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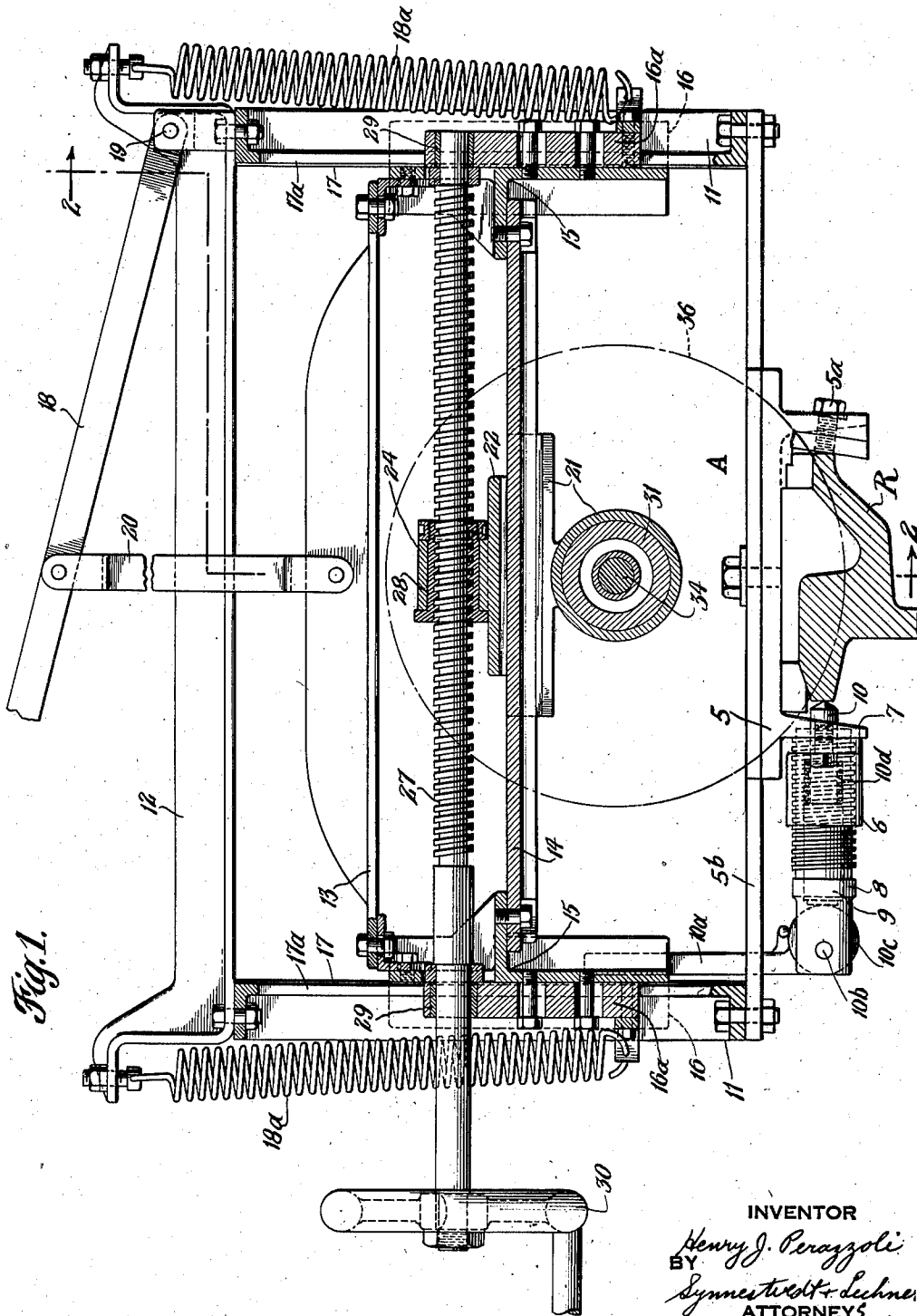
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CUTTING OR GRINDING EQUIPMENT

Filed March 6, 1936

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Fig. 2.

