March 1, 1960 H. ACKERMAN 2,926,460

RAILBASE AND RAILWEB GRINDING MACHINE

Filed Jan. 19, 1959 4 Sheets-Sheet 1

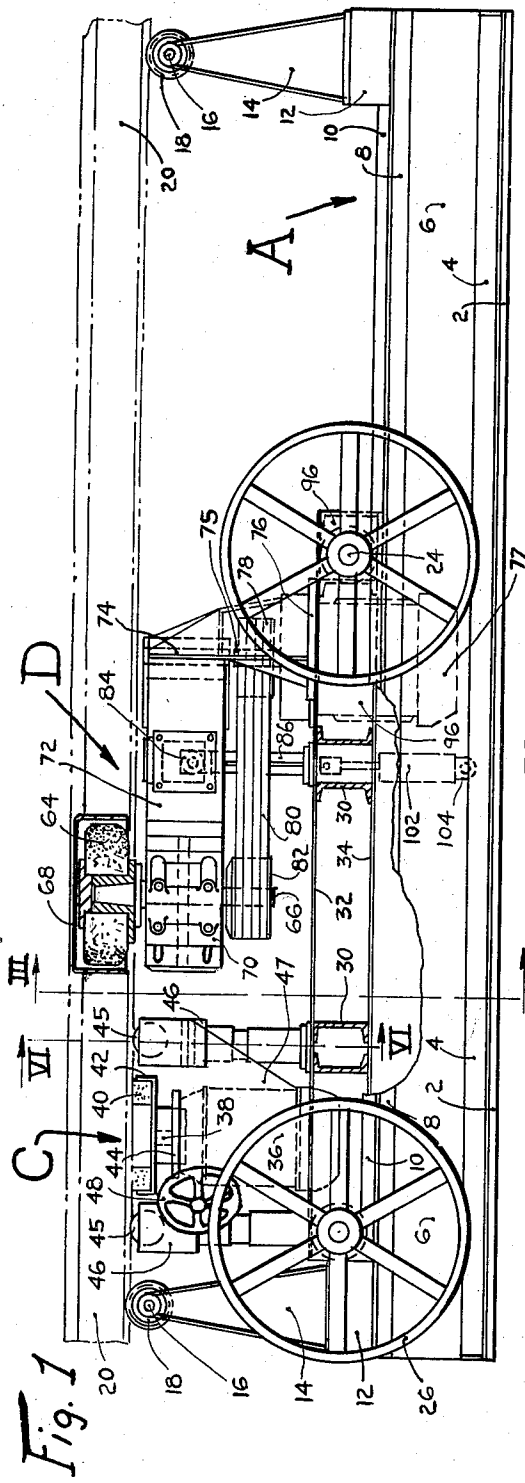


Fig. 1

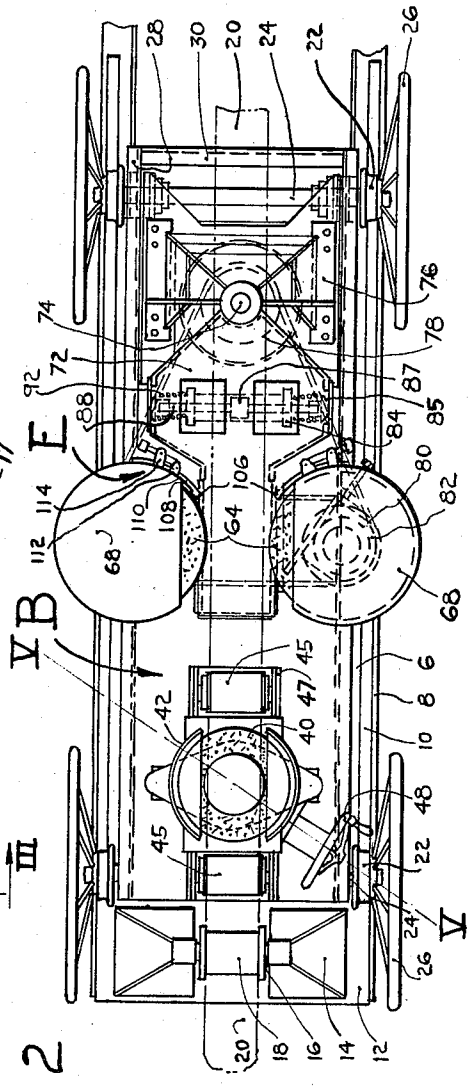


Fig. 2

INVENTOR.
HERMAN ACKERMAN
BY Sabin C. Bronson
ATTORNEY.

