

Sept. 3, 1935.

L. E. WOOLENS

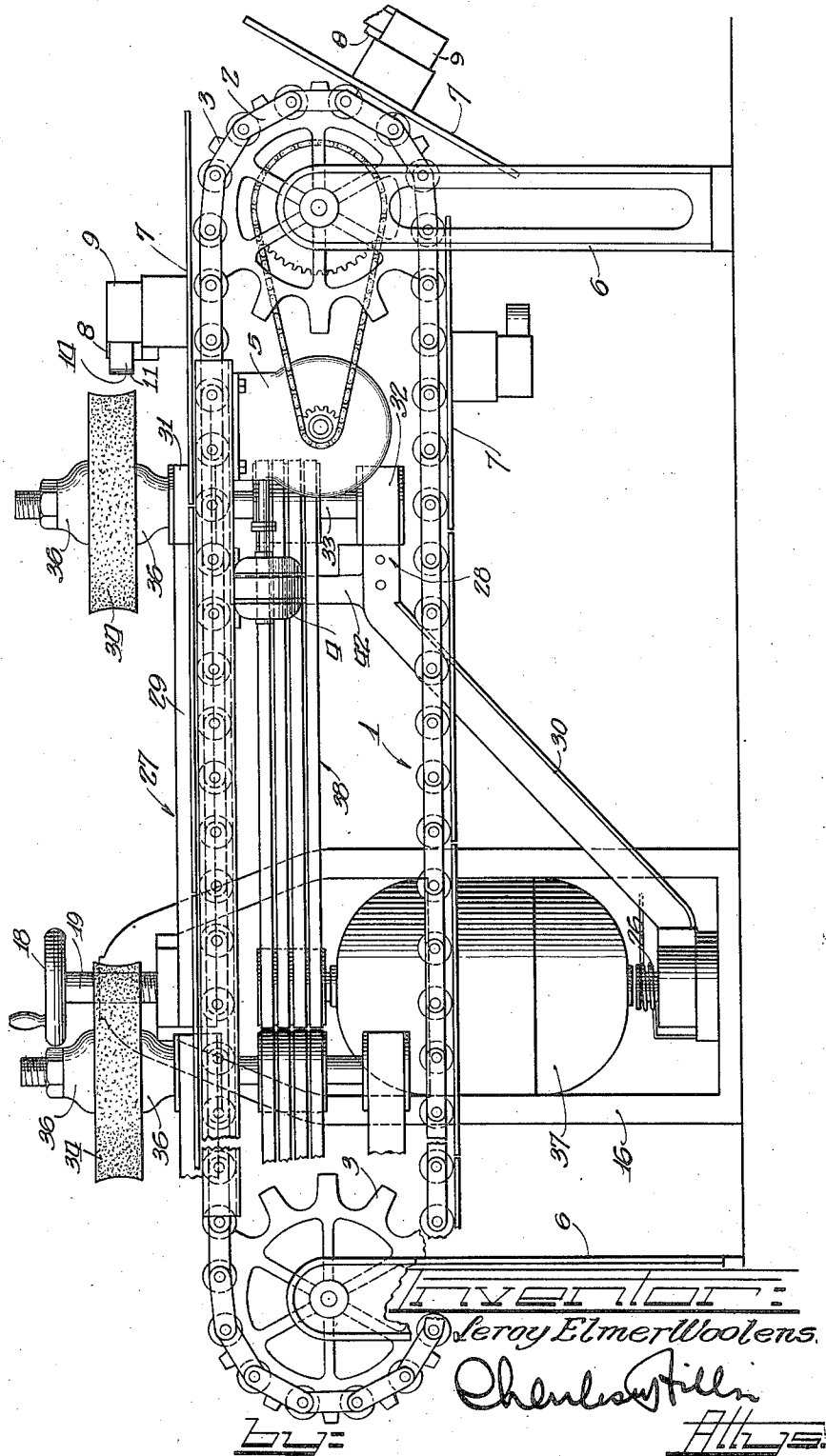
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POLISHING MACHINE

