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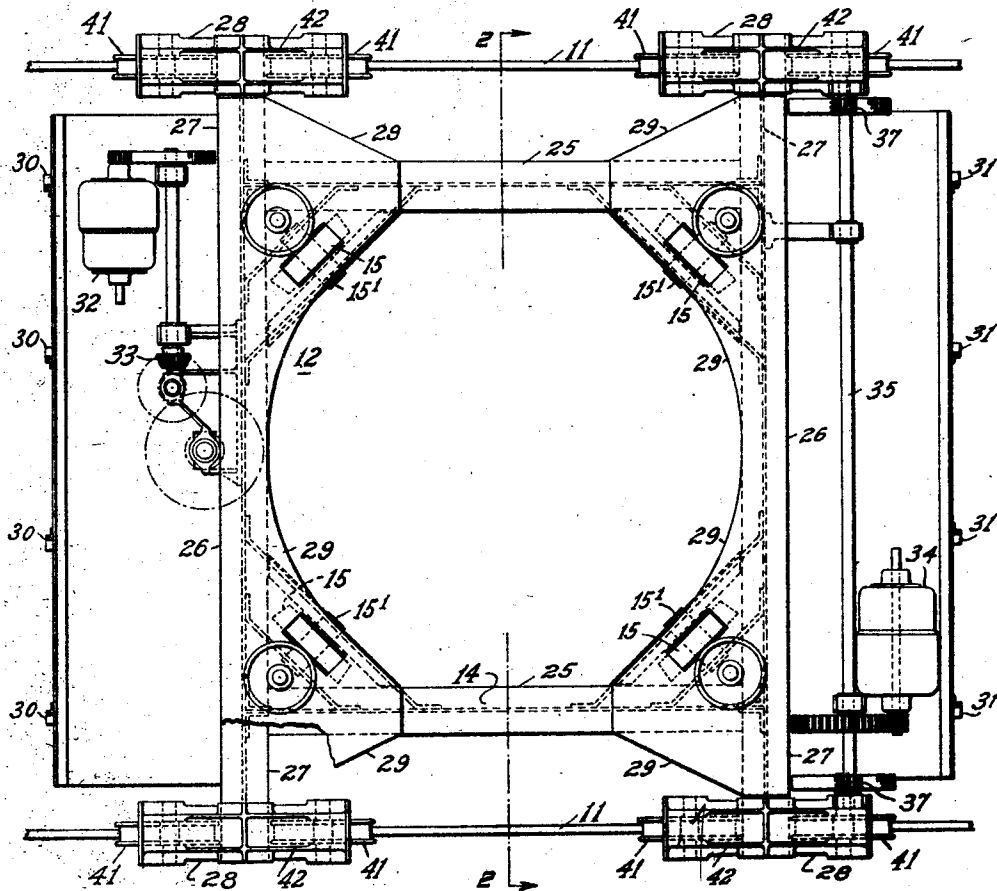
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TROLLEY CONSTRUCTION FOR CRANES

