Sept. 11, 1934. L. J. COONEY 1,973,429

RAIL JOINT GRINDER

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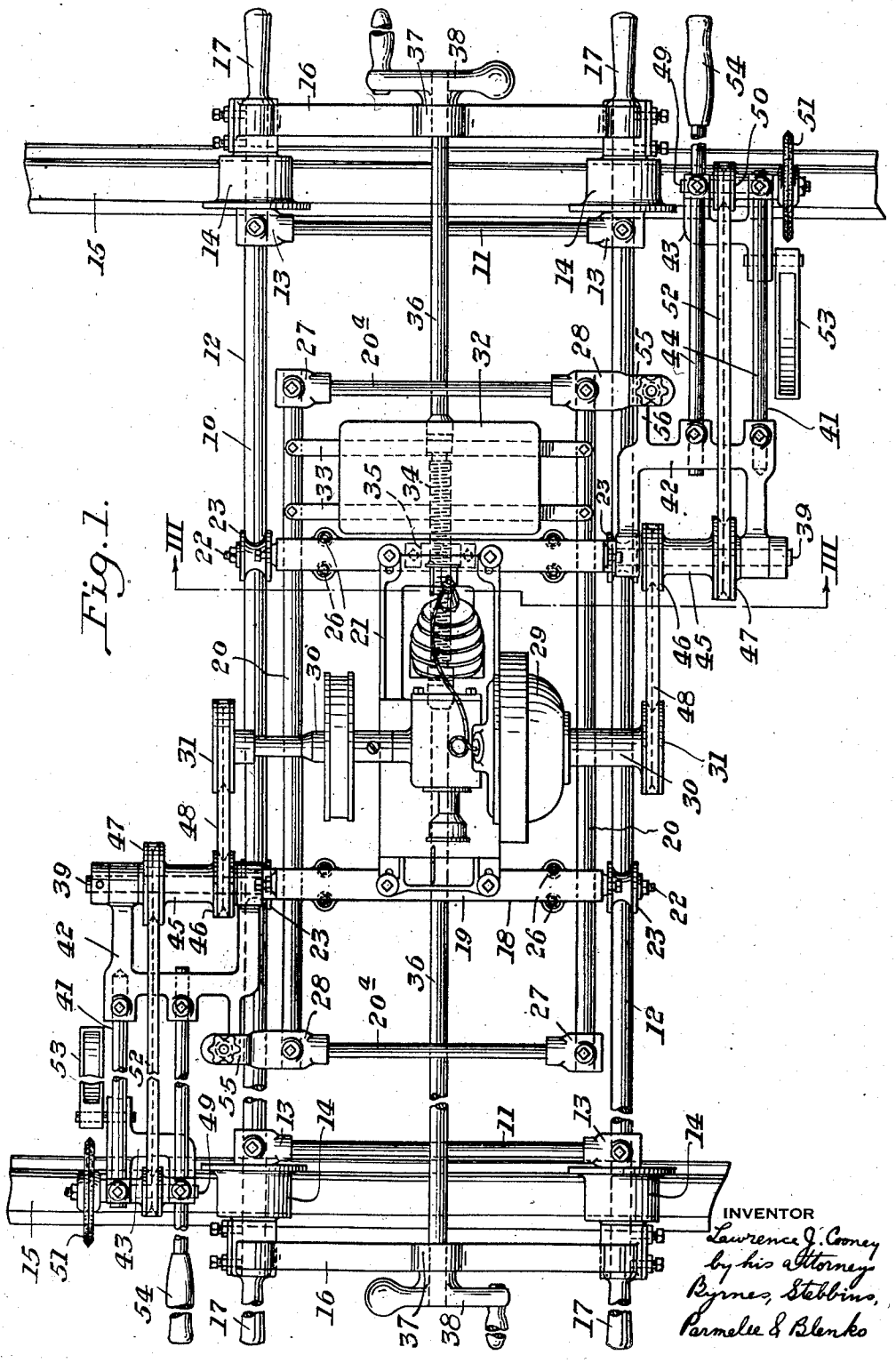


Fig. 1.

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Fig. 2.

