April 27, 1943. A. L. MEDENWALD 2,317,689

UNDER-DRIVE FOR TRAVELING CRANES, MONORAILS AND THE LIKE

Filed April 21, 1941 2 Sheets-Sheet 1

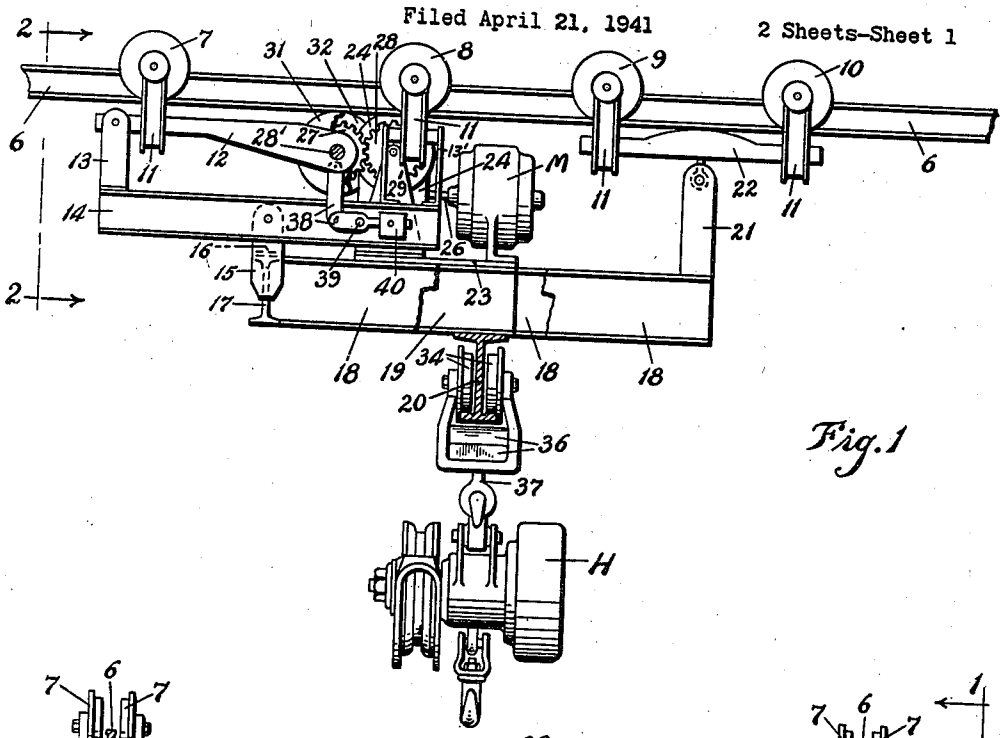


Fig. 1

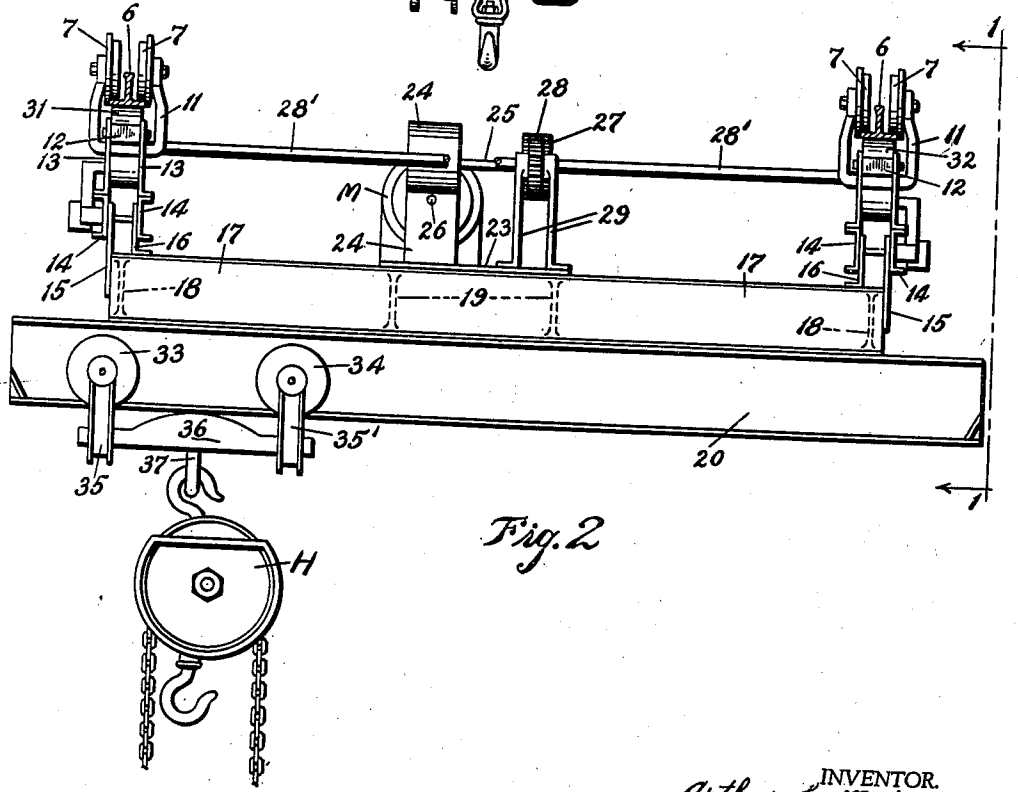


Fig. 2

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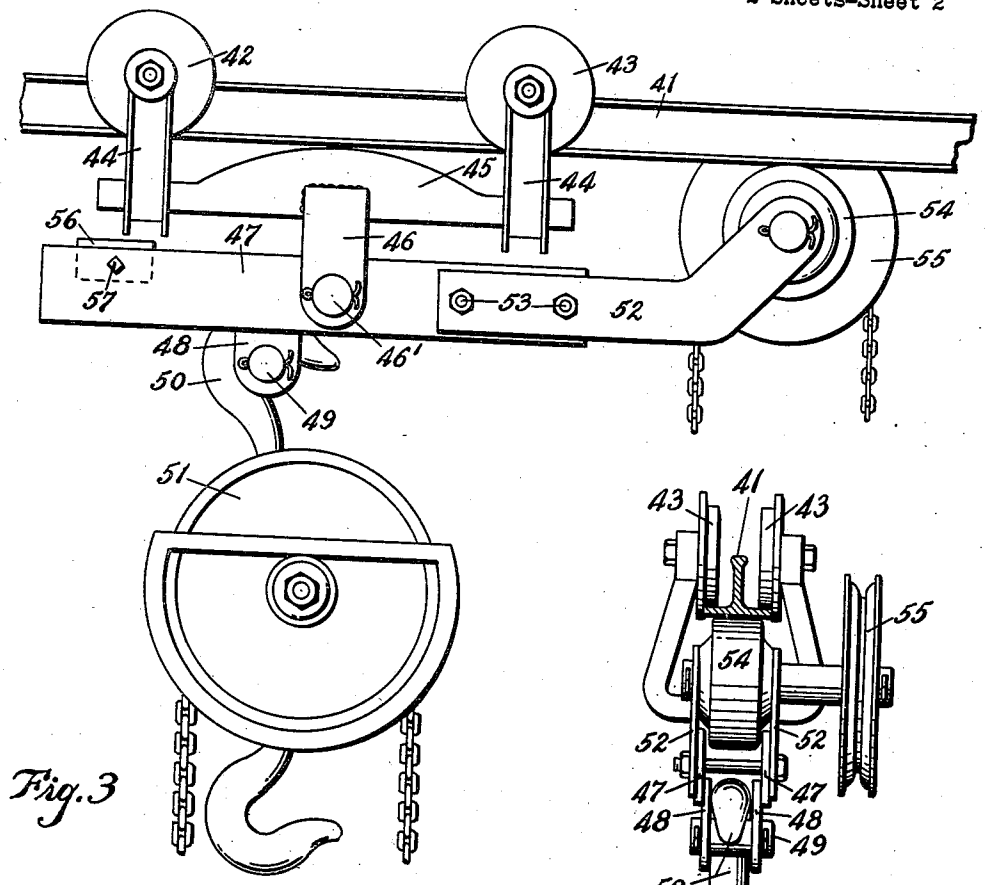


Fig. 3

Fig. 4

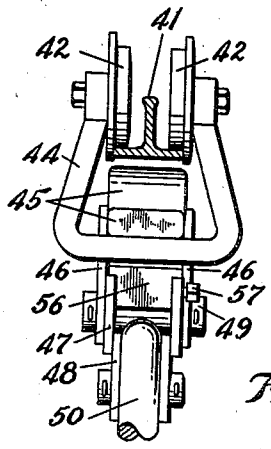


Fig. 5

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UNDERDRIVE FOR TRAVELING CRANES, MONORAILS, AND THE LIKE

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2 Claims. (Cl. 105—153)

This invention relates to an under-drive mechanism for traveling cranes and monorails, and more particularly to an under-drive mechanism in which the load determines the frictional contact, or traction, of the drive wheel with the rail or track.