March 1, 1960 H. ACKERMAN 2,926,460

RAILBASE AND RAILWEB GRINDING MACHINE

Filed Jan. 19, 1959 4 Sheets-Sheet 2

Fig. 3

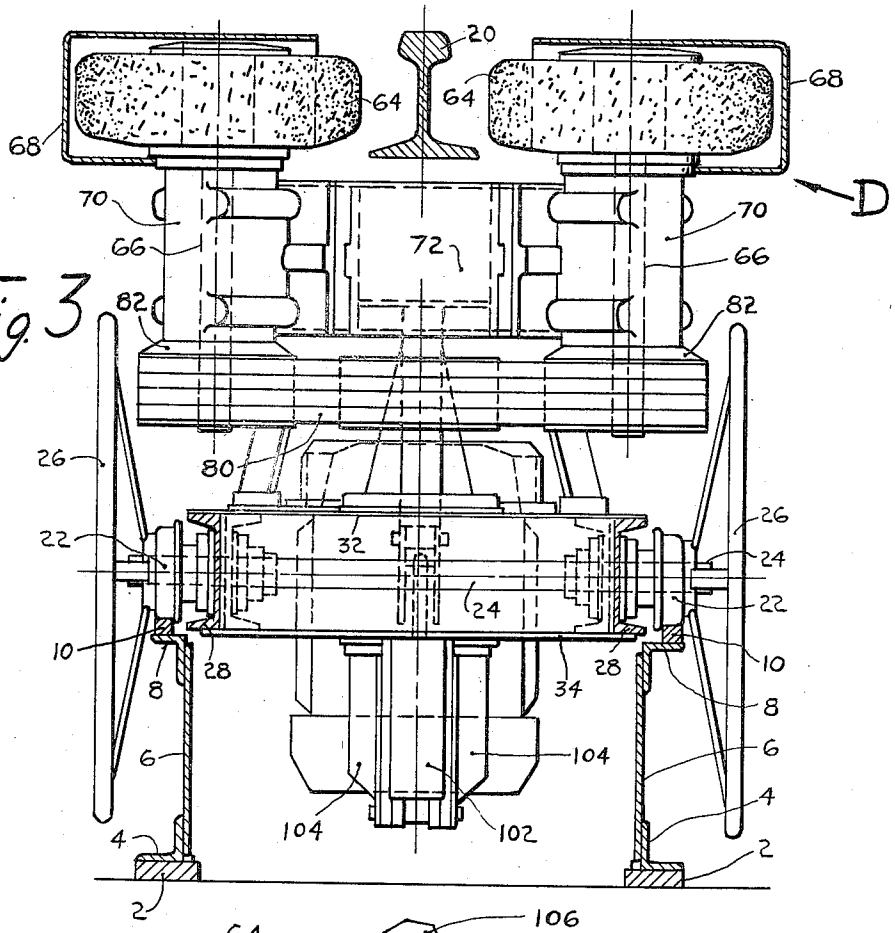
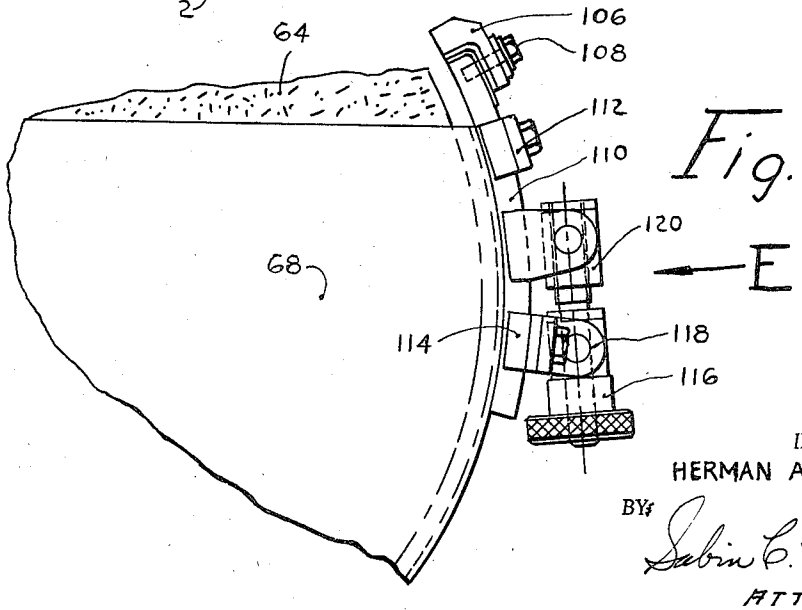