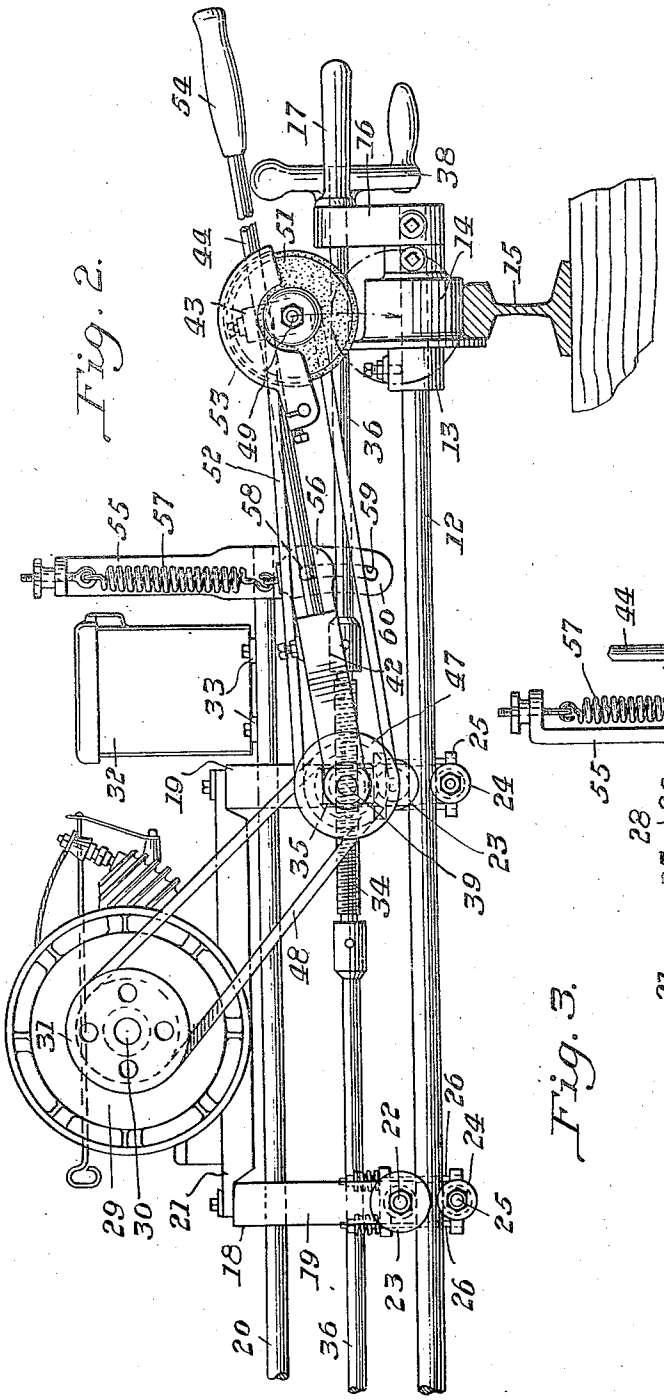


Fig. 8.

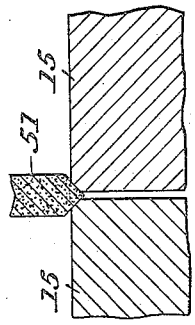
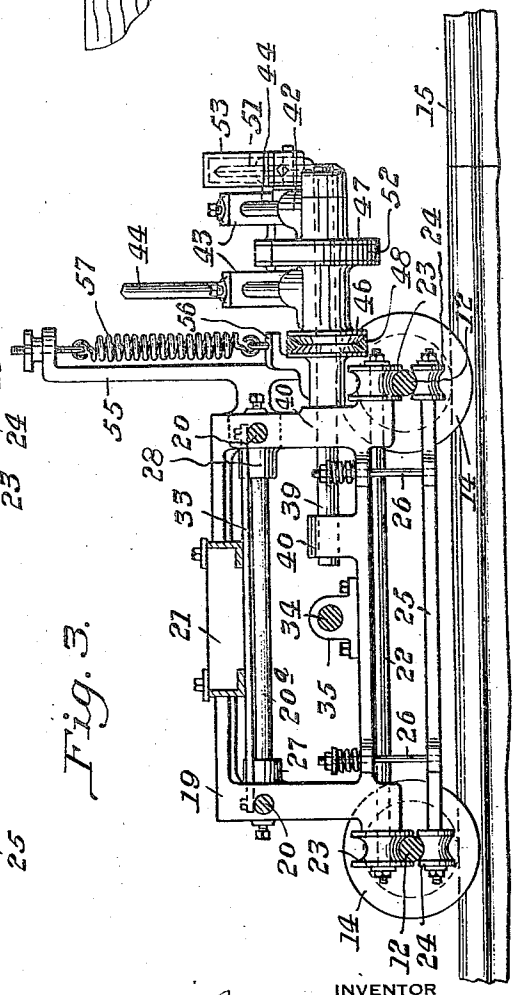


Fig. 3.