Filed May 8, 1924

3 Sheets-Sheet 1

Fig. 1



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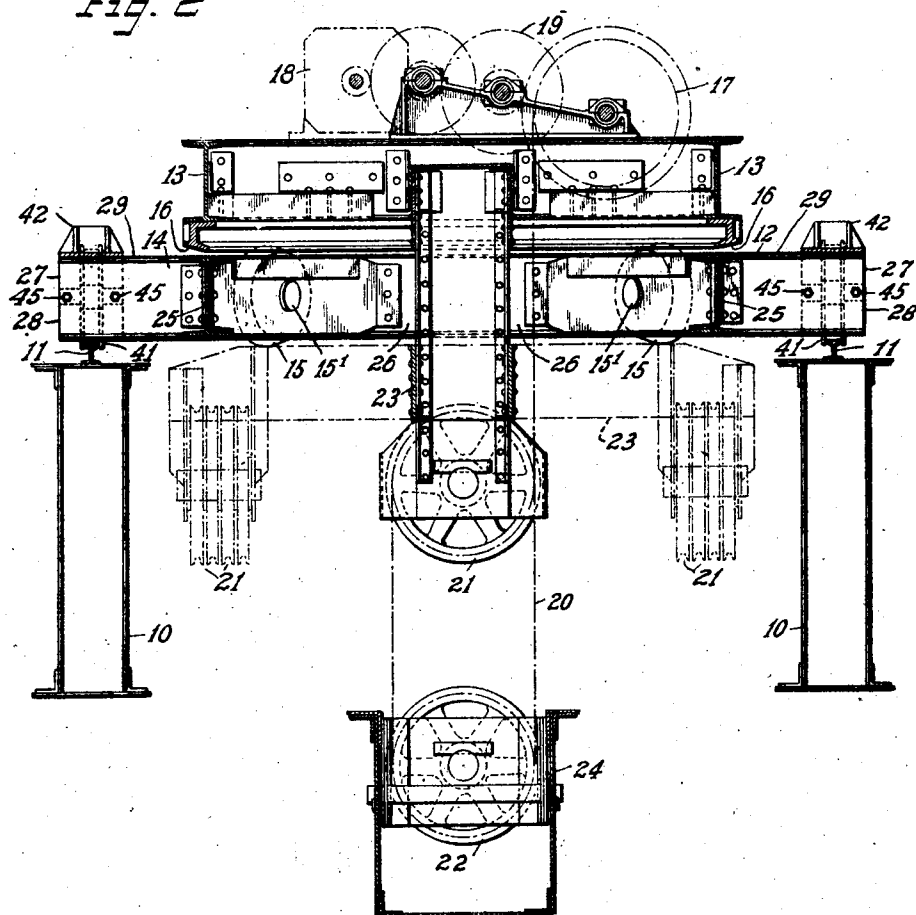
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Fig. 2



