K. S. HOWARD.

LOCOMOTIVE CRANE UNDERFRAME.

APPLICATION FILED SEPT. 2, 1919.

1,409,378. Patented Mar. 14, 1922.

3 SHEETS—SHEET 1.

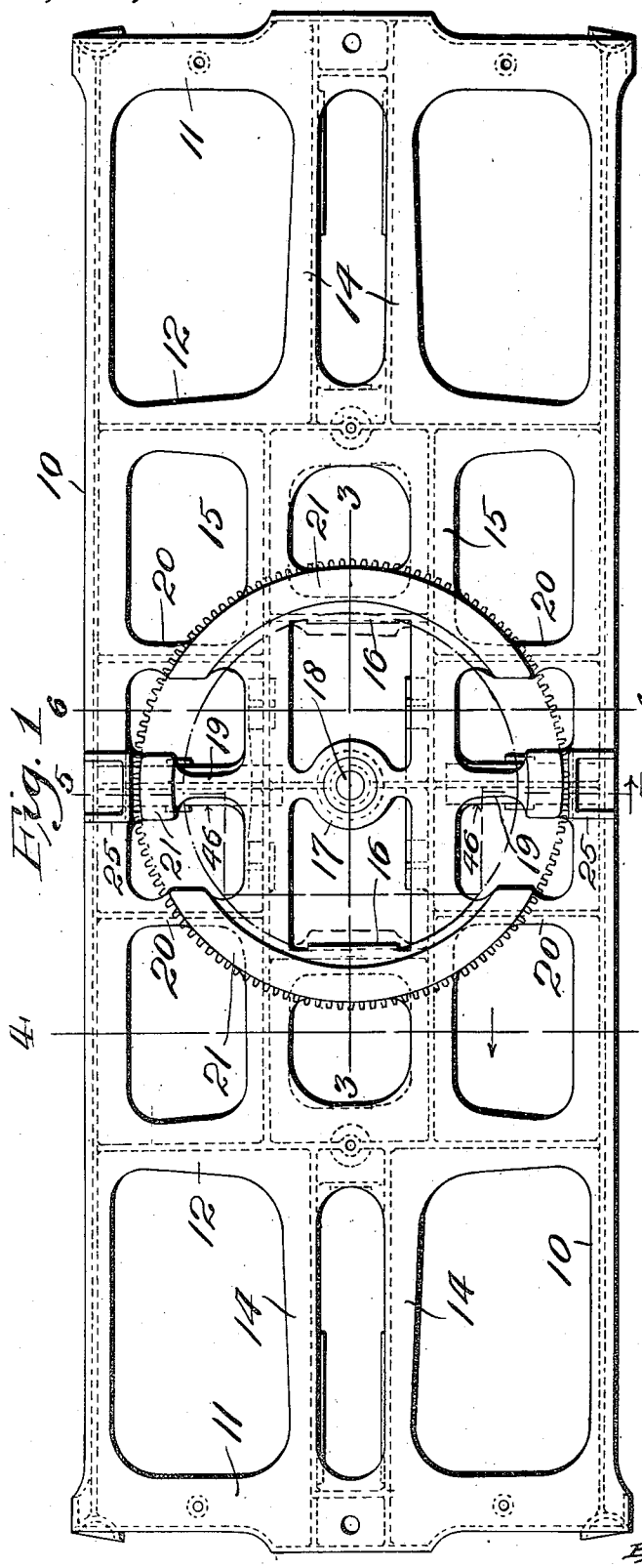