Filed May 20, 1931

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Fig. 1



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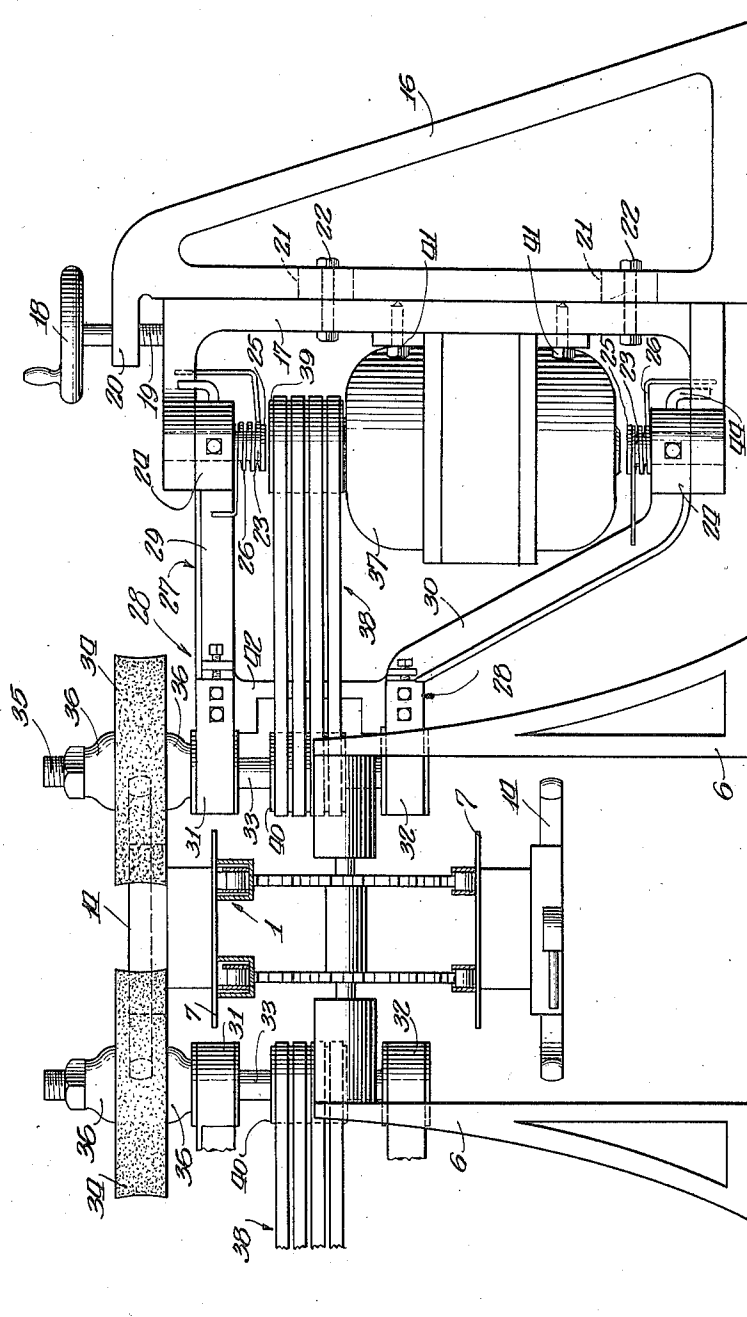
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Fig. 2



