Feb. 20, 1945. A. D. McWHORTER 2,369,836

RAIL GRINDER

Filed Feb. 9, 1944 3 Sheets-Sheet 1

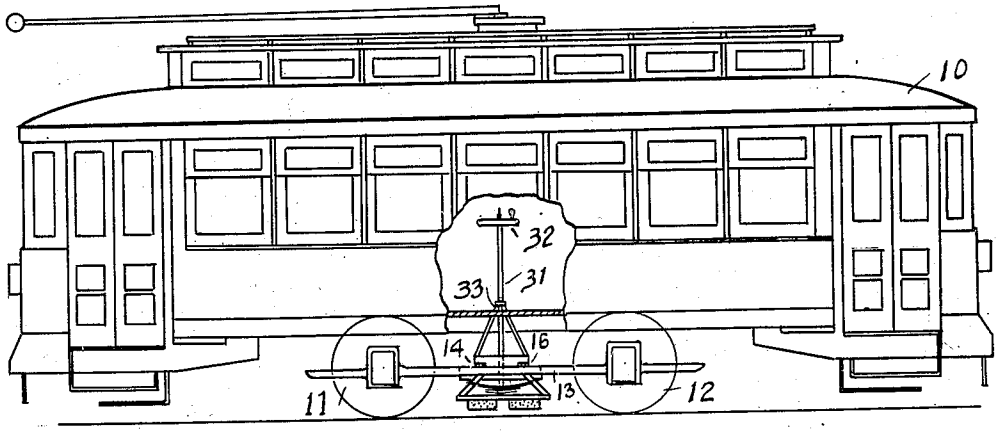


Fig 1

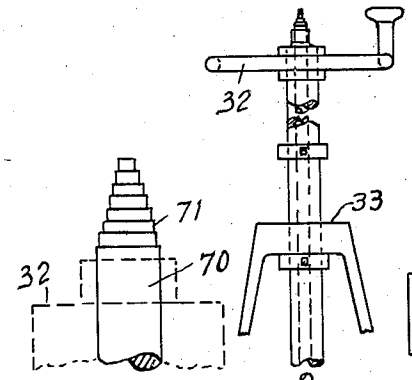


Fig 7

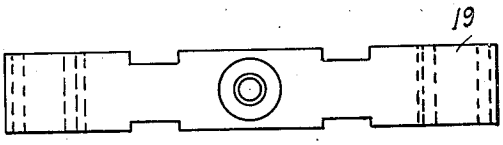


Fig 3

