

Oct. 11, 1960

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2,955,546

UNDERCARRIAGE FOR ROTARY-TOWER CRANE

Filed Nov. 3, 1958

2 Sheets-Sheet 1

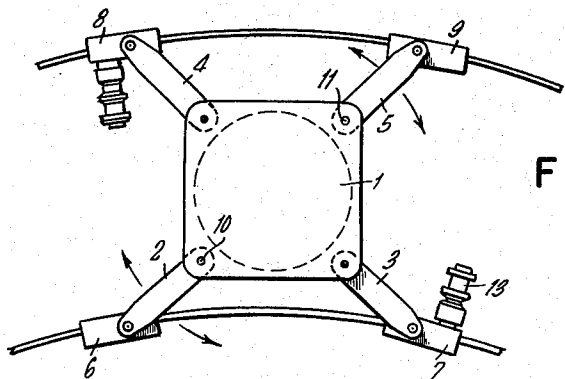


FIG. 2

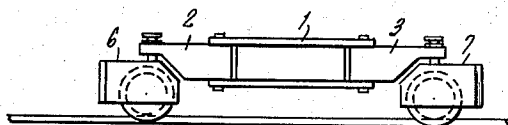


FIG. 1

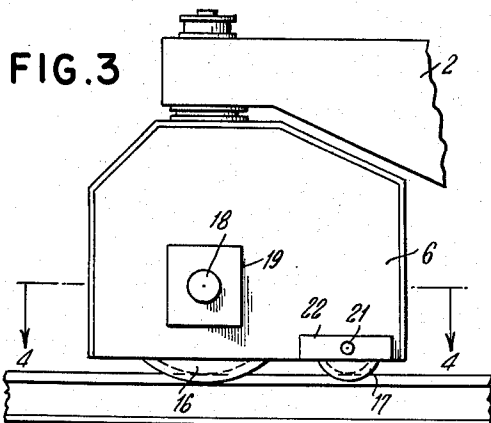


FIG. 3

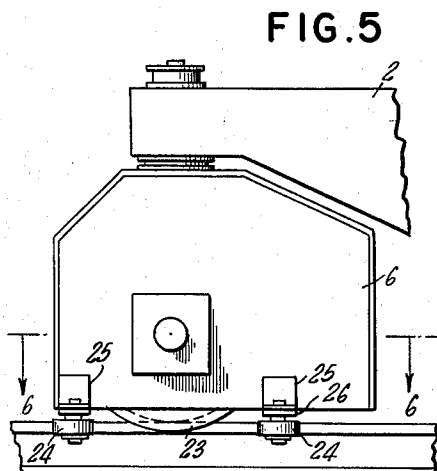


FIG. 5

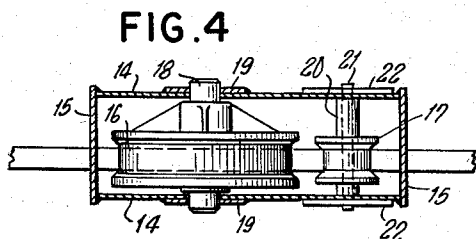


FIG. 4

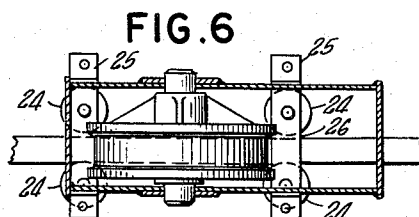


FIG. 6

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2 Sheets-Sheet 2

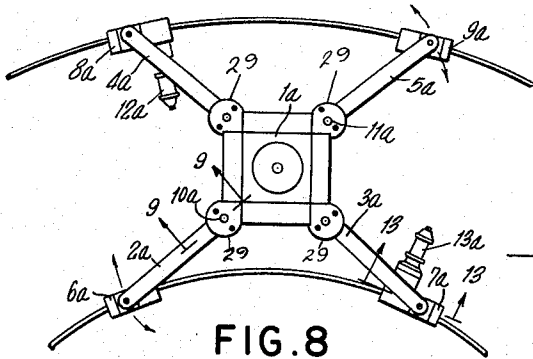


FIG. 8

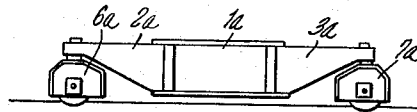


FIG. 7

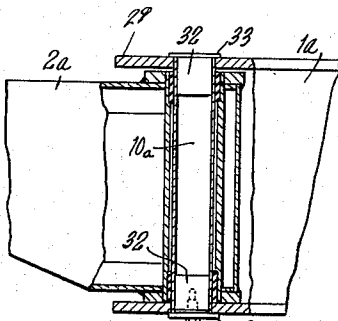


FIG. 9

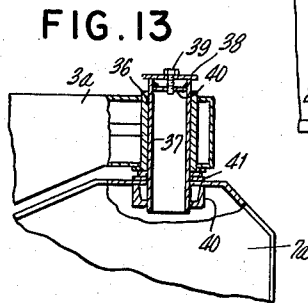


FIG. 13

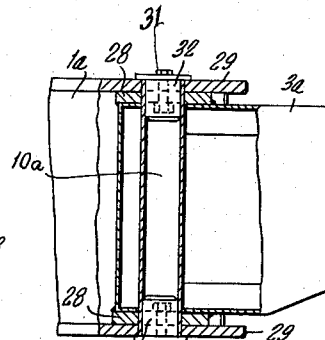


FIG. 10

FIG. 11

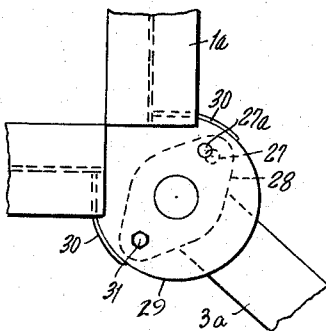
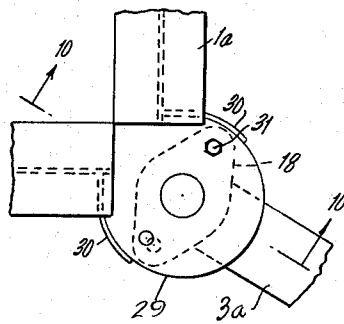


FIG. 12



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UNDERCARRIAGE FOR ROTARY-TOWER CRANE

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Filed Nov. 3, 1958, Ser. No. 771,531

Claims priority, application Germany Nov. 30, 1954

4 Claims. (Cl. 105—27)

This invention relates to undercarriages for rotary-tower cranes of either light or heavy weight construction for use on construction sites utilizing rectilinear as well as curved lengths of track sections. The invention also relates to undercarriages characterized by improved maneuverability.

This application is a continuation-in-part of copending application Serial No. 550,154, filed November 30, 1955, now abandoned.

Generally, undercarriages are comprised of a rectangular platform with a wheel mounted beneath each of the four corners and adapted to rotate about fixed axes. In cases where the curved sections are so laid out as to form sharp bends because of the nature of the surrounding terrain, difficulties arise due to a jamming action between the undercarriage wheels and the rails of the curved sections. This difficulty adversely affected the efficient operation of the crane and undercarriage whereby considerable care had to be taken to prepare the construction site so that the tracks could be laid down in accordance with the requirements of the undercarriage.