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POLISHING MACHINE

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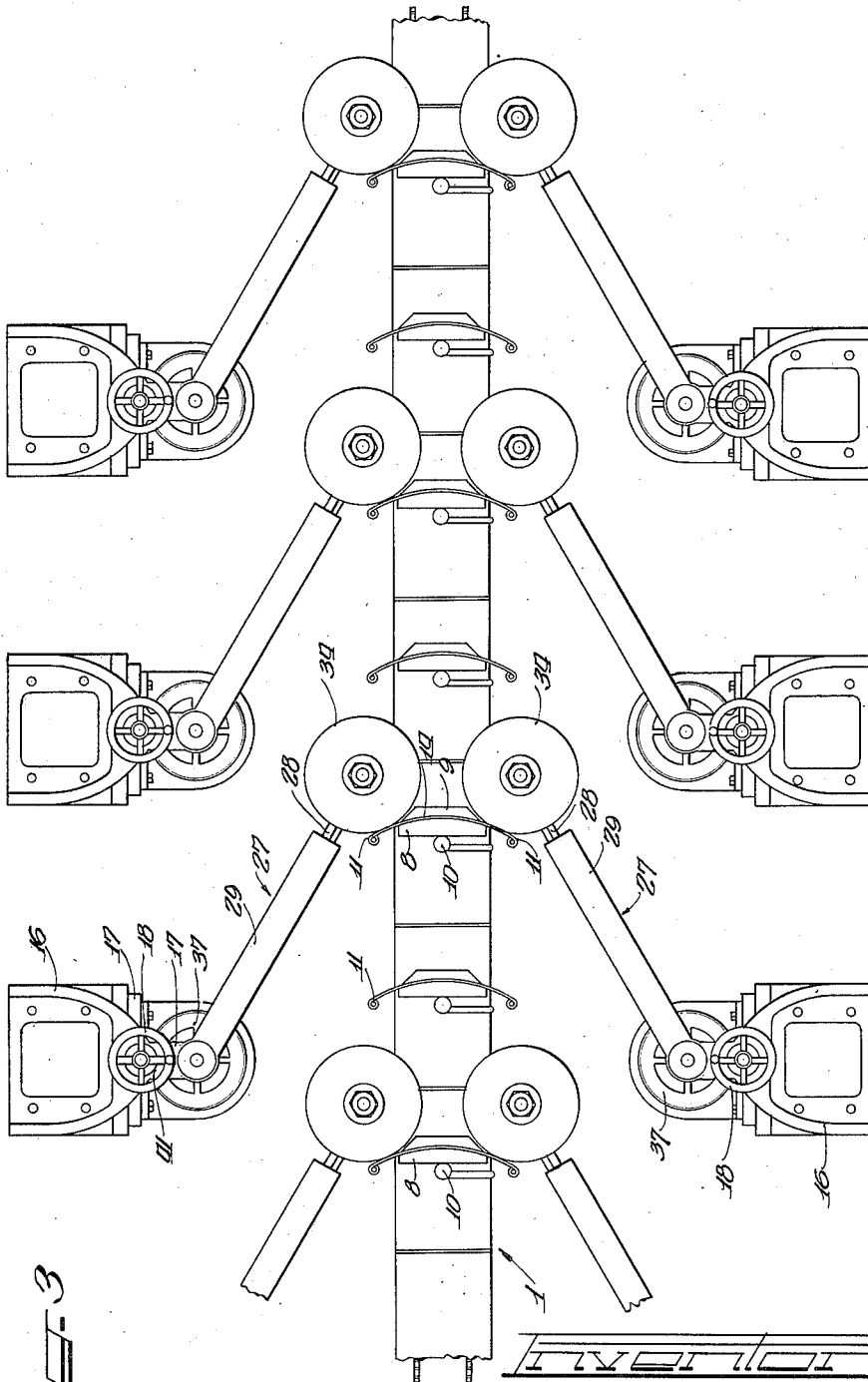