Fig. 1

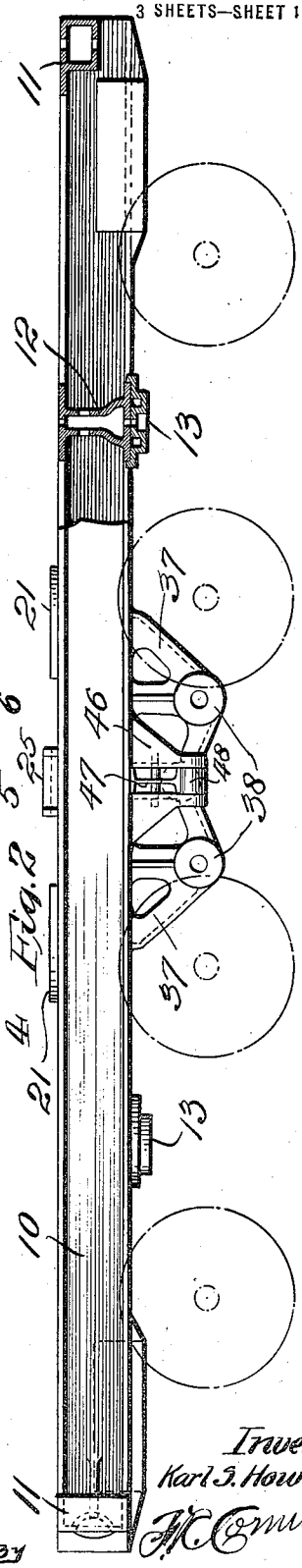


Fig. 2

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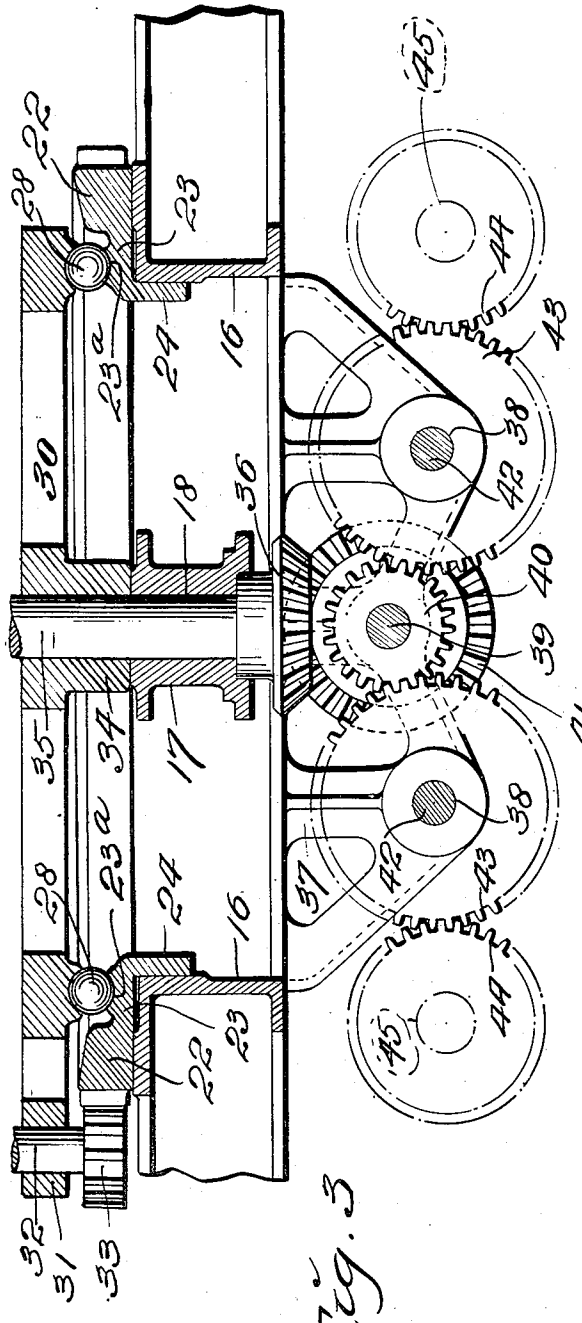