While the invention is shown in the accompanying two sheets of drawings as applied to the underslung type of traveling crane and monorail, it is applicable to other types of moving cranes, load carriers and the like, where there is a moving load-carrying apparatus adapted to be moved by the frictional or traction engagement of a driving wheel with the track or rail upon which it moves.

One of the salient objects of the invention is to provide in such an apparatus a lever mechanism interposed between the load-carrier and the driving wheel which engages the track or rail, which lever mechanism is so connected and arranged that the load automatically determines the frictional engagement or traction of said driving wheel with the rail.

In order to explain the invention, I have shown on the accompanying two sheets of drawings, two practical embodiments thereof, which I will now describe:

Figure 1 is a side elevation of a track, with a crane structure suspended thereunder, and a load-carrier mechanism suspended under said crane, to travel transversely of the crane movement, looking at the right hand side of Fig. 2;

Figure 2 is a view thereof looking at the left hand side of Fig. 1;

Figure 3 is a side elevation of a monorail type of load-carrier, embodying the invention;

Figure 4 is an end view thereof from the right hand end of Fig. 3; and

Figure 5 is a fragmentary view from the left hand end of Fig. 3.

Referring now to the drawings, Figs. 1 and 2, spaced rails or tracks 6, 6, are shown, which would be supported overhead in the building or place of use, and on these rails or tracks are four pairs of carrier wheels, said four pairs being designated 7, 8, 9 and 10, respectively; there being four pairs on each rail or track, the wheels of each pair being connected with a yoke, designated 11 in all places, said yokes looping under the rail or track, as seen in Fig. 2, and forming the supporting means from said carrying wheels.

Extended through the yokes 11, from the carrying wheels 7, at each side of the crane structure is a lever, as 12, the ends of which levers 12 are pivotally connected with a pair of supporting members, as 13, 13, which are, in turn, at their lower ends, secured to a pair of channel members, as 14, 14, the opposite ends of which are supported in a similar manner from the loop 11, from wheel 8, as by members 13'. Secured to said channel members 14, 14, are two supporting straps, or members, as 15 and 16, which are secured to the end and top, respectively, of an I-beam 17, extending from one side to the other of said structure, as seen in Fig. 2.

Welded to said I-beam 17, at their ends, are four transverse I-beams 18, 18 and 19, 19, seen in light broken lines in Fig. 2. The I-beams 18, 18, at the opposite ends are longer, as seen in Fig. 1, while the I-beams 19, 19, in the middle, are shorter. In Fig. 1, I-beam 18 is broken out in the middle to expose the end of I-beam 19, only one being seen because the other one is directly behind the exposed one.

The ends of said short I-beams 19, 19, are welded on top of an underlying I-beam or track member 20, while the free ends of the long I-beams 18, 18, are held by supporting straps or members, as 21, the upper ends of which are pivotally connected with a bar or member 22, the opposite ends of which are supported in the yokes 11, 11, from the carrying wheels 9 and 10, as seen in Fig. 1. Said I-beams 18, 18, are also welded or otherwise secured in their middle portions to the top of the transverse I-beam or track member 20.

Mounted on top of said short I-beams 19, 19, is a plate or platform 23, on which is mounted a motor M, a gear box 24, of reduction gears of any known type, from which gear box extends a drive shaft 25. The motor shaft is designated 26 for driving said gears in a well known manner.

The drive shaft 25, from the reduction gears, is provided with a gear 27, which meshes with a gear 28, on a shaft 28'. Said gears and their shafts are supported on suitable brackets, as 29, and 29', only brackets 29 being seen in Fig. 2, and bracket 29' being seen in Fig. 1.

Mounted on the shaft 28, at its opposite ends, are the friction or traction drive wheels 31 and 32, seen in Fig. 2, wheel 31 being broken away in Fig. 1, to expose wheel 32 at the opposite side and also the gear 27, on the same shaft 28'.

Said shaft 28' is also connected with the end of the lever 12, at each side of the structure, for a purpose hereinafter referred to.

Moving upon the I-beam or track beam 20, are two pairs of wheels 33, 33, and 34, 34, having yokes 35, 35', thereunder, said yokes 35, 35',

supporting a connecting member 36, as seen clearly in Fig. 2, provided on its under side with an eye or supporting member 37, to which is hooked or supported the usual or any type of hoisting mechanism, designated as a whole H.

It will be seen from the foregoing that the weight to be lifted by the hoisting mechanism H, is transmitted through the connections to the carrying wheels 9 and 10, at one end of the I-beams 18, 18, and at the other ends of said beams, to carrying wheels 7 and 8; that said weight is, through the levers 12, 12, and their connections, also transmitted to the friction or traction drive wheels 31 and 32, which bear up under the tracks or rails 6, 6, at opposite sides of the crane structure. It will also be seen that the amount of the weight, determines the pressure or traction applied through the drive wheels 31 and 32 to said tracks or rails.