FIG. 3

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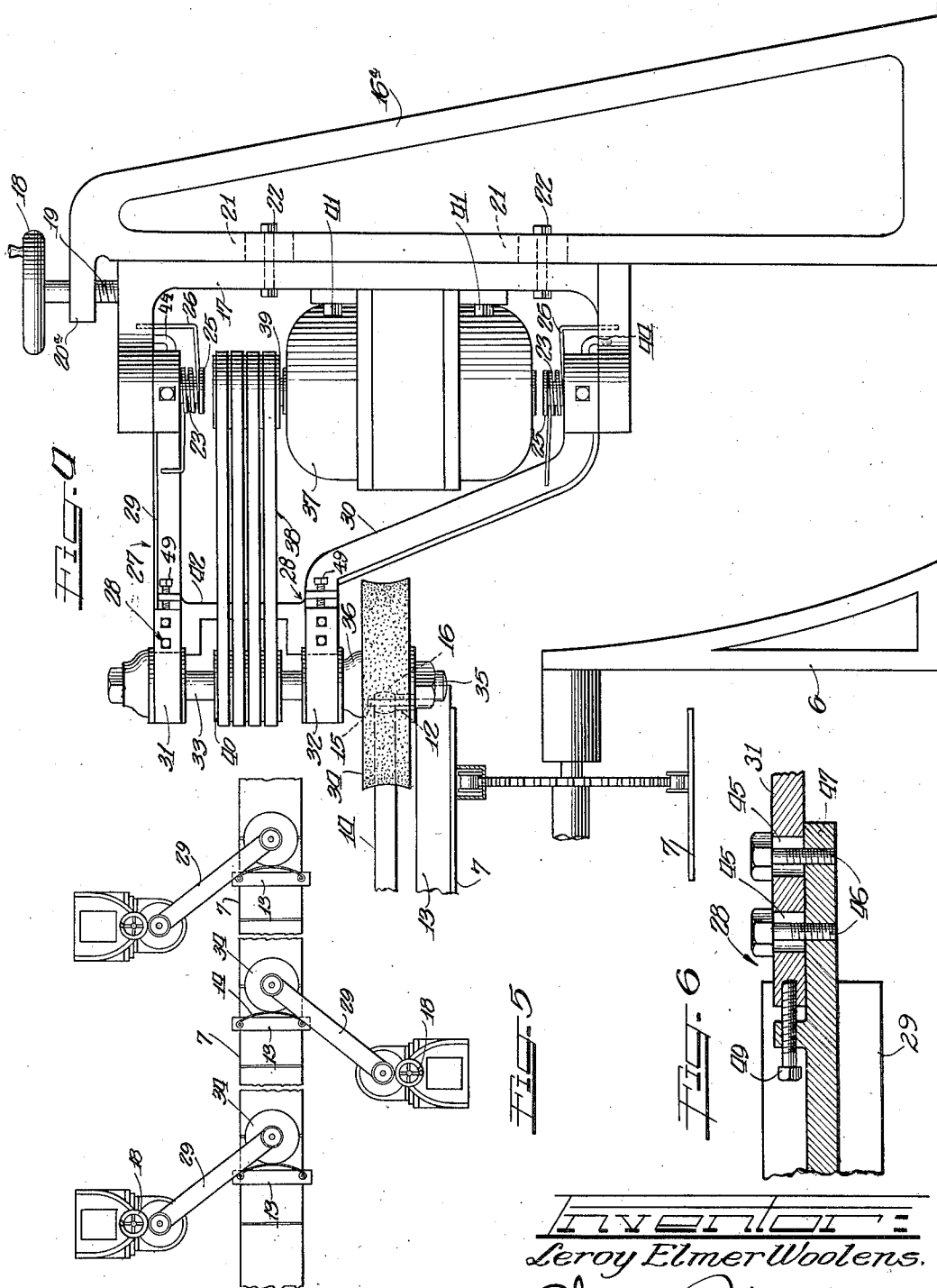
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UNITED STATES PATENT OFFICE

2,013,196

POLISHING MACHINE

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Application May 20, 1931, Serial No. 538,776

11 Claims. (Cl. 51—33)

This invention has to do with polishing machines, and it is one of the principal objects of the invention to provide a machine of this character which will polish the curved ends of bumper bars mechanically.

It is a further object of the invention to provide a machine of this character designed to polish entire bumper bars, including the curved end portions thereof.

In the present known process of polishing bumper bars, the machines in use are adapted to polish only the straight portions of the bars, and the end portions where the radius is somewhat sharp adjacent the eyes of the bars are left to be finished by hand. This obviously consumes a large amount of time and labor which is considerably obviated by the use of the machine forming the subject matter of the present invention.