Fig. 3

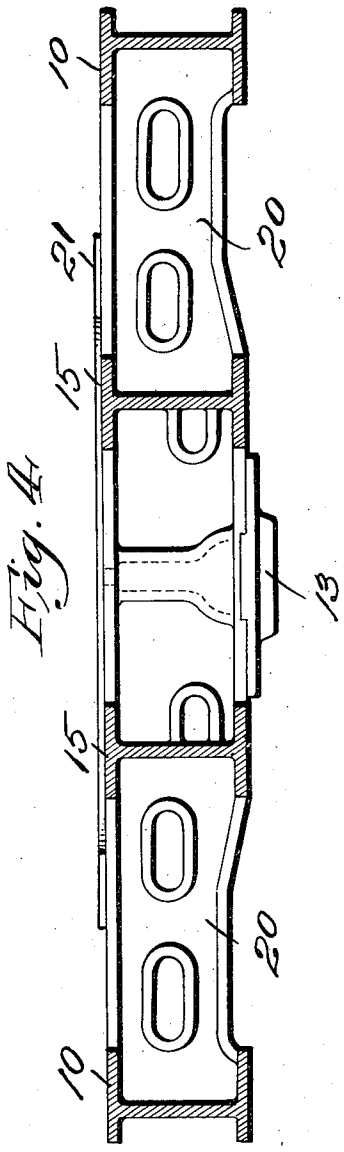


Fig. 4

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3 SHEETS—SHEET 3.