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Fig. 3

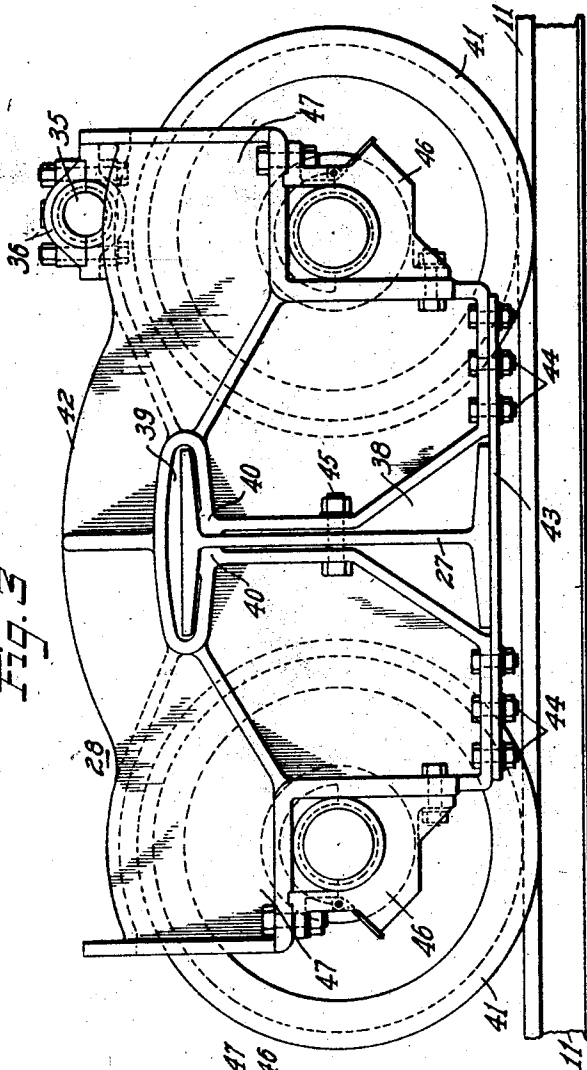


Fig. 4

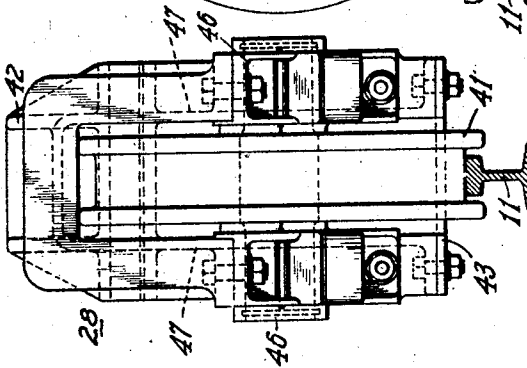
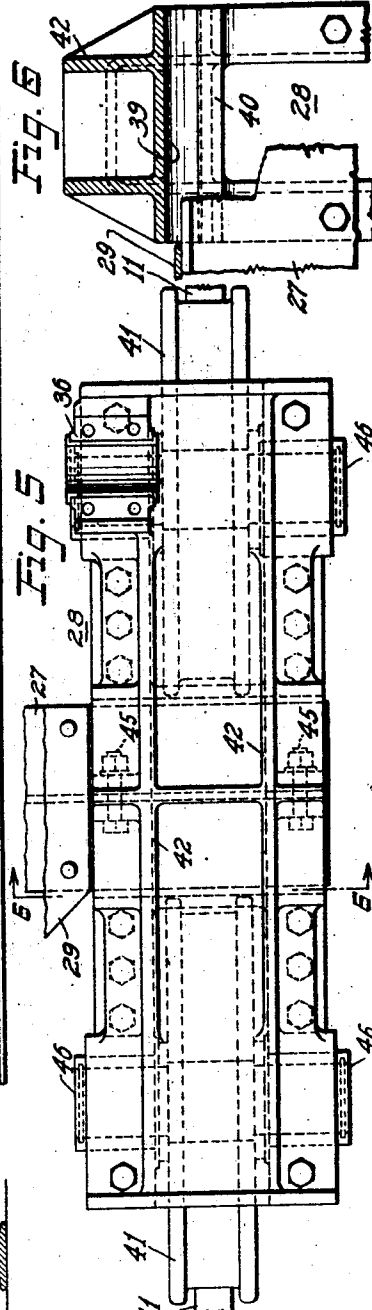


Fig. 5

Fig. 6



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TROLLEY CONSTRUCTION FOR CRANES.

Application filed May 8, 1924. Serial No. 711,788.

This invention relates to improvements in hoisting mechanism and particularly in improvements in the trolley construction used in travelling cranes. In cranes of this type many times it is desirable that the trolley shall carry a turn-table mounted to turn about a vertical axis. The cranes are designed to carry heavy loads amounting at times to hundreds of tons, this requiring that the construction be exceptionally strong and well fabricated. The designer of such cranes has to use the same in limited space, requiring that the head room for the trolley shall be restricted to the least possible dimensions; there is a factor of shipping space to be observed in order that the construction shall be capable of shipment within the maximum dimensions allowed in cars in shipment and that the parts which may be removed from the assembly for shipment can be readily attached in the field without the necessity of employing highly skilled labor and, preferably, that no riveted connection of parts shall have to take place in the field owing to the practical impossibility of doing as good work or producing as strong a structure where field riveting has to be done. And at the same time a maximum roller path for the turn-table is very desirable. All this has to be done and the construction made economically in order to make the same at a cost where it can compete with others and be sold.

My invention has for its primary object and purpose, the production of a turn-table trolley construction for cranes wherein all of the above desirable features are attained, the structure being compact, occupying very little head room, strong and at the same time light and economical in the use of materials in building, one which has a maximum roller path with frame dimensions kept down to a minimum and within the dimensions allowed for shipment, and this without the necessity of field riveting in any part. Subsidiary to this principal object of the invention are many minor objects and purposes for the effective attainment of the ends noted, as will appear fully and in detail in the following description, taken in connection with the accompanying drawings, in which,

Fig. 1 is a plan view of the trolley con-

struction of my invention, the hoisting mechanism being removed for better disclosure of the trolley.

Fig. 2 is a vertical section taken substantially on the plane of line 2—2, of Fig. 1 and looking in the direction indicated by the arrows, the showing of the beam and attached pulley blocks in dotted lines indicating the same swung to a position at right angles to the full line position appearing in the figure.