It is a further object of this invention to provide a special supporting structure for a polishing wheel and embodying instrumentalities for rotating the wheel while yieldingly urging the same against the work, such as bumper bars.

Another object of the invention resides in the provision of a polishing wheel supporting structure of a character embodying means for shifting the polishing wheel in a direction transverse to its plane to accommodate the wheel to different sizes of bumper bars to be ground.

Another noteworthy object of this invention involves the provision of means automatically operative to successively polishing bumper bars or the like with polishing wheels of successively increasing fineness.

In carrying out the invention, individual motor driven polishing wheels are provided, the wheels being carried on arms so arranged as to swing against bars carried on a continuous conveyor, the swinging movement being controlled by springs or by gravity, so that a polishing or grinding contact between the wheels and the work may be obtained at all times. As each piece of work, which for the purpose of illustration is disclosed herein as a bumper bar, travels adjacent the contacting wheel, the springs or the like yield and permit the bar to force the wheel to swing out of its way, and after the bar has passed the zone of its contact with the wheel, the latter is swung inwardly by the springs or the like to engage the next bar on the conveyor. Suitable means are of course provided to clamp the bars on the conveyor belt, providing for the ready securement and removal of the bars before and after grinding.

The machine may embody an arrangement whereby the individual polishing wheels are disposed in staggered relation. When the wheels are thus arranged, the bars are preferably held in place by pins through their eyes instead of by means of centrally located clamping means, so that it is possible for each wheel to polish each bar from a point beyond its center to the end thereof, so that the operation of each wheel will overlap that of the previous one and thus any two successive wheels will completely polish the entire surface of a bar. The wheels will preferably be arranged in consecutive sets of two, each set comprising wheels having the same abrading effect and the sets arranged in diminishing degrees of roughness, so that the last set provides the finishing polishing touches to the bar.

Other important objects and advantages of the present invention will be apparent from the following description and accompanying drawings.

This invention (in a preferred form) is illustrated in the drawings and hereinafter more fully described.

On the drawings:

Figure 1 is a fragmentary side elevational view of a polishing apparatus constructed in accordance with the present invention.

Figure 2 is a fragmentary front elevation of the same.

Figure 3 is a fragmentary plan view of the arrangement shown in Figure 1.

Figure 4 is a fragmentary front elevation of a polishing device constructed in such a manner as to perform a polishing operation over at least half the extent of a bumper bar, together with a special mounting for the bar.

Figure 5 is a fragmentary plan view showing the relation of the parts of an apparatus embodying the construction shown in Figure 4.

Figure 6 shows certain details of adjusting means for the wheels.

As shown on the drawings:

Referring now more particularly to the drawings, wherein the same parts are designated throughout by the same reference characters, the numeral 1 refers to a conveyor of the endless type embodying a chain 2 mounted on sprockets 3, the latter being driven by any suitable means, such as the motor 4 combined with a reduction gear unit 5. Suitable frame members 6 support the sprocket wheels 3 and the chain 2, and suitable supporting means for the motor 4 and reduction unit 5 is also provided. The chain 2 carries a series of individually mounted plates 7, 55

each plate carrying means for receiving and holding a piece of work to be ground, such as a bumper bar.

In the form of bumper bar holding means shown in Figures 1, 2, and 3, a pair of clamping jaws 3, 9 are provided with arcuate or other gripping surfaces to engage opposite surfaces of the bumper bar, and a cam device 10 is manually employed to clamp the jaws against the bumper bar. The jaws 3 and 9 being applied to the central portion of the bar, the sharply curved ends 11 of the bar are exposed for contact with the polishing wheels.