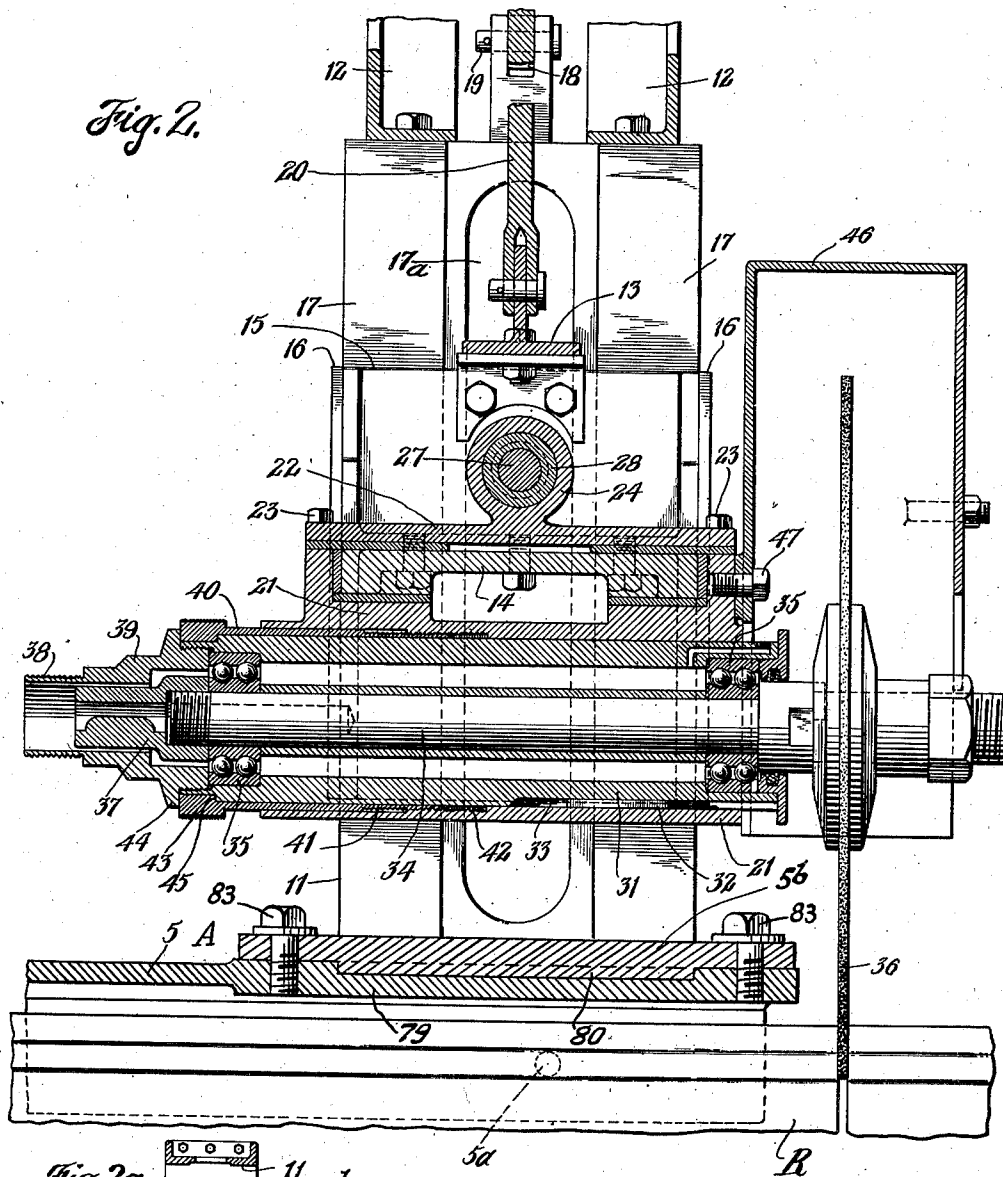
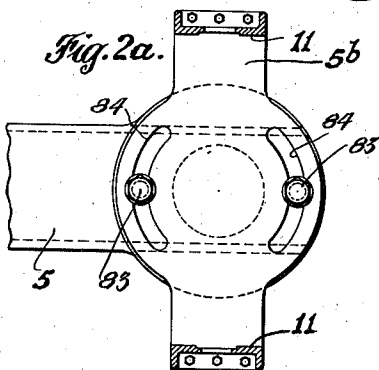


Fig. 2a.