Fig. 4



INVENTOR.
HERMAN ACKERMAN
BY: Sabin C. Bronson.
ATTORNEY.

March 1, 1960 H. ACKERMAN 2,926,460

RAILBASE AND RAILWEB GRINDING MACHINE

Filed Jan. 19, 1959 4 Sheets-Sheet 3

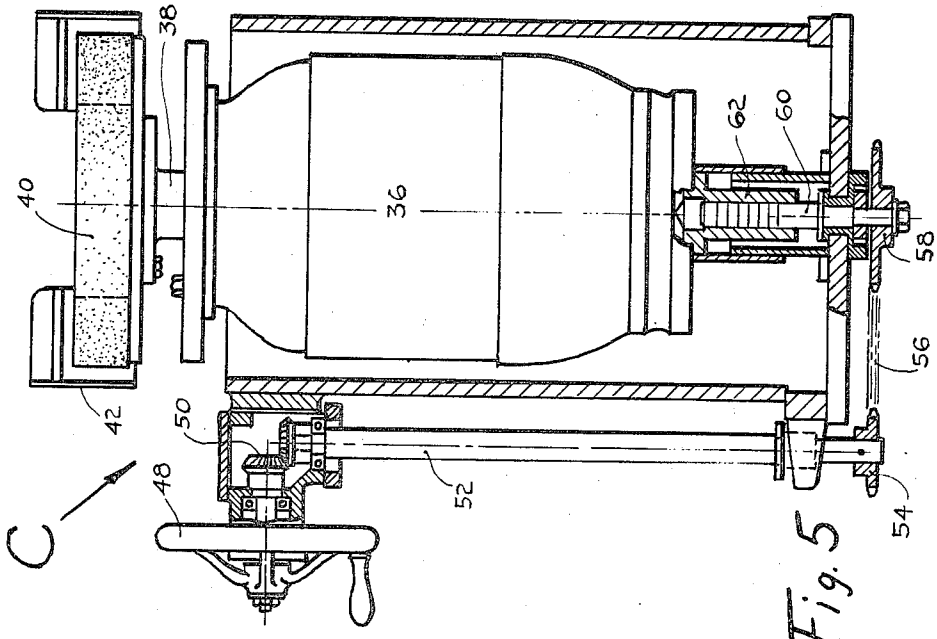


Fig. 5

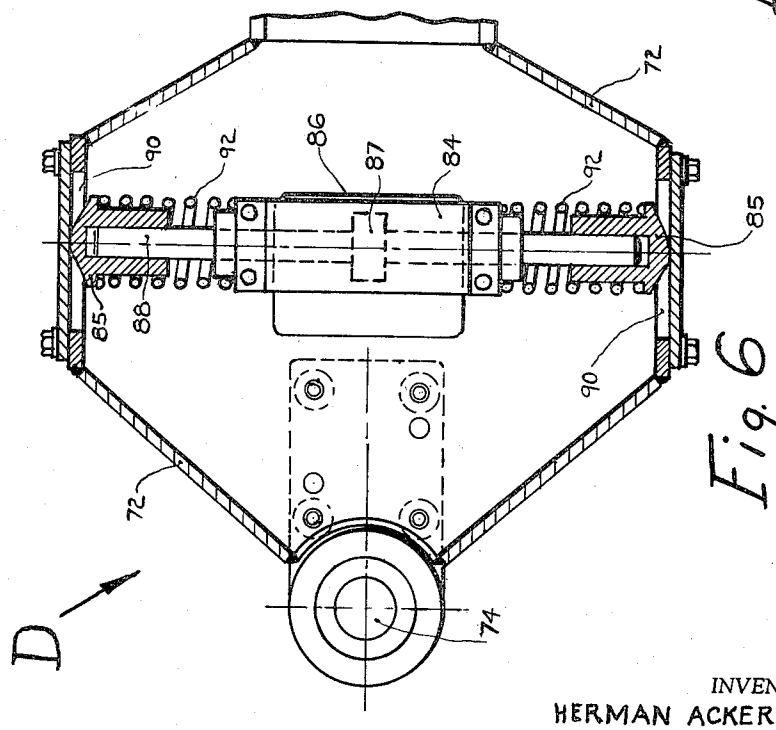


Fig. 6

INVENTOR.
HERMAN ACKERMAN
BY
Sabin C. Bronson.
ATTORNEY

March 1, 1960 H. ACKERMAN 2,926,460

RAILBASE AND RAILWEB GRINDING MACHINE

Filed Jan. 19, 1959 4 Sheets-Sheet 4

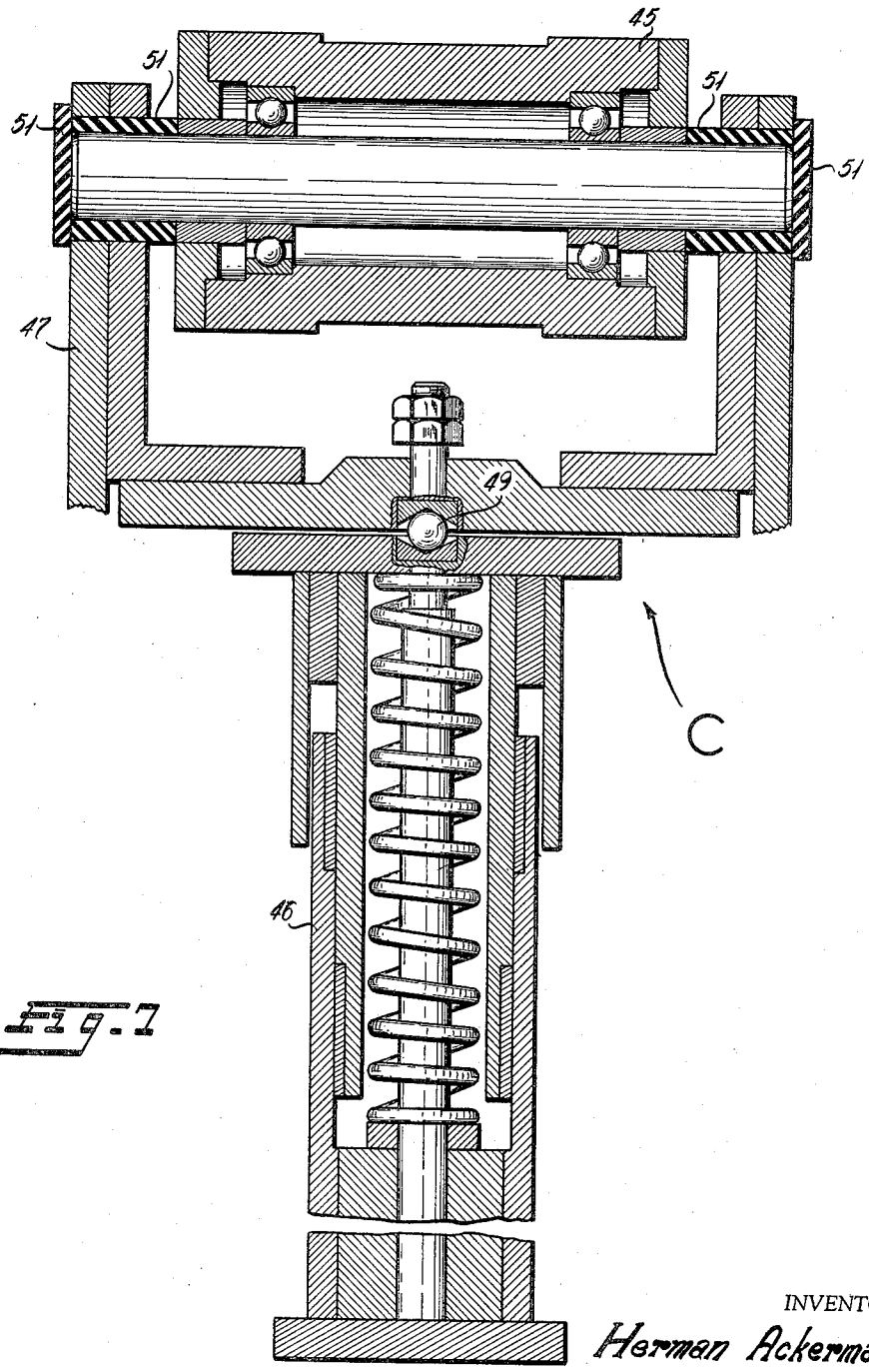


Fig. 7

INVENTOR
Herman Ackerman

BY Sabin C. Bronson

ATTORNEY

United States Patent Office 2,926,460 Patented Mar. 1, 1960

2,926,460

RAILBASE AND RAILWEB GRINDING MACHINE

Herman Ackerman, Richton Park, Ill., assignor to Railtrack Equipment Corporation, S.A., Panama, Panama, a corporation of Panama

Application January 19, 1959, Serial No. 787,499

7 Claims. (Cl. 51—3)

This invention relates to improvements in grinding machines and has particular reference to such a machine for removing excess weld metal from a butt-welded railroad rail joint.

The practice of welding sections of rail end to end is becoming increasingly common so as to provide a continuous rail extending over several miles of track whereby the bumps of wheels rolling over the rail may be reduced to a minimum.

It is necessary to remove the excess weld seam metal which unites sections of rail together, because the weld metal is usually rough and collects and retains moisture and filth from the railroad right-of-way, all of which enhances corrosion. Smoothing the joint to the contour of the rest of the rail web will avoid this difficulty.

An object of this invention, therefore, is to provide a new and improved machine for grinding the excess weld metal from the web and base flange of a butt-welded rail.