When it is desired to polish the entire surface of the bar while the same is being carried along by the conveyor, the form of clamping means such as shown in Figures 4 and 5 is employed. To this end, spacing means 12 are located between a bar or block 13 carried by the plates 7 and the bumper bar 14, the block 13 carrying pins 15 passing through the spacers 12 and the eyes 16 of the bumper bar 14. The entire surface to be ground is thereby exposed for contact with the polishing wheels. The form of polishing wheel support and operating means employed for polishing the ends only of the bars embodies a frame 16 by which a secondary frame 17 is adjustably supported. The adjustment is afforded by virtue of the hand wheel 18 having a threaded shank 19 which is preferably journaled in the ledge 20 of the frame 16 and threadedly engaged with the secondary frame 17. Slots 21 through which the clamping bolts 22 pass permit of the adjustment of the secondary frame 17, the bolts 22 then serving to retain the secondary frame 17 in any desired position of adjustment.

The polishing wheel and operating mechanism are carried by the secondary frame 17. To this end, the frame 17 is provided with trunnions 23 about which the eyes 24 of the polishing wheel carrying member are received. The trunnions 23 are enlarged at 25, and between the enlargement and the eyes 24, springs 26 are rotated. As viewed in Figure 2, one end of each spring engages the forward side of the wheel supporting member 27, and the other end of each spring engages the rear side of the secondary frame 17, with the result that said springs constantly urge the member 27 and the wheel supported thereby to swing toward the rear and yieldably engage the approaching work, which in Figure 2 is shown to be a bumper bar 14.

The arms 29 and 30 of the wheel supporting member 27 are made in sections suitably held together in adjusted relation, the outer sections 31 and 32 providing eyes in which the polishing wheel shaft 33 is journaled. The polishing wheel 34 is mounted on an extension 35 of the shaft 33 for rotation therewith, suitable thrust bearings 36 being provided on opposite sides of the wheel 34. In the form of the invention shown in Figure 2 wherein the arrangement provides for grinding of the ends only of the bumper bars, the polishing wheel 34 is located above the extension 31. In the form of the invention shown in Figure 4, to be employed in the grinding or polishing of a major portion of the surface of the bar, it is advantageous to locate the wheel below the lower extension 32. By adjusting means shown at 28, the shaft 33 may be adjusted relative to the shaft of the motor 37 to maintain the proper tightness of the belt means 38, carried by the motor pulley 39 and the polishing wheel shaft pulley 40. The motor 37 is mounted with its shaft in alignment with the trunnions 23 so

that swinging movement of the supporting member 27 will not affect the condition of the belt means 38, the motor 37 being suitably carried by the secondary frame 17 and held by means of bolts 41 or the like. A connecting member 42 adequately braces the arms 29 and 30. In the construction shown in Figure 4, wherein the grinding or polishing wheel 34 depends from the supporting frame 27, a suitable thrust bearing 43 overlying the extension 31 will be provided.

With the arrangement shown respectively in Figures 3 and 5, the grinding wheels 34 are located in the positions they occupy just as the grinding operation begins. It will be understood that as the grinding operation is completed, the bumper bar being ground forces the polishing wheel away against the pressure of the springs 26, and when the curved end of the bar has cleared the wheel, the latter is swung toward the next bar by the springs. In order to limit the swinging movement of the wheel to the position which it is to occupy upon commencement of the grinding operation, suitable stop means is provided. The stop means consist of stop lugs 44 projecting from the eyes of the arms 29 and 30 and engageable with the secondary frame 17 as shown. It will be appreciated that the angular movement of each wheel will be somewhat greater with the arrangement shown in Figure 5 than with the arrangement shown in Figure 3, and the stop lugs 44 will then of course be correspondingly rotated.

In Figure 4, in order that the wheel 34 may be suspended from the supporting frame work, the main supporting frame 16a is made of greater height than the frame 16 of the modification shown in Figure 2. The ledge 20a of the frame 16a corresponds with the ledge 20 of the frame 16, the shank 19 of the hand wheel 18 cooperating therewith in exactly the same way in which they cooperate with the ledge 20.

