PORTABLE TOOL FOR RECONDITIONING CRANE RAILS

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The invention described herein may be manufactured and used by or for the Government for governmental purposes without the payment of any royalty thereon.

This invention relates to improved means for grinding burrs from rails and is concerned particularly with rails for large overhead cranes.

In shops where it is necessary to lift and move large, heavy objects from one section to another, there is usually provided a crane which travels on rails hung overhead and thereby moves the objects above the shop machines and equipment. The wheels of the crane are flanged to retain the crane on the rails and are generally cold worked so as to be less susceptible to wear than the rails they ride on. Consequently, after a period of operation, the pressure and the weight of the crane causes the wheels to wear the metal on the top portion of the rails to the edges, producing burrs.

These burrs are undesirable because they increase the width of the rails and thereby reduce the clearance between the rails and the flanges of the wheels. Further, these burrs are cold worked to a hardened degree and are sharp, thereby acting as cutting edges which cause considerable damage to the wheels and create dangerous conditions. It is important, therefore, that these burrs be removed from the rails. The conventional means of removal are either to remove the rails and machine or grind them in the shop or to grind them in place with band grinders. The first method causes a lengthy interruption of production, and both methods involve considerable labor costs and the many hazards inherent when working on heavy objects at considerable heights.

It is, therefore, an object of this invention to provide means for removing burrs from crane rails without interfering with production, which effects a saving of man hours, and reduces the existing hazards of the operation.

Another object of this invention is to provide a grinding device attachable to a crane and movable thereby.

The specific object of this invention is to provide a device for grinding burrs from crane rails and means for mounting the grinding device to a crane, for movement thereby, and whereby the characteristic weaving motion of the crane during travel is absorbed by a compensating mechanism so as not to interfere with the grinding operation.

The specific nature of the invention as well as other objects and advantages thereof will clearly appear from a description of a preferred embodiment as shown in the accompanying drawings in which:

Fig. 1 is a perspective assembly view of the grinding mechanism of this invention;

Fig. 2 is a top view of the motion compensating device partially broken away to show the mounting means;

Fig. 3 is a continuation of Fig. 2 and shows the means for mounting the grinder to the grinding mechanism;

Fig. 4 is an exploded view of the motion compensating device;
An angle iron member 45 is secured to each end of cross arms 40 so as to provide a downwardly depending leg portion 49. Each leg portion 49 is provided with a laterally disposed hole 50 to receive support members 51 and 70. Support members 51 are mounted on one side of carrier 15 and are comprised of a rod portion 52 receivable by hole 50 and a bifurcated portion 53 to receive a roller 54 which is rotatably mounted therein on a pin 55 so as to engage the side of rail 17. Rod portions 52 are threaded and are provided with a pair of check nuts 56 therein for adjustably retaining such support members 51 to leg portions 49. Support members 70 are mounted to carrier 15 to oppose support members 51 and are provided with a rod portion 71, slidable received in hole 50, and a bifurcated portion 72 having a roller 73 rotatably mounted therein. Rod portions 71 have a stop pin 58 provided transversely therethrough for retaining such support members 70 in leg portions 49 and are provided with springs 59 disposed between leg portions 49 and bifurcated portions 72 for biasing such support member 70 toward rail 17. Support members 51 and 70 are arranged so as to be interchangeably mounted to carrier 15 for a reason to be explained later.

The means provided for mounting grinder 16 to support bar 14 includes a saddle member 60 arranged to receive support bar 14 and a plate member 61 secured thereto whereby support bar 14 is securely clamped thereto. An L-bracket 62 is slidable mounted to plate 61 by vertically arranged dovetail means 63 and screw means 64 is provided to adjustably move L-bracket 62 therethrough. The free arm of L-bracket 62 is arranged to extend laterally away from support bar 14 and slidable mounted thereon by laterally arranged dovetail means 65 is a support arm 66 to which grinder 16 is securely attached. Screw means 67, similar to screw means 59, provides adjustable lateral movement of mount 66 and a crank 68 is connected by chain 69 thereto to provide remote operation of such screw means.