Another object of the invention is to provide a rail grinding machine having a mobile carriage unit which may be set in motion longitudinally on a base structure, whereby grinding means may be moved back and forth along butt-welded junctures of rail sections and in the immediate vicinity of the weld.

Another object of this invention is to provide a rail grinding machine having a rail base flange planar grinding wheel mounted on a vertical axis and positioned so as to be moved vertically toward or away from engagement with the bottom of the base flange of the rail to be ground.

Another object of this invention is to provide a rail grinding machine having a pair of opposed spaced rail web contour grinding wheels mounted on vertical axes and adapted to fit the contour of and to be brought into engagement with each side of the web and portions of the head and base flange of the rail to be ground.

Another object of this invention is to provide a rail grinding machine having a pair of grinding wheels adapted to be brought into engagement with the sides of the base flanges of the rail to be ground.

Another object of this invention is to provide a rail grinding machine having an adjustable bumper arm to automatically regulate the depth of cut of the rail web grinding wheels.

Other objects and advantages of this invention will appear in the following description thereof, especially when considered with the accompanying drawings, in which:

Figure 1 is a side elevation of the apparatus comprising the invention.

Figure 2 is a top plan view of Figure 1, partially broken away.

Figure 3 is an enlarged sectional view taken along the line III—III of Figure 1.