The adjustment instrumentalities shown generally at 28 is afforded by reason of the fact that the extensions 31 and 32 are provided with elongated openings 45 through which studs 46, carried by the webs 47 of the arms 29 and 30 project, nuts being applied to the free ends of the studs if desired. In addition to providing for adjustment, the elongated holes obviously facilitate assembly. Once the parts are adjusted by the screw 49 in the relation desired, the studs are tightened up.

It will be seen from the foregoing that in accordance with the present invention the grinding or polishing wheels are individually mounted and operated, that the supporting and operating means for each wheel is extremely simple and embodies provisions for maintaining the wheels in contact with the work with the desired degree of pressure and at the same time making both vertical and horizontal adjustment with respect to the wheel, the arrangement on the whole being such that the only operation to be performed by hand involves merely the securing of unground or unpolished bumper bars and clamping the same on the chain at one end thereof, and removing the polished or ground work at the same end or at the other end of the chain upon completion of the grinding or polishing operation. By providing sets of polishing wheels of progressively finer polishing material, and thus eliminating numerous manual polishing or grinding operations formerly involving successive manual operations by a number of different workmen, with the attendant inaccuracy due to

the human element, the present invention provides a great advance in the industry. This is true both of the arrangement in Figure 3, wherein the ends, only, of the bars are polished or ground, and of the form of the invention shown in Figure 5, wherein the entire surface of the bars, including the ends, is ground or polished, as the case may be. The arrangement in Figure 5 combines in one apparatus the operations of grinding the central portions of the bars and the sharply curved end portions thereof, whereas formerly machines were employed for grinding the central portion only, the sharply curved ends thereof having, as heretofore stated, been entirely polished or ground by hand.

The means by which the grinding wheel is held in adjusted position with respect to its supporting arms is obviously extremely simple, so that the wheel may be expeditiously removed for repairs or replacement.

It is to be expressly understood that the term "bumper bar" employed herein, both in the description and claims, is merely illustrative and is intended to include bars of generally similar construction regardless of the use to which they are to be put.

It is further to be expressly understood that the terms "polishing" and "grinding" are used interchangeably herein, and wherever each is used, the other is to be considered as being included in its meaning.

I am aware that many changes may be made and numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I, therefore, do not purpose limiting the patent granted hereon otherwise than necessitated by the prior art.

I claim as my invention:

1. Polishing apparatus comprising a movable carrier for a bumper bar arranged transversely to the direction of movement of the carrier, a series of polishing wheels located on opposite sides of said carrier and arranged in pairs engageable simultaneously with opposite end portions of the bar, means for rotating the wheels, means movably supporting the wheels, whereby, as said carrier progresses, the bar will force said wheels to move toward the outermost portions of the bar, and means yieldably resisting such movement of the wheels.

2. In an apparatus for polishing the return curved end portion of a bar, a carrier for supporting the bar so that the latter extends transverse to the direction of movement of the carrier and with the surface to be polished transverse to the carrier, instrumentalities for moving the carrier, a polishing wheel having a working surface engageable with the bar surface, a support for the wheel, means for rotating the wheel, yieldable means urging the wheel into engagement with the bar surface, the wheel being arranged in the path of movement of the end portion of the bar and being yieldable laterally away from the bar so that as the fore part of the end portion of the bar engages the wheel and continues in its motion with the carrier, said portion cams the wheel laterally away from the bar and said yieldable means causes the wheel to ride along the end portion to the other extremity thereof and, when the extremity has moved beyond the wheel, to ride along the rear surface of the end portion away from the extremity.

3. Polishing apparatus of the class described,

comprising a continuously movable carrier for bumper bars extending transversely to their direction of movement, polishing elements for the bars, each bar being engageable successively with all of said elements, said elements being arranged in sets progressively in accordance with the fineness of their polishing material, whereby when each bumper bar passes beyond the last polishing element, its polishing operation has been completed, and yieldable mountings for said elements, whereby said elements are forced aside by the bars during the polishing operation, so that as the bars pass by said elements, the latter are urged toward the carrier and serve to polish rear portions of the bars.