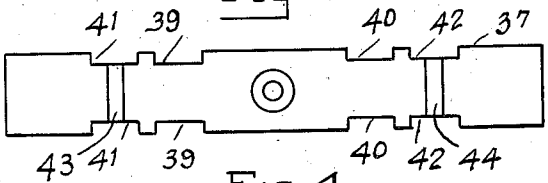


Fig 4

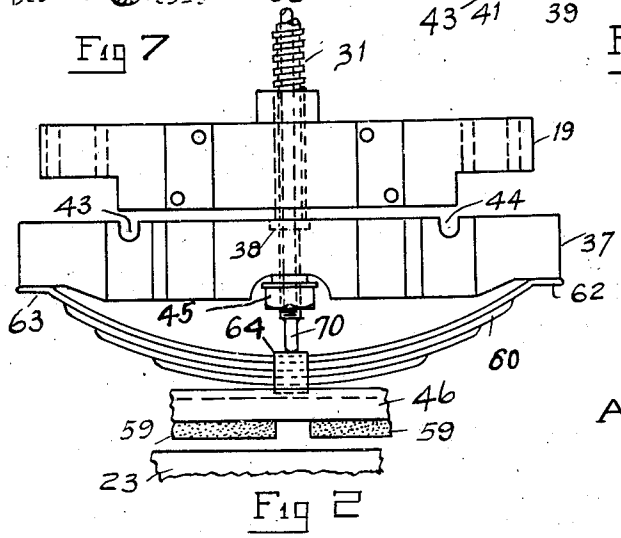


Fig 2

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RAIL GRINDER

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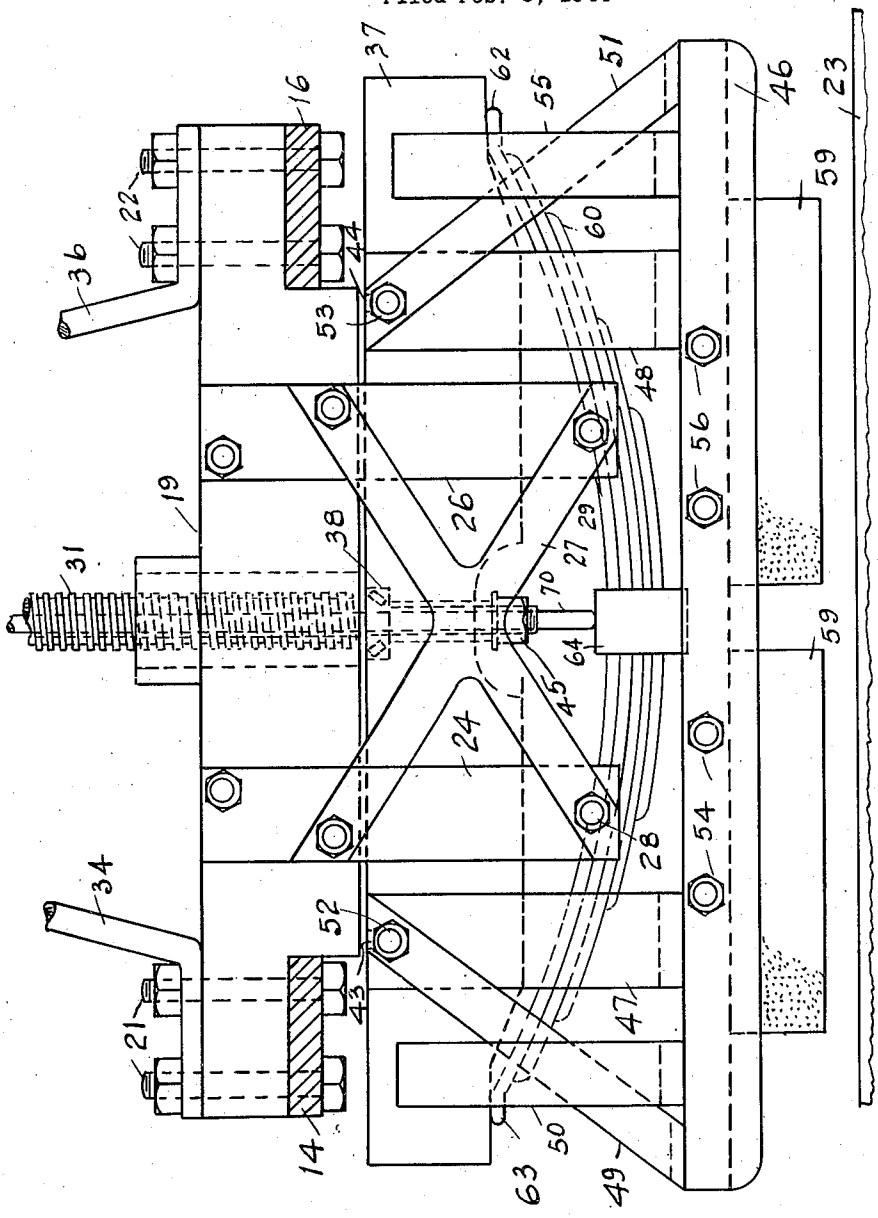