Figure 4 is an enlarged broken top plan view of the adjustable safety stop for the rail web grinding wheel.

Figure 5 is an enlarged sectional side elevation, taken along the line V—V of Figure 2, showing the hand operated elevating means for the rail base flange grinding wheel.

Figure 6 is an enlarged top sectional view of the hydraulic means for feeding the web grinding units in relation to the web of the rail.

Figure 7 is an enlarged sectional side elevation taken along line VI—VI of Figure 1 showing the spring mounted pivot rollers for the rail base grinding wheel.

Referring now to the drawings, the invention, as generally shown in Figure 1, comprises a base end track support unit, indicated generally by the designation A, which may be mounted on a railroad flatcar or other suitable foundation, not shown in the drawings, a carriage unit B, which may be moved longitudinally forward and backward on the base structure, a rail base flange grinding unit and motor assembly C, shown in greater detail in Figure 5, a rail web grinding unit and motor assembly D, and an automatic stop assembly unit E, shown in Figure 4.

Referring more specifically to the base and track support unit A, shown in Figures 1, 2 and 3, it comprises a pair of longitudinally extending parallel spaced foundation members 2, on each of which is mounted a built-up base channel section 6, the lower angle or flange 4 thereof being mounted to the corresponding foundation member 2 and the upper flange 8 having mounted thereon a rectangular track member 10. Extending between the base channels 6 at each end of the same are cross members 12, each supporting a pair of upstanding pedestals 14 on which are carried an axle 16 and a spool-type flanged roller 18. On these supports the rail 20 to be ground rests and travels.