Fig. 3 is an enlarged elevation of one of the truck members of the construction, four of which are used.

Fig. 4 is an end elevation thereof.

Fig. 5 is a plan of said truck member, and

Fig. 6 is a fragmentary vertical section taken substantially on the plane of line 6—6, of Fig. 5 looking in the direction indicated by the arrows.

Like reference characters refer to like parts in the different figures of the drawings.

The trolley, in cranes of this character, is designed to move on and over a bridge, the girders of which are shown at 10, said girders carrying tracks or rails 11 upon which the trolley, indicated as a whole by character 12, is mounted for travel. As shown, the trolley is divided into upper and lower sections 13 and 14, the former being rotatably mounted on the latter to turn about a vertical axis. This mounting for rotation is accomplished by means of rollers 15 on the lower member or section 14 against which a circular track 16 on the upper section bears. The rollers 15 may be mounted on short shafts 15' supported by brackets at the corners of the lower section 14 which is in the shape of a rectangular frame. It is apparent, however, that the track and roller construction can be reversed without change in mode of operation, and that in either case a minimum amount of head room is required, this design making the construction occupy as little head room as is possible.

The upper trolley member 13, or turn-table carries the hoisting mechanism shown in dot and dash lines in Fig. 2, including hoisting drums 17 connected for driving by a motor 18 through suitable gearing 19. The hoisting cables 20 are wound over drums 17 and upper and lower sheaves 21 and 22.

The upper sheaves 21 are mounted on an upper beam or girder 23 which may be rigidly attached to the upper section or frame 13, being rigidly built in connection therewith and attached to form a compound girder member. The lower sheaves 22 are carried on a movable beam 24 which is suspended from the upper beam 23 by the hoisting cables 20. The length of the upper beam 23 is greater than the diameter of the roller track thus providing an arrangement which gives a comparatively large spread to the sheaves 21 to increase the stability of the construction in its different hoisting and turning operations. The upper beam or girder 23 being rigidly attached to the turntable section 13 rotates therewith at all times.

The under supporting section or member 14 of the trolley is of improved construction to cut down the head room required to a minimum, as well as the maximum dimensions to the extent that it can be received for shipment, while provided a maximum roller path, this permitting the construction of cranes of a high capacity and have the assembly of the parts requiring shop work all done in the shop where proper attention and inspection can be given, rather than in the field with all of the disadvantages of field assembly, particularly in riveting together parts in a secure and strong connection which in the field cannot be done as well nor produce as good a structure as in the shops of the manufacturer. The lower member 14 in its preferred form is made with longitudinal side sills 25 paralleling each other and like transverse sills 26 spaced apart and paralleling each other and located at right angles to the side sills 25, being connected to the side sills by suitable angle members or gussets such as used in structural work. The sills 25 and 26 may be made from I-beams. The transverse sills 26 at their end portions extend beyond the sills 25 to provide integral extensions 27, there being four of such extensions on each of which a supporting truck 28 is to be mounted to support the trolley for movement on the tracks 11. The member or section 14 may be strengthened and reinforced by suitable plates 29 secured to the upper flanges of the sills 25 and 26, as shown in Fig. 1.

The operating parts of the crane mechanism are preferably supported on removable platforms carried by brackets, such as 30 and 31. The platform carried by brackets 30, for instance is designed to support the turn-table motor 32 and transmission gearing 33 for rotating the upper member 13, while motor 34 with its driving shaft 35, the latter being supported at its opposite extremities in bearings 36 in the truck frames 28, is carried on the other platform

carried by brackets 31. The shaft 35 has driving gears 37 to drive two of the truck wheels.