The grinding mechanism of this invention is easily secured to a crane (not shown) and may be left attached thereto during normal operation thereof, ready for use during intervals when the crane is not being used in production work.

To operate the grinding mechanism, the crane is moved slowly along rail 17 under its own power, pushing the grinding mechanism before it. An operator occupies a platform (not shown) attached to the front end of the crane whereby he is able to adjustably control the grinding operation by turning crank 68 to move grinder 16 towards or away from rail 17. As the burr to be removed is considerably narrower than the face of grinding wheel 18, screw means 67 is provided to move grinder 16 vertically so that the entire face of grinding wheel 18 may be used before truing is necessary. The spring-biased support members 70 are assembled to carrier 15 so as to engage the side of rail 17 opposite that engaged by grinder 16 and thereby provide resilient engagement of grinding wheel 18 to rail 17 to reduce any undesirable effects if grinding wheel 18 should hit a snag during the grinding operation.

The crane is subject to a characteristic lateral weaving movement as it moves along rail 17 because of the reciprocating movement of the crane wheels therealong between the limits of their flanges. This movement is only a fraction of an inch but it is sufficient to cause undesirable effects on the grinding operation if transmitted to grinder 16. Motion compensation device 13 is provided to absorb any normal lateral movement of the crane, and thereby stabilizes grinder 16. This is accomplished by the flexible support given support bar 14 by the pivotal mountings of arms 45 and forearms 27, and their acute angular relationships, and the free lateral movement of the crane is permitted by the differences in the diameters of extension 34 of shaft 33 and bore 36 in support bar 14. When the opposite side of rail 17 is to be ground, grinder 16 is unclamped from support bar 14 by removing saddle member 66 and then re-assembled on the other side. Support members 51 and 70 are also transferred so that support members 70 will engage the side of rail 17 opposite that engaged by grinding wheel 18.

From the foregoing, it will be seen that there is herein provided a simple and unique means of quickly and safely grinding the burrs from crane rails without interfering with production.

Although a particular embodiment of the invention has been described in detail herein, it is evident that many variations may be devised within the spirit and scope thereof and the following claims are intended to include such variations.

I claim:

1. A portable tool for reconditioning a crane rail including a mounting plate attachable to a vehicle mounted for transit on the rail, a support bar provided with a longitudinal bore in the rear end thereof, a carrier roller-mounted on the rail and attached to the front end of said support bar for support and guidance thereof, flexible means for supporting the rear end of said support bar, a shaft fixed to said mounting plate and having a shoulder portion arranged to engage the rear end of said support bar for longitudinal movement thereof and a smaller diameter portion mounted in said bore for limited free movement therein to permit lateral movement of said mounting plate without disturbing said support bar, and grinding means mounted on said support bar for adjustable engagement with the rail.

2. A device for grinding the sides of a rail including a mounting plate attachable to a vehicle mounted for transit on the rail, a support bar having a longitudinal bore in the rear portion thereof, a carrier roller-mounted on the rail and attached to the front end of said support bar for support and guidance thereof, a pair of vertically spaced apart brackets secured to said mounting plate, a pair of spindles rotatably mounted between said brackets, a pair of arms secured at one end to said spindle, a pair of forearms hinged to the free end of said arms, said forearms being pivotally mounted by vertical transverse pins to said support arm whereby said support arm is pivotally mounted to said mounting plate so as to absorb lateral movement of said mounting plate, a longitudinal shaft secured to said mounting plate, said shaft being provided with a shoulder portion engageable with the rear end of said support bar for movement thereof, an extension portion protruding from said shoulder portion to be received by said bore, said extension portion arranged to be of smaller diameter than said bore to permit limited lateral movement therein, and a grinder mounted on said support bar for adjustable engagement with the rail.

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