According to the invention, the above mentioned disadvantage is eliminated by providing the undercarriage with pivotally mounted wheel bogies connected to supporting members which in turn are connected to and adapted to cooperate pivotally with each corner of the undercarriage. While each of the wheel bogies are pivotally mounted to each of the supporting members, only two of the supporting members are pivotally connected to the carriage, the other two being rigidly connected with such an arrangement. Thus, the wheel bogies are enabled to align themselves with the curved rails of the tracks thereby eliminating the jamming difficulties.

In a specific embodiment of the invention, two diametrically oppositely extending supporting members are rigidly secured to the said platform. By means of this arrangement the transverse distance between the bogie wheels in relation to the direction of travel of the crane is maintained in such a manner that the transverse distance of the wheels on either side of the platform cannot be increased or reduced, particularly when the crane travels on a curved section of the track. The same effect can be achieved by rigidly attaching to the platform two adjacent supporting members extending to the wheel bogies running on one and the same rail of the track.

It is therefore an object to provide an undercarriage for rotary tower cranes characterized by improved maneuverability along curved track sections.

Other objects and advantages of the invention will become further apparent from the following detailed description, reference being made to the accompanying drawings showing a preferred embodiment of the invention.

It is to be expressly understood, however, that the drawings are for purposes of illustration only and are not intended as a definition of the limits of the invention,

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reference for this latter purpose being had primarily to the appended claims.