Fig 5

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RAIL GRINDER

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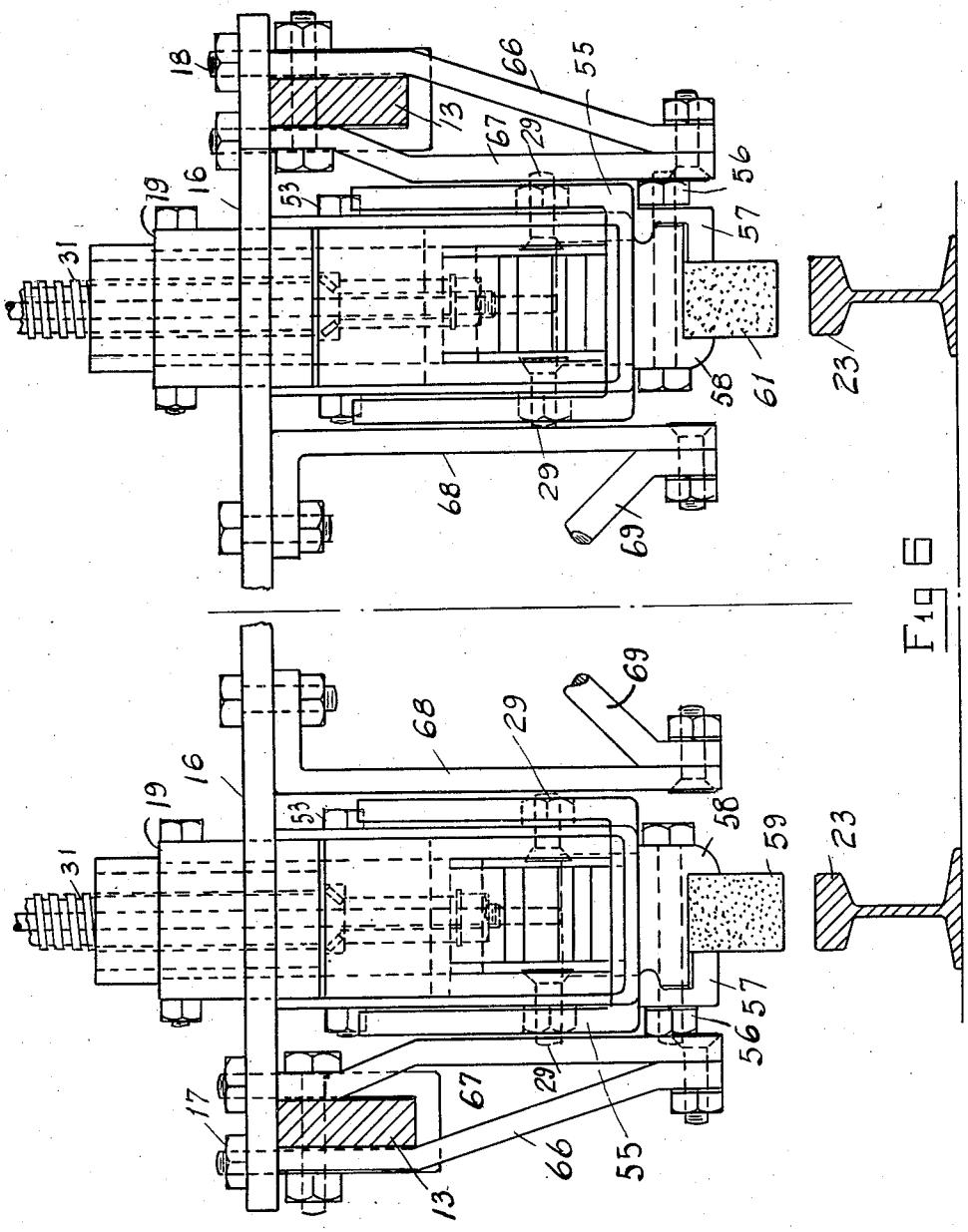


FIG 6

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2,369,836

RAIL GRINDER

Alfred D. McWhorter, Memphis, Tenn.

Application February 9, 1944, Serial No. 521,617

8 Claims. (Cl. 51—178)

This invention relates to track, or rail grinding machines and has for its object the provision of apparatus of the character designated which shall be adapted to be attached to any single truck electric street railway car and which shall grind the rails of the track as the car is propelled therealong.

A further object of the invention is to provide, in apparatus for grinding the rails of a track, improved means for applying the grinding elements to the rails with a regulated pressure, together with visual means for indicating the amount of pressure employed, and means for raising the grinding elements clear of the rails.

A still further object of the invention is to provide apparatus of the character designated which shall be simple and sturdy of design, economical to manufacture and reliable in operation.

As is well known in the art to which my invention relates, electric street railway rails, in service, acquire transverse corrugations which cause a vehicle passing thereover to ride rough and create discomfort for passengers. It is the principal object of this invention to provide a grinding machine which may be mounted on the side bars of a single truck electric street railway vehicle and which shall be adapted to grind the rough spots out of the track by being moved along the track with abrasive elements in engagement therewith. Other objects and features of my invention will become apparent from the following description, reference being had to the accompanying drawings, forming a part of this application, in which:

Fig. 1 is a side elevation of a single truck electric street railway vehicle having my improved rail grinder applied thereto.

Fig. 2 is a side elevation showing the operating screw and the principal parts connected therewith, with other parts removed.

Fig. 3 is a plan view of the main supporting bar.

Fig. 4 is a plan view of the cross head.