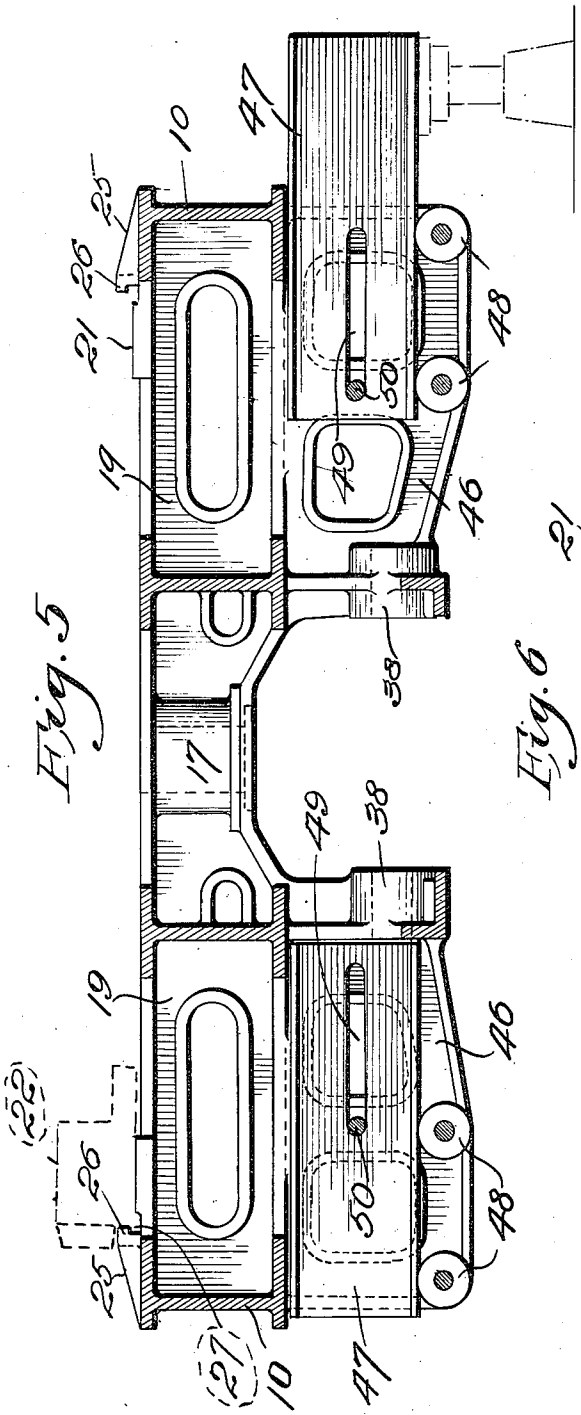


Fig. 5

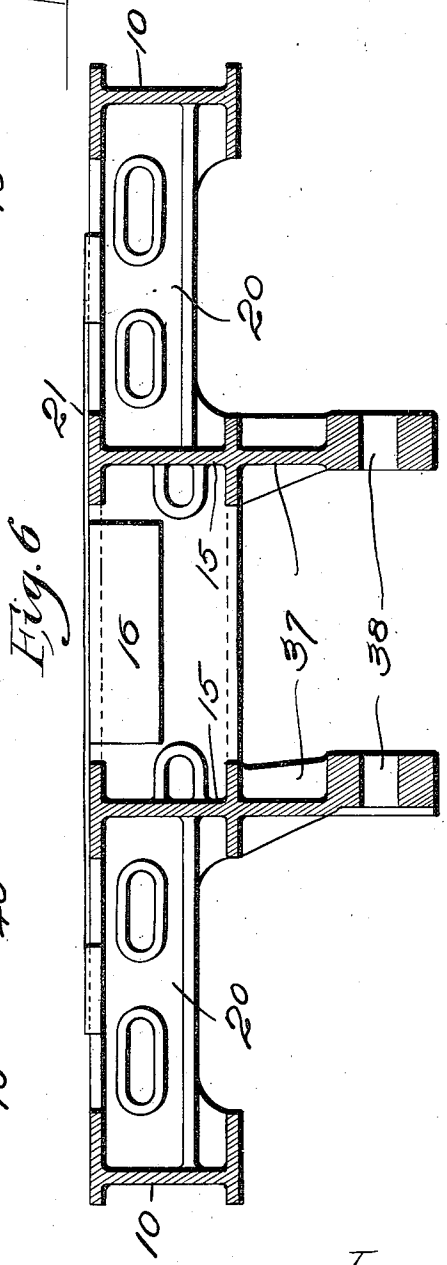


Fig. 6

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UNITED STATES PATENT OFFICE.

KARL S. HOWARD, OF ST. LOUIS, MISSOURI, ASSIGNOR TO COMMONWEALTH STEEL COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF NEW JERSEY.

LOCOMOTIVE-CRANE UNDERFRAME.

1,409,378. Specification of Letters Patent. Patented Mar. 14, 1922.

Application filed September 2, 1919. Serial No. 321,047.

To all whom it may concern:

Be it known that I, KARL S. HOWARD, a citizen of the United States, residing at St. Louis, Missouri, have invented a certain new and useful Improvement in Locomotive-Crane Underframes, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to new and useful improvements in underframes for locomotive cranes, the principal objects of my invention being to form the underframe in a single piece, preferably by casting, thereby producing a one-piece construction which combines great strength and rigidity with minimum weight, and further, to form integral with said frame certain parts in the nature of brackets, lugs, plates, and the like, that will serve as seats and points of attachment for parts of the crane and associated mechanism that is carried by the underframe.

A further object of my invention is to provide simple means in the form of outriggers which are adjustably carried on opposite sides of the frame and which riggers, when withdrawn, cooperate with jacks or like supporting means for preventing the overturning of the crane while lifting side loads.

With the foregoing and other objects in view my invention consists in certain novel features of construction and arrangement of parts, hereinafter more fully described and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a top plan view of a locomotive crane underframe of my improved construction.

Figure 2 is a side elevational view of the underframe with parts thereof in vertical section.

Figure 3 is an enlarged cross section taken approximately on the line 3—3 of Figure 1.

Figure 4 is an enlarged cross section taken approximately on the line 4—4 of Figure 1;

Figure 5 is an enlarged cross section taken approximately on the line 5—5 of Figure 1 and showing one of the outriggers extended for engagement with a support such as a block or jack.

