a turntable with a top member mounted for rotation on a center-pin and providing a support for the crane boom adjacent the outer periphery of said member and a carrier with a frame underlying said member and having a support thereon for said pin and a peripheral bearing for supporting said member at said boom supporting portion, a circular track fixedly mounted on said frame and surrounding said bearing in concentric relation to said pin and provided with a substantially horizontally disposed undersurface with a free side edge and

a vertical inner surface, a hanger depending from said member at a portion in substantially diametrically opposed relation to the portion supporting the boom and alongside of said free edge, a roller on said hanger positioned to engage and ride on said track surface to cooperate with said pin and the support therefor to prevent tilting of said member toward said boom supporting portion and a part on said hanger positioned to engage said inner track surface opposite the free side edge and hold the hanger against displacement radially of the track.

2. In a crane having a turntable with a top member mounted for rotation on a center-pin and providing a support for the crane boom radially outwardly from a side of the pin and a lower relatively stationary member providing a support for said pin and an annular peripheral supporting bearing for said upper member, a track positioned below said upper member and fixedly associated with said lower member in concentric relation with and adjacent said bearing, and a pivoted hanger depending from said upper member at a portion substantially radially outwardly from the opposite side of said pin and engaging said track in a manner holding said portion of the upper member against upwardly displacement relation to the track.

3. A crane in accordance with claim 2, characterized by means on said hanger engaging said track to hold the track engaging portion thereof against radial displacement with respect to the track.

4. The combination with a crane including a turntable with an upper member rotatable about a center-pin and having a boom supporting portion thereon adjacent the outer periphery of the member and a relatively stationary lower member having a support for said pin and means providing an annular peripheral bearing for said upper member and a fixed gear concentric with said pin, of a circular track fixed to said lower member in concentric relation with said gear and positioned to underlie the boom supporting portion of the upper member, said latter member formed to provide a floor for the support of machinery and controls for operating said boom and rotating the upper member and having a slotted portion overlying the track and diametrically opposed to the portion of the upper member supporting the boom, a hanger having its upper portion extended through the slot in said floor portion and mounted to rotate thereat about an axis extending radially of the pin axis, and rollers carried by said hanger engaging said track at circumferentially spaced points and in a manner to interlock said hanger with the track and prevent upward displacement of the upper member at the portion at which the hanger is mounted.

5. The combination with a crane including a turntable with an upper member rotatable about a center-pin and having boom supporting brackets thereon adjacent the outer-periphery of the member and a relatively stationary lower member

having a support for the pin and an exteriorly toothed bull-ring concentric with the pin and arranged to support the upper member along its periphery, said upper member providing a floor for the support of machinery and controls for operating the boom and rotating the member and including a driving pinion positioned at the edge of said ring and meshing with the teeth thereof, a circular track fixed relative to said lower member and disposed concentric with said ring and spaced therefrom to accommodate said pinion, said track having a horizontally extending flange with a free edge, hangers adjacent the peripheral portion of the upper member in substantially diametric relation with said brackets and extending through said floor, hangers being spaced arcuately of the track and disposed at said free edge, means supported on said floor provided pivot mounting for said hangers, rollers carried by hangers and engaging under said flange to thereby lock the upper member to the track at said last mentioned portion, and spacer means fixed to said track and positioned between same and the ring and below said pinion and fitting against said ring.

6. The combination with a crane mounted on a carrier and including a turntable with an upper member rotatable about a center-pin and having boom supporting brackets thereon adjacent the outer periphery of the member and a relatively stationary lower member removably supported on a bed plate on the frame of said carrier and having a support for said pin and a bull ring for supporting the upper member adjacent its periphery, said ring having cylindrical outer sides with gear teeth thereon, said upper member providing at its upper side a floor for the support of machinery and controls for operating the boom and rotating the member and including a driving pinion positioned opposite and meshing said gear teeth, a circular track fixedly mounted on said plate and surrounding said ring and spaced therefrom to accommodate said pinion, said track having a vertically extending web and a flange extending outwardly and horizontally therefrom at the top, said upper member having in said floor thereof in substantially diametrically opposed relation to said brackets a pair of slots, hangers extending downwardly through said slots, pivotal mountings for said hangers supported on said floor and formed to prevent the hanger from raising in the slots, rollers carried by said hangers and engaging under said flange to thereby prevent upward displacement of the portion of the upper member diametrically opposed to the brackets, rollers carried by said hangers between the track and ring and engaging the adjacent vertical side of said web, and a spacer member between said track and ring positioned to lie below said last rollers and fixed to said web and fitting around said ring.

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