Fig. 5 is a detailed side elevation of one of the grinding machine units with the top and operating screw broken away.

Fig. 6 is a detailed end elevation of the apparatus, and

Fig. 7 is a detailed view of the upper end of the visual indicating means employed with my invention.

Referring to the drawings for a better understanding of my invention I show in Fig. 1 a typical street railway vehicle 10 having a single truck thereunder including wheels 11 and 12 with a truck frame embodying side bars 13. See Fig. 6. The side bars 13 form the chief support for my improved grinding machine units which are mounted thereon by means of parallel supporting cross members 14 and 16, which in turn, are secured to the side bars 13 by means of U bolts 17 and 18. The grinding apparatus consists of separate units mounted on the cross members 14 and 16 on opposite sides of the vehicle, each of which is operable separately, or both may be operated in unison. Inasmuch as the separate units are identical, only one will now be described.

Each of the separate rail grinding units comprises an upper supporting beam 19 mounted on the cross bars 14 and 16 and secured thereto by means of bolts 21 and 22. The supporting beam 19 is mounted directly over one of the rails of the track indicated by the numerals 23 in Fig. 6. Secured to the upper supporting beam and extending downwardly therefrom are opposed guides 24 and 26, the same being mounted on both sides of the supporting beam 19 and braced on both sides by metal cross braces 27. The metal cross braces are joined to the lower ends of the guides 24 and 26 by means of bolts 28 and 29 having countersunk heads fitting in the inner sides of the guides as shown in Fig. 6.

A hollow operating screw 31 extends through the supporting beam 19 in threaded engagement therewith and extends upwardly into the vehicle. An operating wheel 32 is mounted on the upper end of the screw so as to be readily accessible to the operator of the machine. A sleeve 33 surrounds the screw within the vehicle and braces 34 and 36 extend downwardly from the sleeve to the beam 19 to steady the screw.

Mounted directly beneath the supporting beam 19 is a cross head 37 which is reciprocable up and down beneath the supporting beam 19. Near the lower end of the hollow screw 31 an unthreaded portion extends through the cross head 37 and is screwed by a nut 45 at the end so as to raise and lower the cross head. Preferably an anti-friction thrust bearing 38 is interposed between the screw and the upper part of the cross head so that the screw may be easily turned when exerting pressure on the cross head. The cross head is provided with opposed guide slots 39 and 40, the slots 39 being adapted to receive the guides 24 and the slots 40, the guides 26, secured to the supporting beam 19. The cross head 37 is also supplied with opposed guide slots 41 and 42 which are adapted to receive other guides, to be described later, and with notches 43 and 44 in

the upper surface joining the opposite sides respectively of the slots 41 and 42.

Mounted directly beneath the cross head 37 is a grinding block holder 46 which is adapted for limited relative movement with respect to the cross head 37. Connected to the grinding block holder and extending upwardly therefrom are U shaped guides 47 and 48 which extend upwardly and fit in the guide slots 41 and 42, respectively, of the cross head 37. Diagonal braces 49 and 51 extend upwardly from the holder 46 and are joined to the upper ends of the guides 47 and 48 by means of bolts 52 and 53. The bolts 52 and 53 rest in the notches 43 and 44, respectively, joining the ends of the braces 49 and guides 47, and thus provide a connection between the cross head 37 and the grinding block holder 46 whereby the latter has a limited relative movement with respect to the cross head. Mounted in the grinding block holder 46 by means of bolts 54 and 56, acting against a side rail 57 which, with the other side 58 of the holder, forms a clamp, are grinding blocks 59 and 61. The grinding blocks 59 and 61 are adapted to be brought into contact with the rails 23 for grinding the same. Secured to the grinding block holder 46 near the ends thereof, and extending upwardly therefrom are additional U shaped guide members 50 and 55.

Downward motion is imparted to the grinding block holder 46 from the cross head 37 through a leaf spring 60 having its ends 62 and 63 bearing against the under side of the cross head 37 and having its band 64 resting on the upper surface of the holder 46 midway its ends. It will be seen that this spring forms a yieldable connection between the cross head 37 and the holder 46 whereby the grinding blocks 59 and 61 may be brought to bear on the rails 23 with a yieldable pressure.