In the drawings:

Fig. 1 is a side elevational view of one embodiment of the crane undercarriage of the invention;

Fig. 2 is a plan view of the arrangement shown in Fig. 1;

Figs. 3 and 4 are illustrative of an embodiment of a wheel bogie assembly having a peripherally grooved, double flange wheel together with a peripherally grooved slave wheel adapted to fit and stay on the track;

Figs. 5 and 6 show another type wheel bogie assembly characterized by a grooved wheel adapted to ride the track and further characterized by idler wheels for providing additional stability to the assembly;

Figs. 7 and 8 are side elevational and plan views of the undercarriage provided by the invention showing a more detailed rendition of the arrangement shown in Figs. 1 and 2;

Fig. 9 shows a partial section taken through line 9—9 of Fig. 8;

Fig. 10 depicts a similar partial section taken through line 10—10 of Fig. 12;

Fig. 11 shows in a more detailed plan view the connection of the supporting members 3a to platform 1a and how said connection is made rigid by bolt 31;

Fig. 12 is similar to Fig. 11 and shows another position of the bolt 31 for maintaining the support member 3a rigid with respect to the platform; and

Fig. 13 depicts a partial section through member 3a and wheel bogie 7a taken along line 13—13 through the pivot pin shown in Fig. 8.

Referring now to Figs. 1 and 2, the supporting members 2, 3, 4 and 5, respectively, are indicated broadly to extend from the corners of the platform 1 to the associated wheel bogies 6, 7, 8 and 9. In one embodiment, supporting members 3 and 4 are rigidly secured to the platform by means not shown (but more clearly indicated in Figs. 7, 11 and 12) while supporting members 2 and 5 are pivotally attached to the platform at 10 and 11 respectively.

Each of the two diametrically opposite bogies 7 and 8 carries a drive motor 12, 13. It will be understood, however, that the two drive motors may also be mounted on the bogies 7 and 9, respectively. In the case of this latter arrangement the supporting members 4 and 5 are those which are rigidly attached to the platform 1.

With the crane undercarriage constructed in the manner just described, the undercarriage is adapted to travel over curved sections of track without any jamming action, since the supporting members 2 and 5 which are pivoted at 10 and 11 are adapted to follow the movements of the wheels supporting the bogies 6 and 9 when the latter are guided along curved paths by the rails of the track. Where it is preferred to attach rigidly the supporting members 4 and 5 to the platform, a similar effect is obtained by the pivoting action of the supporting members 2 and 3 permitting them to follow the movements of the wheels supported by the bogies 6 and 7.

In order to achieve the results of the invention, the wheel bogies must be adapted to stay on the track. One means of achieving this is to use grooved wheels characterized by a double flange adapted to fit over the track, with the bottom of the groove conforming to the surface of the track. The wheels illustrated in Fig. 1 would be such a grooved wheel.

Another type is depicted in Figs. 3 and 4 showing bogie 6 pivotally connected to member 2 of the undercarriage. The bogie comprises a welded structure of side and end walls 14 and 15 of plate steel between which are supported grooved bogie wheel 16 and grooved slave wheel 17. Bogie wheel 16 is mounted on axle 18 which passes

through side walls 14 and is further supported by means of plates 19 welded to the side walls. Slave wheel 17 which lags the bogie wheel is similarly supported, the wheel being mounted on a hollow journal 20 through which axle 21 passes, the axle likewise passing through and being supported by side walls 14 and plates 22 also of plate steel. While the slave wheel need not be used, it is preferred for optimum stability and maneuverability.

Another embodiment is shown in Figs. 5 and 6. While the bogie assembly is broadly similar to that of Fig. 3, it differs in that a single grooved wheel 23 is employed further stabilized by laterally disposed idler wheels 24 which are so spaced as to abut the side of the track (note Fig. 6) as the bogie wheel veers to the right or left as it rounds a curve. The idler wheels are supported via angle brackets 25 and cross bar 26 by the side walls of the bogie. With such an arrangement, a double flanged grooved wheel need not be employed, since the idler wheels can work as well with a conventional single flange railway wheel. Thus, the idler wheels are illustrative of another type means for keeping the bogie wheels of the novel undercarriage on the track.

Fig. 8 which is a more detailed rendition of the undercarriage provided by the invention shows how supporting members 2a, 3a, 4a and 5a are each connected to the four corners of the platform. Bolt holes 27 are provided in terminal wing 28 of supporting members 2a to 5a which holes are adapted to coincide with one of the slightly staggered bolt holes 27a in upper and lower securing plates 29 extending from each corner of the platform, the securing plates being stiffened by plates 30 which extend from along the sides of the platform, the stiffening plates being welded to the edges of the upper and lower securing plates 29 (Fig. 11).