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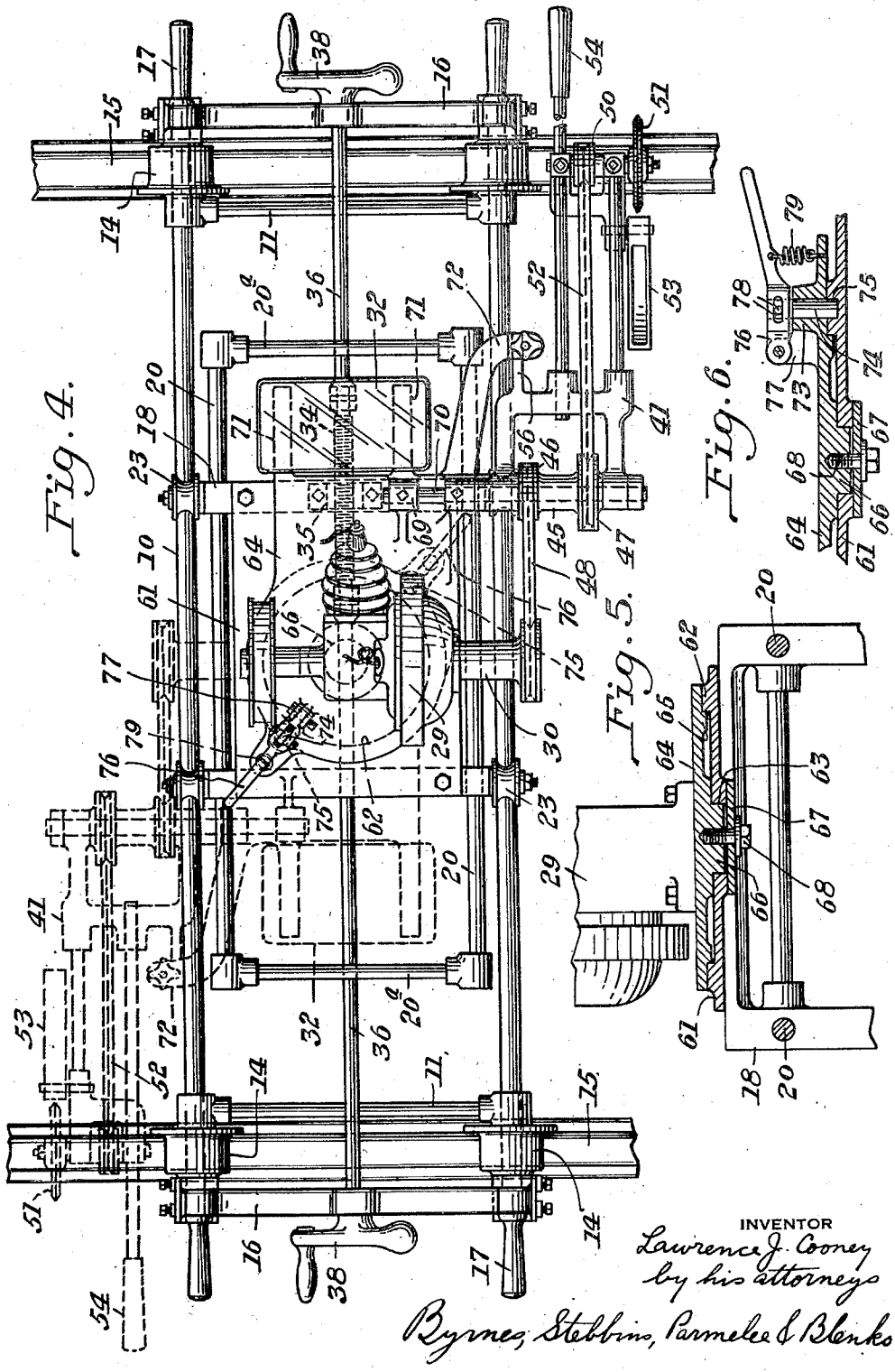


Fig. 4.

Fig. 6.

Fig. 5.