Referring more specifically to the carriage unit B, on and for rolling engagement with track members 10 are pairs of flanged wheels 22 mounted on axles 24 to the outer ends of which are fixed one or more hand wheels 26. By means of manual rotation of any one of these hand wheels 26, the wheel and axle assemblies and associated structure may be moved back and forth along the track members 10 during the grinding operation. Within and slightly above the base channels 6 are provided auxiliary longitudinal channels 28 through which the axles 24 extend, the auxiliary channels 28 being connected by a plurality of cross channels 30 to form a rectangular frame or chassis, above and below which are mounted floor plates 32 and 34.

Referring more specifically to the rail base flange grinding unit C, shown to the left in Figures 1 and 2 and in Figures 5 and 7, it is comprised of an electric motor 36, an armature shaft 38 vertically disposed and extending thereabove, a planar grinding wheel 40 removably fixed to the upper end of the shaft 38 and disposed within a wheel housing 42, which is mounted above the motor and open in the central portion to permit the grinding wheel to engage the bottom of the base flange of the rail to be ground. The electric motor 36 and associated grinding apparatus are mounted for vertical movement within a narrow range inside a motor housing or chassis 44 on which are mounted guide rollers 45 which bear against the bottom surface of the rail 20 and help to guide and position the grinding unit C. The guide rollers 45 and motor chassis 44 are mounted to the upper ends of a pair of spring loaded guides 46. The guide rollers 45 and motor chassis 44 are mounted in a support 47 which is free to pivot in a lateral direction around the balls 49 thus allowing the grinding wheel 40 to align itself with the base flange of rail 20 should said base flange be twisted or irregular. The guide rollers 45 are insulated from support 47 by means of non-conductive

bushings and washers 51. The spring loaded guides 46 are fixedly mounted on the upper floor plate 32 of the carriage frame unit B and braced by cross channels 30 thereof. Rotation of the hand wheel 48 through bevel gears 50 rotates a vertical shaft 52 mounted into a sprocket wheel 54 which in turn through a sprocket chain 56 rotates a sprocket gear 58 on the end of a screwthreaded shaft 60 threadedly engaged within a sleeve nut 62 on the bottom of the motor 36. This vertical screw arrangement may be used to raise or lower at will the motor 36 and associated structure and thereby to bring the grinding wheel 40 up against the bottom surface of the rail base flange for grinding the excess weld metal from the weldment.

Adjacent to the rail base grinding unit C is the rail web grinding unit D, shown in Figures 1, 2 and 3. Two laterally opposed spaced grinding wheels 64 are mounted on vertical shafts 66 and enclosed within wheel housings 68, open only adjacent to the rail to be ground so that the grinding wheels 64 can project therethrough in engaging and grinding the rail 20. The peripheral surface of each grinding wheel 64 is contoured to the lower head portion and upper base portion of the rail 20 and is cylindrical where it meets the web portion of the rail. Shaft housings 70 enclose the shafts 66 and support the wheel housings 68, and are fixed to a frame 72, which is pivotally mounted to the support 76 by pivot pin 74. On the armature shaft 75 of the motor 77 are a nest of pulleys 78 for driving V-belts 80 which in turn drive pulleys 82 on the ends of the shafts 66 for rotating the grinding wheels 64. A double acting hydraulic cylinder 84 is mounted in the upper end of a rectangular column 86, the base of which is fixed to the plate 32 of the carriage frame. The piston rod ends 88, mounted within spring pilot sleeves 85 on opposite sides of the column 86, are positioned against recesses 90 in the frame 72 by springs 92, thereby permitting lateral movement to the frame 72 about the pivotal shaft 74, so as to alternately move the grinding wheels 64 in a horizontal plane to and from the rail 20 by means of hydraulic actuation of the piston 87. The coil springs 92 also act as a device to facilitate centering of the grinding wheels 64 when not in grinding use. The motor 77 is mounted pivotally by means of support member 96 on the adjacent axle 24, so that the entire grinding unit D may be pivoted longitudinally in a vertical plane in order to grind the sides of the base flange of the rail 20. This pivoting movement is controlled by means of a double acting hydraulic cylinder 102 mounted by supports 104 within the carriage frame beneath the column 86 attached to the motor support member 96, so as to permit the grinding unit D to be raised or lowered about its axis 24.