The frames in which the truck wheels are mounted are of like construction for the four frames used. As shown in Figs. 3 to 6, inclusive, the truck frame 28 is a casting in which, between its ends an opening 38 is made through which the extension 27 of the sills 26 pass, the opening being formed to conform roughly to the shape of the sill extension 27. That is the opening at its upper portion has an upper enlargement 39 to freely receive the upper flanges of the sill extension, below which the opening is narrowed for the passage of the web of the extension 27. The lower part of the opening is enlarged downwardly so that the shape of said enlargement is substantially like an equilateral triangle. At the junction of the narrow vertical portion of the opening with the upper enlargement 39, closely spaced shoulders 40 are formed extending transversely of the truck frame and positioned to contact with the under sides of the upper flanges of the extension 27 close to the web thereof. The shoulders 40 provide supports through which the principal load stresses are transmitted between the truck frames and the under section 14 of the trolley. The construction described and mounting for the sill extensions 27 make a semi-pivotal flexibility of connection between the truck frames and the part 14, at the same time one which is much more practical and durable in service and more economical to produce. Through this flexible connection, load stresses transmitted to the truck wheels 41 are equalized, said wheels being preferably spaced at equal distances from the sill extensions 27 on opposite sides thereof.

As before described, the opening 38 in the truck frames extends entirely through to the lower side of the truck frames, practically dividing each frame into two parts which are integrally connected at their upper portions by an upper compression chord 42. A separate lower tension chord 43 made from rolled steel plate underlies the lower flanges of the sill extension 27, passing across and bridging the lower side of the opening 38 and is secured to the truck frame at each side of the opening by bolts, as shown, said bolts being indicated at 44. It is not necessary that the lower flanges of the sill extension 27 contact with the lower chord 43, as all of the load may be carried on the shoulders 40, but it is preferred that such contact shall take place. Bolts 45 are used to connect the truck frames 28 to the sill extensions 27. The sole function of said bolts 45 is to prevent creeping of the trolley frame member 14 on the truck frames due to vibrations or other causes incident to the operation of the device. No load is carried

on said bolts, and but one bolt is needed for each truck frame. This makes it easy to disconnect the truck frames from the sill extensions 27 on which they are mounted whenever desired, as for shipment.

The bearings 46 in which the truck wheels 41 are mounted are located in angular recesses at opposite ends of the truck and the wheels 41 are accommodated and housed partly in the truck frames, the opposite ends thereof being provided with spaced walls 47 integrally connected at their upper edges thereby providing pockets for the reception of the wheels.

It is apparent that this truck construction is relatively inexpensive, being readily produced as a single casting and having a truss construction in which the upper chord 42 takes the compression and the attached lower chord 43 the tension strains. The trucks are readily attached in the field, permitting them to be detached and shipped separate from the other structure. The lower flanges of the sills of the lower section 14 of the trolley are located in a plane closely adjacent to the tops of the rails 11, the head room required for the trolley being reduced to the lowest minimum possible. With the trucks 28 removed, and the platforms carried by brackets 30 and 31 likewise removed, it is a simple matter to strip the frame 14 for shipment but with no parts which cannot be easily attached when installation is to be made and this without skilled labor. All of the riveted connection of parts is done in the factory, and all of the careful structural work done under factory supervision and inspection, the frame being given maximum dimensions within the limits prescribed by transportation rules and regulations which could not be the case without this ready detachment of the truck frames. All of the features which must be had to meet the different conditions and problems arising in constructions of this character, as set forth in the general statement of the invention are incorporated in this construction, which is practical in every way and has so proved in actual practice.

The invention is defined in the appended claims, and all forms of construction coming within their scope are to be considered as comprehended by the invention, the specific construction shown and described not to be considered in any sense as limiting the invention thereto but rather to be considered as diagrammatic and illustrative of the invention.

I claim:

1. A trolley frame construction including a frame provided with oppositely projecting extensions at opposed sides thereof, said extensions having upper and lower flanges and a connecting web, truck frames each formed as a truss with an opening transversely

therethrough for the passage of one of said extensions, said truck frames being formed with shoulders to contact with the under sides of the upper flanges of said extensions near the plane of the web.

2. A trolley construction including a frame provided with oppositely projecting extensions at opposed sides thereof, said extensions having upper and lower flanges and a connecting web, a truck frame including a truss member having a transverse opening therethrough mounted on each extension, said extensions passing through the said openings, and a member spanning the opening in each truck frame at the lower side thereof, below the lower flange of the associated extension and connected to said truck frame.