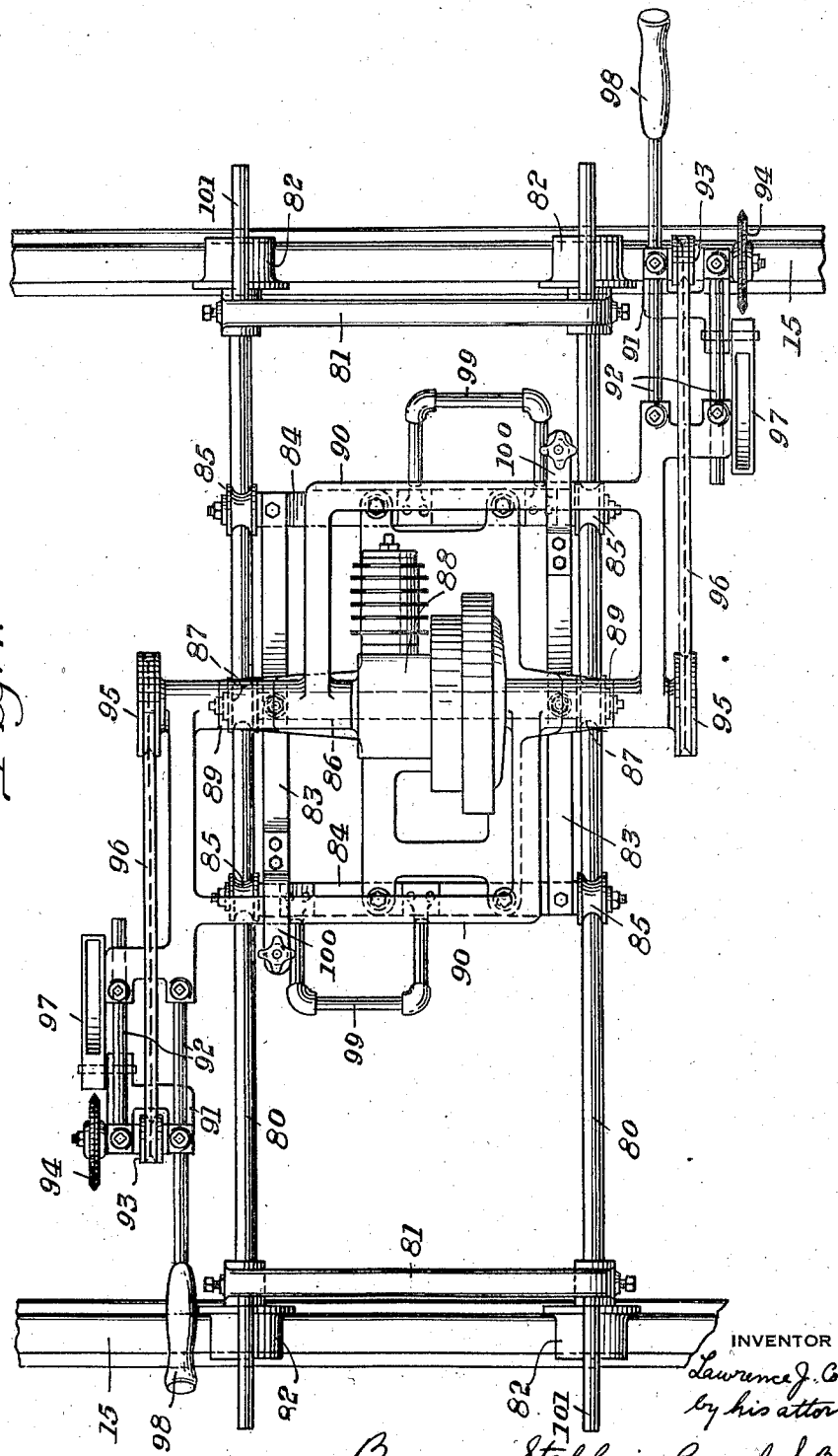
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Fig. 7.



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UNITED STATES PATENT OFFICE

1,973,429

RAIL JOINT GRINDER

Lawrence J. Cooney, Pittsburgh, Pa., assignor to Keystone Grinder & Manufacturing Company, Pittsburgh, Pa., a corporation of Pennsylvania

Application October 21, 1930, Serial No. 490,225

18 Claims. (Cl. 51—178)

My invention relates to a device for grinding the joints between railroad rails.

The principal characteristics which a desirable rail joint grinder should possess are lightness in weight, ease of manipulation, and simplicity of construction. I have invented a device of this character which satisfactorily meets all these requirements and, in addition, is characterized by other features of novelty which will appear more fully and at large in the description of the invention given herebelow.