In order to provide additional side bracing for the apparatus in operation I provide additional guide members 66 secured to the side rails 13 alongside each of the units and extending downwardly with inner members 67 adapted to engage the outside surface of the guide members 50 and 55. Likewise I provide inner guide members 68 secured to the cross members 14 and 16 which extend downwardly between the units and bear against the guide members 50 and 55. The guide members 68 are braced by means of diagonal braces 69.

Extending downwardly through the hollow operating screw 31 and freely movable responsive to gravity with respect thereto, is an indicating rod 70 the lower end of which rests on the spring band 64 and the upper end of which extends outwardly through the operating wheel 32 on the upper unthreaded end of the screw 31. The upper end of the rod 70 is calibrated preferably in successive steps 71 of decreasing diameter. As the screw 31 is screwed downwardly moving the cross head 37 and the spring 60 is deflected responsive to pressure exerted against the grinding block holder 46, the indicating rod 70 projects more and more through the operating wheel 31 and the calibrations 71 indicate the amount of pressure being exerted on the grinding blocks.

From the foregoing description, the operation of my improved rail grinding machine will be readily apparent. With the separate units mounted on the side rails of the truck frame on opposite sides of the vehicle, the vehicle is propelled by its own power in a manner well understood, along the tracks. When the grinding units are not in operation, the screw 31 is retracted sufficiently to raise the grinding blocks 59 off the rails. When it is desired to grind a section of the rails of the track, the screws 31 are screwed downwardly to bring the grinding blocks, which are preferably made of Carborundum or other similar abrasive, into contact with the rails. The pressure exerted on the grinding blocks is regulated according to the condition of the track to be ground and is indicated by the extent that the upper end of the indicating rod 70 protrudes through the operating wheel 32. The vehicle is then propelled along the track at as high a rate of speed as possible, consistent with safety, and the grinding blocks act to remove the corrugations in the rails. When the rails have thus been smoothed out the screws 31 are retracted, raising the grinding blocks off the rails.

In carrying out the operation just described, it will be seen that there is considerable resistance to movement of the grinding blocks in frictional engagement with the rails and the importance of the guide elements 24 and 26 on the supporting beam 19 and the guides 47 and 48 on the grinding block holder 46 will be appreciated. That is the guides reciprocating in the slots 39, 40, 41 and 42 of the cross head 37, hold the grinding block holder firmly to its proper position on the rail 23. Also, the retaining braces 67, 68 prevent lateral displacement of the grinding machine units with respect to the rails 23.

It will be apparent from the foregoing that I have devised an improved rail grinding machine which is simple of construction and operation, which apparatus is adapted for mounting on an ordinary electric street railway vehicle.

While I have shown my invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications, without departing from the spirit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are specifically set forth in the appended claims.

What I claim is:

1. In a rail grinding machine, a railway car truck having a frame with side rails, an upper supporting beam supported by the side rails, and mounted directly over the rail to be ground, a cross head mounted beneath the supporting beam and movable up and down with respect thereto, guide means cooperating between the cross head and the supporting beam, a screw extending through the supporting beam in threaded engagement therewith and connected to the cross head, a grinding block holder mounted beneath the cross head and adapted for limited movement relative thereto, a spring for transmitting pressure from the cross head to the grinding block holder, and means for visually indicating the pressure transmitted.

2. In rail grinding apparatus, the combination with a single truck railway vehicle having a truck frame, of separate grinding units mounted on opposite sides of the vehicle and supported from the truck frame, each unit comprising an upper supporting beam mounted over the rail and extending parallel thereto, a grinding block holder with grinding blocks mounted beneath the supporting beam and the grinding block holder and operatively connected thereto, a cross head disposed between the supporting beam and the grinding block holder, a leaf spring interposed between the cross head and the grinding block holder through which downward movement is

imparted to the holder, guide means cooperating between the supporting beam and the cross head and the grinding block holder and the cross head to hold the grinding blocks in engagement with the rail, and means to actuate the cross head to raise and lower the grinding block holder.

3. In rail grinding apparatus, the combination with a single truck railway vehicle having a truck frame, of separate grinding units mounted on opposite sides of the vehicle and supported from the truck frame, each unit comprising an upper supporting beam mounted over the rail and extending parallel thereto, a grinding block holder with grinding blocks mounted beneath the supporting beam directly above the rail, a cross head disposed between the upper supporting beam and the grinding block holder and operatively connected thereto, a leaf spring interposed between the cross head and the grinding block holder through which downward movement is imparted to the holder, guide means cooperating between the supporting beam and the cross head and the grinding block holder and the cross head to hold the grinding blocks in engagement with the rail, means to actuate the cross head to raise and lower the grinding block holder, and means to indicate the pressure imposed on the grinding block holder by the cross head.