4. Polishing apparatus of the class described, comprising a continuously movable carrier for bumper bars extending transversely to their direction of movement, polishing elements for the bars, each bar being engageable successively with all of said elements, said elements being arranged progressively in sets in accordance with the fineness of their polishing material, whereby when each bumper bar passes beyond the last polishing element, its polishing operation has been completed, and yieldable mountings for said elements, whereby said elements are forced aside by the bars during the polishing operation, so that as the bars pass by said elements, the latter are urged toward the carrier and serve to polish rear portions of the bars, the elements of each set being arranged in staggered relation, so that they engage opposite sides of successive bars.

5. Polishing apparatus of the class described, comprising a continuously movable carrier for bumper bars extending transversely to their direction of movement, polishing elements for the bars, each bar being engageable successively with all of said elements, said elements being arranged progressively in sets in accordance with the fineness of their polishing material, whereby when each bumper bar passes beyond the last polishing element, its polishing operation has been completed, and yieldable mountings for said elements, whereby said elements are forced aside by the bars during the polishing operation, so that as the bars pass by said elements, the latter are urged toward the carrier and serve to polish rear portions of the bars, the elements of each set being arranged in staggered relation, so that they engage opposite sides of successive bars, the zones of contact between said staggered elements and each bar substantially meeting, whereby the entire surface to be polished is operated upon by each set of elements.

6. Polishing apparatus comprising a movable carrier for a bumper bar arranged transversely to the direction of movement of the carrier, a series of individually mounted and operated polishing wheels located on opposite sides of said carrier and arranged in pairs engageable simultaneously with opposite end portions of the bar, and means yieldably urging said wheels against the bar, whereby, as said carrier progresses, the bar will force said wheels toward the outermost portions of the bar.

7. Polishing apparatus comprising a movable carrier for a bumper bar arranged transversely to the direction of movement of the carrier, a series of individually mounted and operated polishing wheels located on opposite sides of said carrier and arranged in pairs engageable simultaneously with opposite end portions of the bar, and means yieldably urging said wheels against

the bar, whereby, as said carrier progresses, the bar will force said wheels toward the outermost portions of the bar, said wheels being in substantially the same plane as the bar.

5 8. Polishing apparatus comprising a movable carrier for a bumper bar having rearwardly curved end portions and arranged transversely to the direction of movement of the carrier, a series of individually mounted and operated polishing wheels located on opposite sides of said carrier and arranged in pairs engageable simultaneously with opposite end portions of the bar, whereby, as said carrier progresses, the bar will force said wheels toward the outermost portions of the bar, and yieldable means urging said wheels into contact with the rearwardly curved portions after passing beyond the outermost extremities of the bar.

9. Polishing apparatus of the class described, comprising a continuously movable carrier for a bumper bar extending transversely to the direction of movement of the carrier and having a return curved end portion, a polishing element for the bar, means movably supporting the bar, said element being disposed normally in the path of movement of the return curved end portion of the bar, and means resiliently resisting movement of said element away from said bar, whereby said element is forced aside by the bar during

the polishing operation, so that as the bar passes by said element, the latter is urged toward the bar by the resilient means and serves to polish the rear surface of the curved end portion of the bar.

10. In an apparatus for polishing a bar having contiguous forwardly and rearwardly facing surfaces, a movable carrier for the bar, a polishing element, means movably supporting said element, said element being normally located in the path of movement of the bar, and being movable by the bar during the polishing operation on the forwardly facing surface only of the bar, and yieldable means for urging said element against the rearwardly facing surface of the bar.

11. Polishing apparatus comprising a movable carrier for a bumper bar arranged transversely to the direction of movement of the carrier, a series of polishing wheels located on opposite sides of said carrier and arranged in pairs engageable simultaneously with opposite end portions of the bar, means for rotating the wheels, means movably supporting the wheels, whereby, as said carrier progresses, the bar will force said wheels to move toward the outermost portions of the bar, and means yieldably resisting such movement of the wheels, said wheels being in substantially the same plane as the bar.

LEROY ELMER WOOLENS.