Referring more specifically to the automatic stop assembly unit E, shown in Figure 4, in order to position the opposed grinding wheels 64 in relation to the rail 20, and prevent overgrinding, bumper elements 106 are provided and adapted to come in contact with the bulb portion of the rail 20 when the desired cut has been attained. The bumpers 106 are fastened by suitable means 108 such as a bolt to arms 110, which are slidably carried on the wheel housings 68 in brackets 112 and 114 mounted thereon. This mechanism is adjustable by manipulation of a vernier hand screw 116 rotatably carried within sleeve 118 on bracket 114 and threadedly engaged within sleeve 120 secured to arm 110.

In the operation of this invention, the butt-weld rail sections are positioned on the rail supports, formed by the pedestals 14 at each end of the base section A, so that the rail is oriented thereabove. Grinding means C and D, mounted on carriage unit B, may then be moved longitudinally along the tracks 10 of the base section A by manual operation of hand wheel 26, so as to pass backwards and forwards in the vicinity of the welds and remove the excess weld metal therefrom. Grinding unit C is saddled between a pair of guide members 46, mounted on the chassis of carriage unit B, and oriented with the plane of the base flange of the rail 20 by guide rollers 45 seated in the spring loaded guide members 46. The planar grinding wheel 40 of rail base flange grinding unit C may be brought into grinding engagement with the bottom of the base flange of the rail 20 by manual rotation of hand wheel 48. Grinding unit D is pivoted for latitudinal movement about the shaft 74, and pivoted for vertical movement about the carriage axle 24, so that the contour grinding wheels 64, mounted in a plane perpendicular to and intersecting the web of the rail 20 may be hydraulically moved into grinding engagement with the rail web on alternate sides thereof or may be dropped, when centered relative thereto, so as to grind the sides of the rail base flange. The automatic stop assembly unit E, mounted on the wheel housings 68 of grinding unit D, prevents over-grinding of the rail web.

In accordance with the above description, there has been provided herewith a new and improved machine for grinding the excess weld metal from butt-welded rails. Because of the great length of the rails it will be apparent that the practical use of this invention will entail mounting the base and carriage assembly on a railroad flatcar or other suitable means of transportation. Accordingly, the grinding operation would be carried out in the field in the course of welding the successive sections of rail and laying them on the cross ties of the railroad track.

While the arrangement of the invention described herein is at present considered to be preferred, it is understood that variations and modifications may be made therein, and it is intended to cover in the appended claims all such variations and modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. A machine for grinding upset ridges of butt-welds between aligned railroad rails comprising a base structure, a pair of upstanding pedestals in longitudinal alignment with and at opposite ends of said base structure for guiding and supporting said welded rails, first grinding means disposed on said base structure between said pedestals, means for vertically translating said first grinding means into engagement with the bottom surface of said welded rails, second grinding means disposed on said base structure between said pedestals, means for horizontally translating said second grinding means into engagement with the sides of said supported rail, and means for longitudinally translating said grinding means and said supported rail relative to one another, thereby to longitudinally traverse said surfaces of said rail with said grinding means.

2. A machine for grinding upset ridges of butt-welds between aligned railroad rails comprising a base structure, a pair of upstanding pedestals in longitudinal alignment with and at opposite ends of said base structure for guiding and supporting said welded rails, first grinding means disposed on said base structure between said pedestals, means for vertically translating said first grinding means into engagement with the bottom surface of said welded rails, second grinding means disposed on said base structure between said pedestals, means for horizontally translating said second grinding means into engagement with the sides of said supported rail, and carriage means mounting said grinding means and translating means therefor and movable on said base structure between said pedestals, thereby to longitudinally traverse said surfaces of said rail with said grinding means.

3. A machine for grinding upset ridges of butt-welds between aligned railroad rails comprising, a base structure, a pair of upstanding pedestals in longitudinal alignment with and at opposite ends of said base structure for guiding and supporting said welded rails, planar grinding means disposed on said base structure between said pedestals and below the level of the welded rails

supported thereon, means for vertically translating said planar grinding means into engagement with the bottom surface of said welded rails, contour grinding means disposed on said base structure between said pedestals and at the level of the welded rails supported thereon, means for horizontally translating said contour grinding means into engagement with the sides of said supported rail, and carriage means mounting said grinding means and translating means therefor and movable on said base structure between said pedestals, thereby to longitudinally traverse said surfaces of said rail with said grinding means.