4. In a rail grinding machine, a grinding block holder extending parallel with the rail with grinding blocks secured therein, a cross head for actuating the grinding block holder and movable relative thereto, means limiting separating movement between the cross head and the grinding block holder, a leaf spring interposed between the cross head and the grinding block holder with its ends bearing against the cross head and a central band bearing against the grinding block holder for imposing a variable pressure thereon, and an operating screw for actuating the cross head to raise and lower the grinding blocks to engage and disengage them with the rails.

5. In a rail grinding machine, a grinding block holder extending parallel with the rail with grinding blocks secured therein, a cross head for actuating the grinding block holder and movable relative thereto, means limiting separating movement between the cross head and the grinding block holder, a leaf spring interposed between the cross head and the grinding block holder with its ends bearing against the cross head and a central band bearing against the grinding block holder for imposing a variable pressure thereon, a vertically disposed hollow operating screw for actuating the cross head to raise and lower the grinding blocks and engage and disengage them with the rails, an indicating rod telescoped within the operating screw and freely movable therein responsive to gravity, said rod being disposed for its lower end to rest on the spring midway its ends and to protrude from the upper end of the operating screw to indicate by the extent which it protrudes the pressure imposed on the grinding blocks from the cross head.

6. In a rail grinding machine, a grinding block holder extending parallel with the rail with grinding blocks secured therein, a cross head for actuating the grinding block holder and movable relative thereto, means limiting separating movement between the cross head and the grinding block holder, a leaf spring interposed between the cross head and the grinding block holder with its ends bearing against the cross head and a central band bearing against the grinding block holder for imposing a variable pressure thereon, an operating screw for actuating the cross head to raise and lower the grinding blocks to engage them with and disengage them from the rails, a supporting beam fixedly mounted over the cross head, said operating screw being in threaded engagement with the supporting beam and operatively connected to the cross head, and an indicating rod telescoped within the operating screw and freely movable therein responsive to gravity, said rod having its lower end resting on the spring band and its upper end protruding through the upper end of the screw to indicate by the extent which it protrudes the pressure imposed on the grinding block holder.

7. In a rail grinding machine, a grinding block holder extending parallel with the rail with grinding blocks secured therein, a cross head for actuating the grinding block holder and movable relative thereto, means limiting separating movement between the cross head and the grinding block holder, a leaf spring interposed between the cross head and the grinding block holder with its ends bearing against the cross head and a central band bearing against the grinding block holder for imposing a variable pressure thereon, an operating screw for actuating the cross head to raise and lower the grinding blocks to engage them with and to disengage them from the rails, a supporting beam fixedly mounted over the cross head, said operating screw being in threaded engagement with the supporting beam and operatively connected to the cross head, an indicating rod telescoped within the operating screw and freely movable therein responsive to gravity, said rod having its lower end resting on the spring band and its upper end protruding through the upper end of the screw to indicate by the extent which it protrudes the pressure imposed on the grinding block holder, and guide means cooperating between the supporting beam, the grinding block holder and the cross head to limit movements of the grinding block holder to movements in a vertical plane.

8. In a rail grinding machine, a grinding block holder extending parallel with the rail with grinding blocks secured therein, a cross head for actuating the grinding block holder and movable relative thereto, means limiting separating movement between the cross head and the grinding block holder, a leaf spring interposed between the cross head and the grinding block holder with its ends bearing against the cross head and a central band bearing against the grinding block holder for imposing a variable pressure thereon, an operating screw for actuating the cross head to raise and lower the grinding blocks to engage them with and disengage them from the rails, a supporting beam fixedly mounted over the cross head, said operating screw being in threaded engagement with the supporting beam and operatively connected to the cross head, an indicating rod telescoped within the operating screw and freely movable therein responsive to gravity, said rod having its lower end resting on the spring band and its upper end protruding through the upper end of the screw to indicate by the extent which it protrudes the pressure imposed on the grinding block holder, and guide means cooperating between the supporting beam, the grinding block holder and the cross head to limit movements of the grinding block holder to movements in a vertical plane, a railway vehicle including a truck frame, and means to mount the machine on the truck frame.

A. D. McWHORTER.