The necessity for a light-weight construction which can be handled easily by two men will be realized when it is stated that the operation of grinding rail joints is not permitted to interfere with rail traffic. It thus becomes necessary to remove the grinding apparatus from the rails very quickly on the approach of a train. With these desirable characteristics and necessary limitations in mind, I have invented a rail joint grinder which is entirely self-contained and which is light enough to be quickly removed from the rails by two men and, at the same time, is sufficiently substantial to retain its operating position without the necessity of locking it to the rails.

In accordance with the invention, I provide a main frame having wheels adapted to travel on the rails. A carriage is adapted to traverse across the main frame between rails and is provided with a platform for supporting a suitable driving motor. An intermediate driving shaft is journalled in the carriage adjacent one side thereof and a yoke is pivoted thereto. The yoke carries an arm having thereon a grinding wheel which is adapted to be driven by the motor. The main frame is adjusted along the track until the grinding wheel overlies the joint to be ground. The yoke is then depressed until the wheel engages the joint and the carriage is then traversed so that the wheel grinds the entire surface of the joint.

In order to speed up the grinding operation, I preferably duplicate the pivoted yoke, the grinding wheel thereon and the connections between the driving motor and the wheel on both sides of the carriage so that joints in both rails may be ground without shifting the main frame.

In a modified form of the invention, I contemplate the use of a single yoke or arm in which the grinding wheel is journalled and arrange the platform supporting the motor and the yoke for rotation on the carriage so that a single yoke and grinding wheel may serve for working on both rails. In a further modified form of the invention, I dispense with the intermediate shafts and the lead screw, and mount the yokes supporting the grinding wheels loosely on the shaft of the driving motor. The carriage is adapted for free traversing movement by means of a direct push or pull.

For a complete understanding of the invention, reference is made to the accompanying drawings in which—

Figure 1 is a plan view of one form of the invention;

Figure 2 is a partial end elevation;

Figure 3 is a sectional view along the line III—III of Figure 1 with parts omitted for the sake of clearance;

Figure 4 is a plan view similar to Figure 1 showing a modified form of the invention;

Figure 5 is a partial sectional view along the line V—V of Figure 4;

Figure 6 is a partial sectional view along the line VI—VI of Figure 4;

Figure 7 is a plan view of a further modification of the invention; and

Figure 8 is a sectional detail of a rail joint with grinding wheel in the operation of grinding the joint.

Referring in detail to the drawings and, for the present, to Figures 1 through 3, I provide a rectangular frame 10 consisting of side rods 11 and cross bars 12 connected by means of T-sockets 13. The cross bars 12 extend through the T-sockets 13 to provide journal bearings for supporting wheels 14 adapted to travel on the rails 15, the joints of which are to be ground. End castings 16 connect the free ends of the cross bars 12 and are provided with handles 17 for shifting the frame along the rails 15, and for lifting the device from the track.

A carriage 18 consisting of castings 19, connecting rods 20, end rods 20*a* and a motor supporting platform 21, is supported on the frame 10. Shafts 22 are journalled in the lower portion of the castings 19 and are provided with rollers 23 resting on the cross bars 12. In order to secure the carriage firmly to the frame, I provide underslung rollers 24 engaging the lower surface of the cross bars 12. The rollers 24 are journalled on bars 25 which are resiliently suspended from the castings 19 by rods 26. The connecting rods 20 and the end rods 20*a* are secured together by means of T-sockets 27 and 28.

A driving motor 29 which may be of any suitable type is mounted on the platform 21 and is provided with shaft extensions 30 having driv-

ing pulleys 31. A tool box 32 is supported on the carriage 18 on cross straps 33.

The carriage 18 may be traversed across the frame 10 by means of a feed screw 34 traversing a nut 35 secured to the lower portion of one of the castings 19. The screw 34 may be actuated by driving rods 36 pinned at one end to the screw 34. The other ends of the driving rods turn in bearings 37 forming part of the castings 16 and are provided with cranks 38 whereby the carriage may be shifted back and forth across the frame 10.

Intermediate driving shafts 39 are journalled in suitable bearings 40 formed in the lower portion of the castings 19. Supporting arms 41 are pivoted on the shafts 39 and comprise end yokes 42 and 43 connected by rods 44 received in suitable sockets in the yokes. Driving spindles 45 are journalled on the shafts 39 between the ends of the yokes 42. The spindles 45 have driving pulleys 46 and 47 formed integral therewith. The pulleys 46 are connected with the pulleys 31 by belts 48.