4. A machine for grinding upset ridges of butt-welds between aligned railroad rails comprising, a base structure, a pair of upstanding pedestals in longitudinal alignment at opposite ends of said base structure for guiding and supporting said welded rails, planar grinding means disposed on said base structure between said pedestals and below the level of the welded rails supported thereon, means for vertically translating said planar grinding means into engagement with the bottom surface of said welded rails, contour grinding means disposed on said base structure between said pedestals and at the level of the welded rails supported thereon, means for horizontally translating said contour grinding means into engagement with the sides of said supported rail, means for vertically translating said contour grinding means into engagement with sides of said supported rail, and carriage means mounting said grinding means and translating means therefor and movable on said base structure between said pedestals, thereby to longitudinally traverse said surfaces of said rail with said grinding means.

5. A machine for grinding upset ridges of butt-welds between aligned railroad rails comprising, a base structure, a first pair of upstanding pedestals in longitudinal alignment at opposite ends of said base structure for guiding and supporting said welded rails, a carriage movable on said base structure between said pedestals, a second pair of upstanding pedestals closely spaced apart on said carriage in alignment with said welded rails, a spring loaded roller shaft carried in each pedestal of said second pair for forcibly engaging the bottom surface of said welded rails, a planar grinding means supported from said spring loaded roller shafts below the level of said welded rails, means for vertically translating said planar grinding means into engagement with the bottom surface of said welded rails, contour grinding means for engaging the sides of said welded rails, and a support arm for said contour grinding means joined to said carriage for pivotal movement about both a horizontal axis and a vertical axis, whereby said contour grinding means is movable into and out of engagement with the side web of said rail and with the side of the base flange of said rail.

6. A machine for grinding upset ridges of butt-welds between aligned railroad rails comprising, a base structure, a first pair of upstanding pedestals in longitudinal alignment with and at opposite ends of said base structure for guiding and supporting said welded rails, a carriage movable on said base structure between said pedestals, a second pair of upstanding pedestals closely spaced apart on said carriage in alignment with said welded rails, a spring loaded roller shaft carried in each pedestal of said second pair for forcibly engaging the bottom surface of said welded rails, a planar grinding means supported from said spring loaded roller shafts below the level of said welded rails, means for vertically translating said planar grinding means into engagement with the bottom surface of said welded rails, contour grinding means for engaging the sides of said welded rails, a support arm for said contour grinding means joined to said carriage for pivotal movement about both a horizontal axis and a vertical axis, whereby said contour grinding means is movable into and out of engagement with the side web of said rail and with the side of the base flange of said rail, locking means mounted on said support arm for preventing vertical movement of said contour grinding means except when centered relative to said rail.

7. A machine for grinding upset ridges of butt-welds between aligned railroad rails comprising, a base structure, a first pair of upstanding pedestals in longitudinal alignment with and at opposite ends of said base structure for guiding and supporting said welded rails, a carriage movable on said base structure between said pedestals, a second pair of upsanding pedestals closely spaced apart on said carriage in alignment with said welded rails, a spring loaded roller shaft carried in each pedestal of said second pair for forcibly engaging the bottom surface of said welded rails, a planar grinding means supported from said spring loaded roller shafts below the level of said welded rails, means for vertically translating said planar grinding means into engagement with the bottom surface of said welded rails, contour grinding means for engaging the sides of said welded rails, a support arm for said contour grinding means joined to said carriage for pivotal movement about both a horizontal axis and a vertical axis, whereby said contour grinding means is movable into and out of engagement with the side web of said rail and with the side of the base flange of said rail, locking means mounted on said support arm for preventing vertical movement of said contour grinding means except when centered relative to said rail, and stopping means slidably mounted on said contour grinding means and adjustable thereto for forcibly engaging said rails and preventing over-grinding thereof.

References Cited in the file of this patent

UNITED STATES PATENTS

1,772,636	ReQua et al.	Aug. 12, 1930
2,869,288	Bretscher	Jan. 29, 1959