Figure 6 is an enlarged cross section taken approximately on the line 6—6 of Figure 1.

The locomotive crane underframe contemplated by my invention is preferably cast in a single piece and includes a pair of side members 10, a pair of end sills 11, and a pair of transverse members or bolsters 12, the latter being provided on their undersides with center bearings 13 for the truck bolsters. These side and end members and bolsters may be of I-beam or channel-shape in cross section, and extending between the central portions of the end sills and bolsters are longitudinally disposed members 14 arranged in pairs and serving as supports and housings for the draft rigging and parts of the draw-bars (not shown).

Extending between the bolsters 11 are integrally formed beams 15 of I-beam or channel-shape in cross section and connecting these beams at short distances from the bolsters are integrally formed transversely disposed rails 16. Arranged at a point midway between the bolsters 12 and formed integral with the central portions of the beams 15 is a block 17 through which is formed a vertically disposed aperture 18, the same serving as a center bearing for a vertical shaft that is used in connection with the driving gear for the traction wheels and hereinafter more fully described.

Arranged between the central portions of beams 15 and side members 10 are integrally formed transversely disposed rails 19, and located between these rails and the bolsters 12 and connecting said beams 15 and side members 10 are integrally formed transverse rails 20.

Formed integral with the tops of the rails 19 and the tops of the rails 20, the beams 15 and the transverse rails 16, are arcuate pads or plates 21 that are concentric with the bearing 18. The top surfaces of these pads or plates 21 are preferably horizontally disposed and they provide a substantially circular seat for a combined circular track and gear ring 22 and which latter is secured to said track in any suitable manner, preferably by bolts or rivets. This gear ring is provided with an inwardly projecting horizontally disposed flange or web portion 23 in the top of which is formed a ball race 23^a and depending from the inner edge of this flange or web and at diametrically opposite points

are lugs 24 which are adapted to engage against the inner faces of the transverse rails 16. (See Fig. 3.)

Formed on top of the side rails 10 at points adjacent to the ends of transverse rails 19 are brackets 25 provided on their inner faces with lugs 26, the same overlying outwardly projecting lugs 27 that are formed on the lower portion of ring 22. The engagement of lugs 26 with lugs 27 and the engagement of the depending lugs 24 with the transverse members 16 serve to anchor the combined circular track and gear ring 22 firmly in position upon the underframe and said engaging parts are effective in relieving a considerable portion of the shearing strains from the bolts or rivets utilized in securing the gear ring to the underframe.

Spherical anti-friction members 28 occupy the race 23^a and supported by said antifriction members and adapted to revolve thereupon is a horizontally disposed plate or frame 30 that serves as a base for the revolving portion of the crane.

Formed on the base or plate 30 is a bearing 31 in which is arranged for rotation a vertically disposed shaft 32 and secured on the lower end of the latter is a pinion 33 which meshes with the teeth of gearing 22. Depending from the central portion of base 30 is a bearing 34 which rests directly upon block 17 and passing through this bearing 34 and the bearing 18 in said block 17 is a vertically disposed shaft 35 that carries on its lower end a beveled gear wheel 36.

Formed integral with and depending from the beams 15 are brackets 37 in which are formed horizontally disposed bearings 38, the same being arranged in pairs.

Mounted for rotation in the central pair of these bearings 38 is a shaft 39 that carries a pinion 40 and a beveled gear wheel 41, the latter meshing with beveled gear wheel 36. Arranged for rotation in the other pairs of bearings 38 are shafts 42 upon each of which is mounted a gear wheel 43, the same meshing with the gear wheel 40 and with gear wheels 44, the latter being carried by the inner members of the truck axles 45. As shaft 35 is rotated, its motion is transmitted through the beveled gear wheels 36 and 41 to shaft 39 and the motion of the latter is transmitted through gear wheels 40, 43, and 44 to the truck axles 45 and thus the underframe and crane carried thereby will be propelled along the track.