Stub shafts 49 are journalled in the yokes 43 in bearings formed therein below the rods 44. Pulleys 50 are keyed to the shafts 49 and the grinding wheels 51 are also secured to the shafts outside the yokes 43. Belts 52 connect the pulleys 47 and 50. Guards 53 for the grinding wheels 51 are pivoted to the yokes 43 below the rods 44. One of the rods 44 on each of the arms 41 extends through the yoke 43 to which it is secured and is provided with a handle 54 for manipulating the arm 41 about its shaft 39.

In order to normally maintain the grinding wheels 51 above the top of the rails 15, the T-sockets 28 forming part of the carriage are provided with vertical extensions 55 overhanging projections 56 on the yokes 42. Springs 57 connecting these parts serve to elevate the grinding wheels above the top of the rails. The arms 41 may, however, be easily lowered by pressing down on the handle 54 against the tension of the spring 57 so that the grinding wheel engages the surface of the rail. In order to guide such movement more accurately, the projections 56 are provided with pins 58 traveling in arcuate slots 59 formed in downward extension 60 integral with the T-sockets 28.

The operation of the construction described hereinabove will probably be evident from what has already been said, but a brief review thereof will be given. To start the process of grinding rail joints, the frame is placed on the rails and the motor 29 is started. Normally, of course, the springs 57 raise the grinding wheels above the tops of the rails. The motor 29, through its driving pulleys 31, the belts 48, the spindles 45 and the belts 52, drive the shafts 49 to which the grinding wheels 51 are secured. The motor 29 operates continuously, even between successive grinding operations. When the frame has been placed on the rails and the motor started, the frame is shifted along the track until one of the grinding wheels 51 overlies the joint to be ground. The operator then presses down on the handle 54 to lower the grinding wheel 51 into engagement with the rail joint. Simultaneously, he operates the crank 38 to shift the carriage across the frame so that the grinding wheel engages all portions of the joint. When the grinding of one joint has been completed, the handle 54 is released to permit the spring 57 to raise the grinding wheel to the inoperative position and the frame 10 is shifted along the tracks. It may be desirable to provide the frame with a socket for receiving a pushing bar so that the operator will not have to stoop over to shift the frame along the track.

Since the rail joints in the two rails of the track are staggered, it will be preferable to grind first a joint in one rail and then a joint in the other rail. The provision of duplicate grinding wheels and drive connections between the wheels and the motor simplifies the operation and renders it very efficient. There need be only one movement of the carriage 18 for each grinding operation, that is to say, when grinding a joint in one rail, the carriage will be moved from left to right, say, and when grinding the next joint in the other rail the carriage may be shifted back from right to left by means of the feed screw.

The device described hereinabove has been found very efficient in performing the operation for which it was intended, as well as easy to handle. The construction is sufficiently light in weight to permit its prompt removal from the track on the approach of a train, yet is substantial enough to make it unnecessary to lock the frame to the rails during the grinding operation. The unit is entirely self-contained.

In order to further reduce the weight of the form of the invention already described, I have invented a modification thereof according to which only a single pivoted arm carrying the grinder wheel is employed for working on both rails of the track. To make this possible, I provide means permitting the driving motor and pivoted arm to be rotated through 180°. Suitable locking means are provided to maintain the rotatable members in the desired operating positions. An embodiment of this form of the invention is illustrated in Figures 4 through 6, in which the reference numerals already employed are applied to similar elements.

It will be apparent from Figure 4 that the construction of the frame 10 of the modified form of the invention is that of the first form described. The traversing carriage 18 is also the same, except that it is provided with a motor supporting plate 61 having an annular rim 62 and a central opening 63. The motor 29 is secured to a plate or table 64 having an annular rim 65 fitting into the rim 62. The table 64 also has a hub 66 fitting into the opening 63 in the platform 61. A retaining plate 67 and a screw 68 maintain the table 64 in proper position on the platform 61.

The table 64 is provided with bearings 69 for an intermediate drive shaft 70 corresponding to that referred to above as 39. The table also carries projections 71 for supporting the tool box 32. The shaft 70 provides a pivotal support for the arm 41, as well as a bearing for the driving spindle 45, all as previously described. The table 64 has a projecting arm 72 thereon to replace the upstanding portion 55 of the T's 28, which serves through a spring similar to that shown at 57 to retain the arm 41 in elevated position.

The table 64 has a boss 73 bored out to receive a locking pin 74 adapted to enter diametrically opposite holes 75 in the plate 61. A lever 76 is pivoted to legs 77 and has a pin and slot connection 78 with a locking pin 74. A spring 79 tends to maintain the pin 74 in locking position.