As stated in one embodiment hereinabove, supporting members 3 (e.g. 3a) and 4 (e.g. 4a) are rigidly secured to platform 1 (e.g. 1a). This is achieved (note Fig. 11) by passing bolt 31 through hole 27a of securing plate 29 down through hole 27 of wing 28 of member 3a. Thus, member 3a is locked in position. The slight offset of hole 27a from hole 27 shown on the other side of wing 28 enables the setting of arm 3a for another gage track. Thus, the rigid bolt connection shown in Fig. 11 is for one gage track. In Fig. 12 another rigid setting is obtained by taking out bolt 31 from the previous setting and supporting arm 3a pivotally moved counterclockwise until hole 27 coincides with hole 27a of the securing plate and the bolt passed therethrough to lock the arm in position. This would be done for a smaller gage track.

Another obvious locking means could comprise a key and slot combination. Fig. 9 shows in partial cross section how supporting arm 2a is connected to platform 1a by means of pin 10a comprising a thick walled tubing with plug 32 at each end and with a flange 33 on one end and a fastening plate 34 on the other secured by bolt 35 into plug 32 of the pin. Fig. 10 shows a similar arrangement as to connection of arm 3a with platform 1a via the pin but also shows in dotted line locking bolt 31 behind the pin (as viewed in the direction of 10—10 in Fig. 12) for rigidly locking arm 3a to the platform, a similar arrangement being used for locking diagonally opposed arm 4a.

Fig. 13 shows in partial section the pivoting means of the wheel bogie as seen in the direction 13—13 indicated in Fig. 8. Wheel bogie 7a has associated with it a hollow thick walled pivot pin 37 and end of which is welded to an annular hub 40 within the bogie. The pin passes out of the bogie through a welded plate 41 to which it is also welded.

A socket 36 is provided at the free end of member 3a for slidably receiving the pivot pin, the pivot being held

in place by flange plate 38 bolted via bolt 39 to a welded plate 40 within the hollow pivot pin.

The supporting members are made of heavy gage steel plate of girder-like construction. As shown in Fig. 7, the supporting members may taper in size from a maximum thickness at the pivoting end portion of the platform to a minimum thickness at the bogie connecting end portion. For example, in one embodiment, the thickness may taper from a maximum of about 420 mm. (about 16.5 inches) to a minimum of about 130 mm. (about 5 inches), for a distance between pivot centers (i.e. from platform pivot to bogie pivot) of about 1290 mm. (about 50 inches). The steel plate thickness may range upwards to 6 mm. or higher (e.g. 0.25 inch). A hollow pivot pin employed in connecting the aforementioned supporting member to the platform as shown in Figs. 9 and 10 would have a length of about 502 mm. (about 20 inches), a diameter of about 86 mm. (about 3.4 inches), and a wall thickness of about 10.5 mm. (about 0.42 inch). The foregoing is given merely to illustrate the heavy duty characteristics of one embodiment of the undercarriage.

An important advantage afforded by the crane undercarriage of the present invention resides in the fact that its transverse dimension can be reduced to facilitate transit from one site to another by turning the pivoting supporting members round to extend in the direction of travel; by unlocking the normally rigidly secured supporting members it will be possible to align the latter also with the direction of travel.

It will be obvious to those skilled in the art that many modifications and variations of the embodiments herein disclosed can be effected without departing from the spirit and scope of the invention which is defined in the appended claims.

What is claimed is:

1. In an undercarriage for a rotary tower crane having four wheels adapted to ride on a pair of tracks, the combination of a substantially rectangular platform having supporting members extending outwardly and angularly from the corners thereof, each of said supporting members having pivotally connected at substantially its outermost extremity a wheel bogie and a wheel having associated therewith means for maintaining said wheel on its track, a pair of said supporting members being rigidly connected to said platform, the remaining pair being pivotally connected thereto whereby said undercarriage is enabled to ride around curves without the wheels jamming against track rails.

2. The undercarriage as defined in claim 1 wherein a pair of diametrically opposed supporting members are rigidly connected to the platform, the remaining opposed supporting members being pivotally connected thereto.

3. The undercarriage as defined in claim 2 wherein a drive motor is connected to each of two diametrically opposed wheel bogies, the drive motor being adapted with means coupled to the bogie wheel in driving relationship therewith, the supporting members connected to said bogies being rigidly connected to said platform.

4. The undercarriage as defined in claim 1 wherein each of the pair of supporting members extending outwardly and angularly from the same side of the platform is rigidly connected to the platform, and each of the remaining pair extending outwardly and angularly from the other opposite side is pivotally connected to said platform.

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