Power being applied to shaft 32 will effect a movement of pinion 33 around the gear ring 22 and thus the plate or base 30 carrying the crane and associated parts will be revolved as desired.

Arranged immediately beneath the members 19 and formed integral therewith and with the brackets 37 are transversely disposed housings 46 and arranged for movement in each of these housings is a beam 47 which performs the functions of an outrigger and which is supported by rollers 48 that are journaled in the lower portion of the housing. These rollers, together with the lower flange of the side frame 10, form fixed fulcrum supports for the outrigger beams.

Each beam 47 is provided with a longitudinally disposed slot 49 and passing therethrough is a pin or bolt 50, the ends thereof being seated in the side walls of the housing. Normally, these beams are positioned wholly within the housings 46, as shown at the left-hand of Figure 5, but when the supported crane is utilized for lifting relatively heavy side loads, either one or both of the beams may be extended, as illustrated at the right-hand of Figure 5, and said extended beams supported by a suitable block or jack.

Thus it will be seen that I have provided a strong and substantial underframe for locomotive cranes or the like, said underframe being formed in a single piece and having formed integral therewith certain brackets, bearings and parts which serve as supports or points of attachment for parts of the crane or parts of the operating mechanism associated therewith.

It will be readily understood that minor changes in the size, form and construction of the various parts of my improved locomotive crane underframe can be made and substituted for those herein shown and described, without departing from the spirit of my invention, the scope of which is set forth in the appended claims.

I claim:

1. A locomotive crane underframe formed in a single piece and provided with longitudinal and transverse members and with arcuate pads bridging the spaces between said members and having a circular seat for a gear ring.

2. In a locomotive crane underframe formed in a single piece, longitudinal and transverse members, one of said members traversing the center of said underframe and there enlarged and provided with a vertical shaft bearing, and arcuate pads concentric with said bearing and bridging the spaces between said members.

3. In a one piece crane underframe, spaced longitudinal beams and side members, spaced transverse rails between each of said beams and the adjacent side member, and arcuate pads formed on said beams and rails and bridging the spaces between same.

4. In a crane underframe, spaced transverse and longitudinal members, arcuate pads spaced longitudinally from each other, integral with said members and extending across them, brackets on said members adjacent to said pads, a gear ring, a tongue

on said ring, adapted to depend between the spaced ends of said pads and engage said members against movement in one direction, and lugs on said ring adapted to engage said brackets against movement in another direction.

5. In a one piece underframe for locomotive cranes, bolster and sill members, a vertical journal bearing in one of said members, an integral depending bracket on one of said members, and a horizontal journal bearing in said bracket.

6. In a one piece underframe for locomotive cranes, bolster and sill members, a vertical journal bearing in one of said members, an integral depending bracket on one of said members, and a horizontal journal bearing in said bracket in the same vertical plane as said vertical journal bearing.

7. In a one piece underframe for locomotive cranes, bolster and sill members, a central vertical journal bearing in one of said members, an integral depending bracket on one of said members, a central horizontal journal bearing in said bracket in the same vertical plane as said vertical bearing, and horizontal bearings at either side of said central bearing.

8. In a one piece underframe for locomotive cranes, bolster and sill members, a central vertical journal bearing in one of said members, integral depending brackets on said members, horizontal journal bearings in said brackets, said horizontal bearings being arranged in pairs and spaced and extending transversely of the longitudinal center line of the frame.

9. A locomotive crane underframe formed in a single piece, and transversely disposed outrigger beam housings formed integral with and arranged beneath said underframe.

10. A locomotive crane underframe provided near its longitudinal center with transversely disposed pockets, slotted outrigger beams movably seated in said pockets, fixed fulcrum rolling supports journaled in said underframe below said beams, and pins through the slots of said slotted outrigger beams to limit their movement.

In testimony whereof I hereunto affix my signature this 25th day of August, 1919.

KARL S. HOWARD.