In case there is no weight, other than the weight of the apparatus itself, in order to balance the normal weight of the apparatus in its unloaded condition, I have provided an auxiliary balancing weight mechanism operating through suitable connections on said drive wheels, which I will now describe.

Connected under the bearing end of the lever 12, under the shaft 28', extended through said lever, is a lever and link mechanism, designated 38, pivotally supported at 39, with a weight 40, adjustably mounted thereon, whereby to exert an upward pressure on the end of said lever 12, and the shaft 28' therein, and on the drive wheels 31 and 32. This auxiliary balancing weight is used to overcome the balanced condition of the mechanism in an unloaded condition and to cause sufficient traction on the drive wheels to move said unloaded apparatus. It will be understood, of course, that the movement here required is very slight, just sufficient to increase the bearing friction or traction enough to move the structure when moved without any load.

Referring now to Figs. 3, 4 and 5 of the drawings, I have shown my invention as applied to a monorail load-carrier, with an underslung carriage and drive wheel operating on the underside of the rail or track member, with means interposed between the load, and said drive wheel, whereby the weight of the load operates to determine the friction or traction of the drive wheel on the rail or track.

In the drawings, a monorail or track member is shown, designated 41, which may be supported in any suitable and practical manner for transporting a load from one place to another. Mounted to run on said monorail, or track member, 41, are two pairs of track wheels, 42 and 43, each pair of wheels having a yoke, as 44, forming bearings for said wheels and looping down under said monorail, as indicated.

Supported in said yokes 44, is a connecting and supporting member 45, from the middle of which depends a supporting member 46, and in which is pivotally supported at 46' a pair of spaced bars, 47, 47, between which spaced bars are secured spaced depending members 48, 48, with a pin 49 therethrough, said pin being adapted to receive a hook 50, of a hoisting mechanism, designated as a whole 51. Said load hoist can be of any desired type.

At one end of said spaced bars 47, 47, there are connected two spaced members 52, 52, with bolts 53, said members 52, 52, forming extension arms to receive therebetween a drive wheel 54, adapted to frictionally engage the underside of said monorail, or track, as seen in said drawings. On the same shaft with said drive wheel is a chain wheel 55, with chain, for operating said drive wheel by hand, if and when desired to so operate it for the purpose of moving said load carrying mechanism through the operation of said drive wheel on the underside of the monorail, as when loaded.

It will be understood, of course, that any suitable power means can be used to drive said drive wheel. At the other ends of said spaced members 47, 47, and between said members, it adjustably held a weight 56, adapted to be held in adjusted position by a set screw 57. This weight is provided to hold the drive wheel 54 up under the monorail 41, sufficiently to give the necessary friction or traction when there is no load on the hoist mechanism 51.

It will be noted that the pivotal support 46' and the load connection on the pin 49, are close together and that the load operates to force the drive wheel 54 up against the underside of the monorail 41, and that the heavier the load the greater the friction or traction engagement of said drive wheel with the monorail.

These drive wheels may be of any suitable material to give the best friction or traction effect, and are preferably of suitable rubber material.

Thus in both embodiments of my invention, whether of a crane structure, or of the monorail type, the weight or load is so connected that it operates, automatically to regulate the friction or traction of the drive wheels with the rail or track, which is in the main object of my invention.

I am aware that changes can be made in the details of the construction and arrangement of my invention as here shown and described, without departing from the spirit thereof, and I do not, therefore, limit the invention to the showing as made and described, except as I may be limited by the hereto appended claims.

I claim:

1. The combination with a load carrying apparatus to run on a track, of a horizontal load supporting lever pivotally suspended intermediate its ends from said apparatus under said track, a traction wheel carried at one end of said lever and engaging the underside of said track, means at the other end of said load supporting lever for supporting a load to be carried, whereby increased load increases the traction of said traction wheel, and means for driving said traction wheel to move said apparatus on said track.

2. In an apparatus of the character referred to, a track rail, a load-carrier having wheels to run on said track rail with load-supporting means suspended from said wheels under said track rail, said means including a horizontal load-supporting lever pivotally suspended from said apparatus, intermediate its ends, a traction wheel carried at one end of said lever and engaging the underside of said track rail for moving said load-carrier, power means for turning said traction wheel, and means connected with said horizontal lever, at the opposite side of its pivotal support, for suspending the load to be carried, whereby increase of load increases the traction of said traction wheel up against said track rail.

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