When it is desired to employ the device shown in Figure 4 to grind a joint in the right-hand

rail, it is employed in the manner already described and in the position indicated in solid lines. In order to grind the next joint, which will be in the other rail, the locking pin 74 is withdrawn from the plate 61 by raising the lever 76. The table 64 carrying the motor 29 and the arm 41 is then rotated 180° until the locking pin 74 enters the other hole 75. The arm 41 thus assumes the position indicated in dotted lines in Figure 4 and the grinding operation may be repeated as previously described.

The modified form of the device just described is characterized by all of the advantages mentioned for the first form of the invention. In addition, it is somewhat lighter because duplicate parts are omitted, but it is still amply substantial to remain in its working position on the rails without requiring that means be provided for locking it in such position.

A further modified form of the invention which would generally be the preferred form is illustrated in Figure 7. The main frame of this form of the invention which rests on the rails comprises the cross bars 80 and end castings 81. Wheels 82 are journalled on the ends of the bars 80. A carriage consisting of straps 83 and 84 bolted together is provided with wheels or rollers 85 for traversing movement across the main frame. An intermediate bar 86 suspended on springs beneath the carriage is provided with rollers 87 engaging the lower surface of the rods 80 in a manner described in connection with the other modifications of the invention, to prevent the carriage from being removed from the frame.

A motor 88 is secured to the carriage. The shaft of the motor is extended in both directions and the shaft extensions fit into bearings 89 projecting upwardly from the side of the motor base. Yokes 90 are loosely mounted on the motor shaft and, with brackets 91, connected to the yokes by means of rods 92, form levers at each end of the frame pivoted on the motor shaft. The brackets 91 carry shafts to which pulleys 93 and grinding wheels 94 are secured. Pulleys 95 at the ends of the motor shaft drive the pulleys 93 through belts 96.

Guards 97 are provided as in the other forms of the invention for protecting the workmen from accidental contact with the grinding wheel. One of the rods 92 is extended to form a handle 98. The carriage is equipped with grips 99 by which it may be readily traversed across the frame. Standards 100 are secured to the carriage and, by means of a spring similar to that shown at 57 in Figure 2, provide resilient means for normally holding the pivoted levers carrying the grinding wheels in inoperative position. Handles 101 on the main frame facilitate movement thereof along the track to aline the grinding wheels with the rail joints.

The operation of the device shown in Figure 7 is similar to that already described for the other forms of the invention, except that the carriage is pushed or pulled across the frame directly without the use of a lead screw. By eliminating the lead screw, its end castings and the intermediate shaft, the weight of the device is considerably reduced.

If desired, of course, any suitable clutch may be employed in connection with the drive for the grinding wheels. This will make it unnecessary to have the grinding wheels running continuously.

Although I have described and illustrated but few forms of the invention, it is not limited to the specific details of this disclosure but may be otherwise practiced and embodied in many different forms. Any changes, however, in the described construction may be resorted to without sacrificing the advantages of the invention or departing from the scope of the appended claims defining the spirit of the invention.

I claim:

1. In a track rail grinder, a main frame adapted to roll on the track, a traversing carriage shiftable on said main frame transversely thereof, means for actuating the traversing carriage, a source of motive power on said carriage, a member pivoted to the carriage about an axis parallel to the rail, and a grinding wheel journalled on said member, having driving connections with said power source.

2. A grinder for track rails comprising a frame adapted to rest on the track, a carriage movable transversely of the frame, a grinding wheel pivoted on the carriage for rotation in a plane perpendicular to the rail and driving connections therefor.

3. Abrading mechanism for rail joints including a frame adapted to rest on the rails, a carriage movable over the frame, a bracket pivoted to the carriage and a grinding wheel journalled in the bracket for rotation in a plane transverse of the rails.

4. A rail joint grinder comprising a frame adapted to rest on the tracks, a carriage adapted to traverse the frame, a member pivoted to the carriage on a horizontal axis parallel to the rail, and a grinding wheel rotatably carried on said member.

5. A joint grinder comprising a supporting frame, a carriage thereon movable transversely thereof, a member on the carriage swingable in a vertical, transverse plane parallel to the path of movement of the carriage, and a grinding wheel rotatably carried by said member.