3. A trolley frame construction including a frame provided with oppositely projecting extensions at opposed sides thereof, said extensions having upper and lower flanges and a connecting web, a truck frame for each extension comprising an integral truss member having a transverse opening therethrough open at its under side through which the extension passes, a shoulder on the said truss member at each side of the opening contacting with the upper flange of the extension at each side of and adjacent the web thereof, and a tension member spanning said opening at its lower side, below the lower flange of the associated extension and connected to the truck frame.

4. A trolley frame construction including a frame provided with oppositely extending bars of I-beam form at opposed sides thereof, truck frames formed with transverse openings therethrough for passing said bars, and supporting shoulders on the truck frames adjacent the openings therethrough contacting with the under sides of the upper flanges of said I-beam bars adjacent the webs thereof.

5. A trolley frame construction including a frame provided with oppositely extending bars of I-beam formation at opposed sides thereof, an integral cast metal truck frame having a transverse opening therethrough for the passage of said bar, a truck frame being mounted on each bar, supporting shoulders on each truck frame adjacent to said opening and contacting with the upper flange of each bar at each side of and adjacent the web of the bar, and a wrought metal tension member underlying the lower flange of each of the bars and connected to each truck frame at opposite sides of the opening therein.

6. A trolley frame construction including a frame, truck supporting I-beams extending beyond the sides of the frame, each having a substantially vertical web, an integrally cast metal trussed truck frame for each I-beam having a transverse opening

for the passage of an I-beam, and supporting shoulders integrally cast with the truck frame disposed at opposite sides of the opening therethrough and contacting with the under side of the upper flange of the I-beam on which it is mounted adjacent to the web thereof.

7. A trolley frame construction including a frame, truck supporting I-beams extending from opposed sides of the frame, each having a substantially vertical web, an integral cast metal trussed truck frame having a transverse opening therethrough mounted on each I-beam, said beams passing through the openings, supporting shoulders on each truck frame located at opposite sides of the opening and contacting with the under sides of the upper flange of the associated I-beam close to the web thereof, said transverse opening in a truck frame extending to the lower side of the truck frame, and a metal tension member underlying the I-beam associated with each truck frame and secured to the truck frame at opposite sides of the opening.

8. In a trolley construction, a trolley frame member including a truck supporting beam, a trussed truck frame releasably attached intermediate its ends to the beam, said truck frame having an integral compression chord disposed above the supporting beam and a metal tension chord underlying said beam and connected to the truck frame at opposite sides of said beam, and truck wheels mounted on the truck frame and disposed at opposite sides of the beam.

9. In a trolley construction, a trolley frame member including a truck supporting beam, a cast metal truck frame having a medial transverse opening therethrough open at the bottom thereof, said supporting beam extending into said opening and resting directly on the truck frame, an integral compression chord included in the truck frame

located over the beam, and a metal tension chord underlying said beam and secured to the truck frame at opposite sides of the opening.

10. In a trolley construction, a trolley frame member including a truck supporting beam, a trussed truck frame connected intermediate the ends thereof to said supporting beam, said truck frame having an integral compression chord located above the beam, and a metal tension chord underlying the beam and connected to the truck frame at opposite sides of the beam, and truck wheels mounted on the truck frame at opposite sides of the supporting beam.

11. In a trolley construction, a trolley frame member including a truck supporting beam, a truck frame having a transverse opening therethrough with a shoulder on the frame located adjacent said opening, said beam having an upper flange and extending into said opening with said flange bearing against the shoulder.

12. In a trolley construction, a trolley frame including a truck supporting beam, a truck frame, and a lug on said truck frame upon which said supporting beam is flexibly supported.

13. In a trolley construction, a trolley frame including a truck supporting beam, a truck frame having an opening into which said beam extends, and a lug on the truck frame adjacent said opening from which the beam is suspended.

14. In a trolley construction, a trolley frame including a truck supporting beam, a trussed truck frame having an opening between upper and lower chords of the truss into which the beam extends, and a lug disposed between said upper and lower chords on which the beam rests.

In testimony whereof I affix my signature.

GEORGE EDWARD MOORE.