6. A rail-joint grinder comprising a frame adapted to rest on the rails, a carriage shiftable transversely of the frame, a motor rotatable on said carriage having a shaft parallel to the rails, a bracket pivoted on the motor shaft and a grinding wheel journalled in said bracket for rotation in a plane perpendicular to the rails and adapted to be driven from said shaft.

7. A rail-joint grinder comprising a frame adapted to travel on the rails, a carriage traversing on said frame, a table rotatable on said carriage, a motor mounted on the table, a bracket pivoted thereto and a grinding wheel journalled in said bracket adapted to be driven by said motor.

8. In a joint grinder for rails, a frame resting on the rails, a table supported thereby for rotation, a motor on the table and a bracket pivoted thereto supporting a grinding wheel.

9. A joint grinder for rails comprising a frame, a rotatable platform supported thereon, a motor on the platform, and an arm pivoted thereto for carrying a grinding wheel.

10. A grinder for rails comprising a frame resting on the rails, a carriage shiftable along the frame, a rotary table on the frame, a motor on the table, an arm pivoted thereto, and a grinding wheel on the arm adapted to be driven by the motor.

11. A joint grinder for rails comprising a frame traveling on the rails, a carriage having traversing movement across the frame, a motor mounted on the carriage having a shaft paral-

lel to the rails, yokes loosely mounted on the motor shaft and arms extending therefrom for rotatably carrying grinding wheels in planes perpendicular to the rails adapted to be driven from said shaft.

12. The combination, in a rail-joint grinder, with a frame rolling on the rails, a traversing carriage on the frame, and a motor on the carriage having a shaft parallel to the rails, of levers pivoted on the motor shaft and extending toward the rails, and grinding wheels adjacent the ends of the levers adapted to be driven from said shaft.

13. A device for beveling the upper edge of the end of a track-rail comprising a frame movably supported on the track, said frame including members transverse to the rail, a carriage supported on said members for guided translatory movement transversely of the track, a laterally extending arm pivoted to the carriage, a grinding wheel journaled on said arm for rotation in a plane perpendicular to the rail, and driving means movable with said carriage and operably connected to said wheel.

14. An apparatus for beveling the upper edge of the end of a track rail comprising a rectangular frame movably supported on the track, said frame including transverse members, a carriage mounted for translatory guided movement along said members, a laterally extending arm pivoted to the carriage for angular movement in a plane perpendicular to the rail, a grinding wheel journaled on said arm for rotation in said plane, and a motor on said carriage having a driving connection with said wheel.

15. A machine for grinding the ends of track rails comprising a laterally extending arm having a grinding wheel journaled thereon for rotation in a plane perpendicular to the rail, a carriage providing a pivotal support for the arm for angular movement thereof to shift the wheel toward or from the work, guides for supporting the carriage for translatory reciprocation thereof to move the wheel along the line of work, a frame including said guides movably supported on the track, driving means for the wheel, and flanged means for preventing transverse movement of the frame relative to the track.

16. In a rail grinding apparatus, a frame adapted to span and rest upon the rails of a railway track, a carriage slidably supported by said frame and adapted to be moved transversely of said track across the frame, an arm pivotally secured to the carriage and adapted to swing in a substantially vertical plane perpendicular to the rails, a grind wheel journaled to said arm and adapted to rotate about an axis normal to said plane, whereby said wheel can cut a transverse slot at a rail joint, a motor on said carriage, means operably connecting said motor to said grind wheel, and means for adjusting the position of said arm.

17. A rail joint grinder comprising a frame adapted to be movably supported on the rails of a track, flanged means engaging a lateral face of the heads of the rails for guiding movement of the frame on the track, a carriage supported on the frame for movement transversely thereof toward or away from either of the rails, said carriage normally being positioned between the rails, a laterally extending arm pivoted to the carriage about an axis parallel to the rails for angular movement toward or from a rail, a grinding wheel journaled on said arm for rotation in a plane perpendicular to the rails, and means on said carriage for driving said wheel.

18. A rail joint grinder comprising a frame adapted to be movably supported on the rails of a track, flanged means engaging a lateral face of the heads of the rails for guiding movement of the frame on the track, a carriage supported on the frame for movement transversely thereof toward or away from either of the rails, said carriage normally being positioned between the rails, a laterally extending arm pivoted to the carriage about an axis parallel to the rails for angular movement toward or from a rail, a grinding wheel journaled on said arm for rotation in a plane perpendicular to the rails, means on said carriage for driving said wheel, and means for swinging said arm about its axis to position said wheel for working engagement with a rail on transverse movement of the carriage.

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