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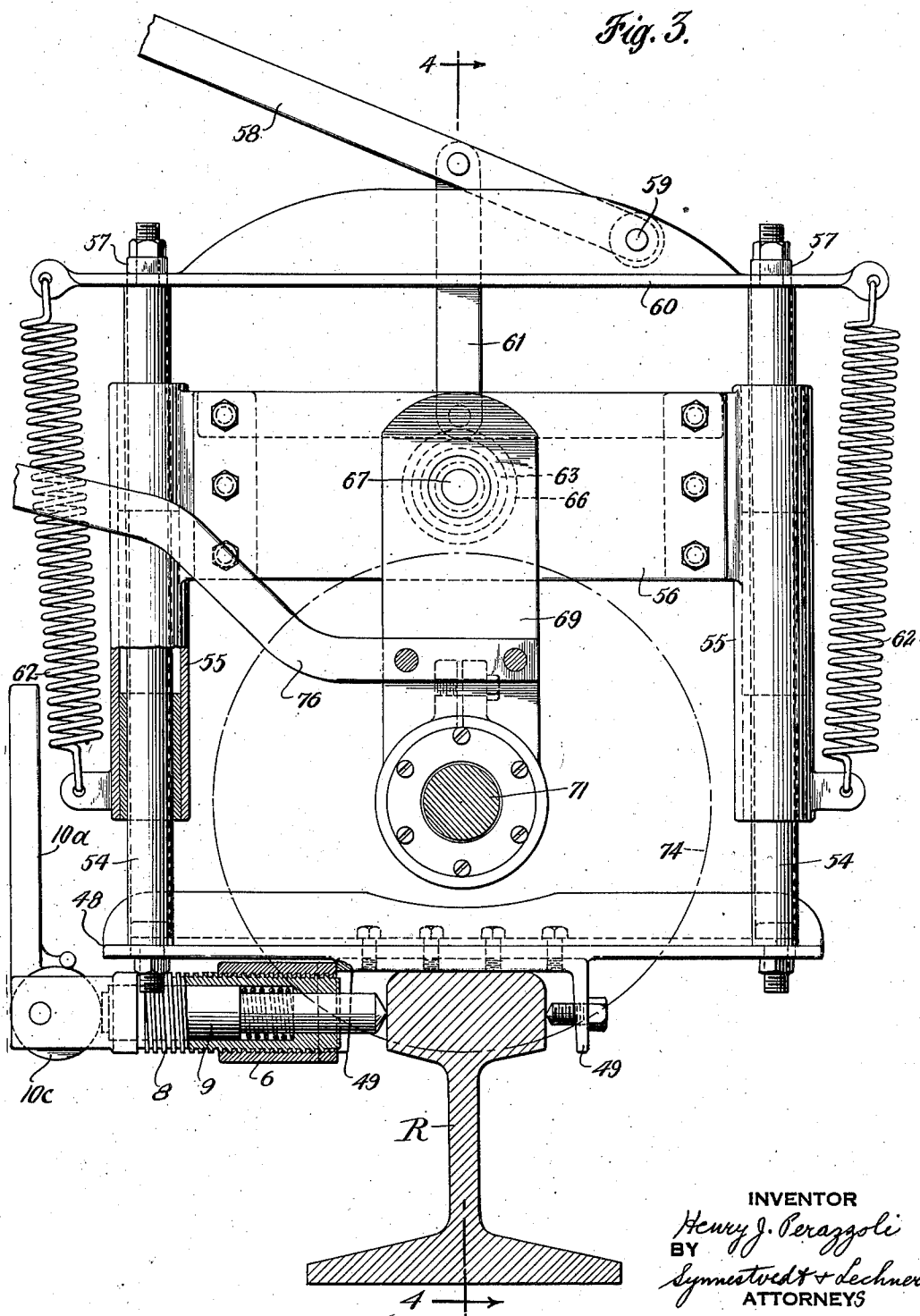
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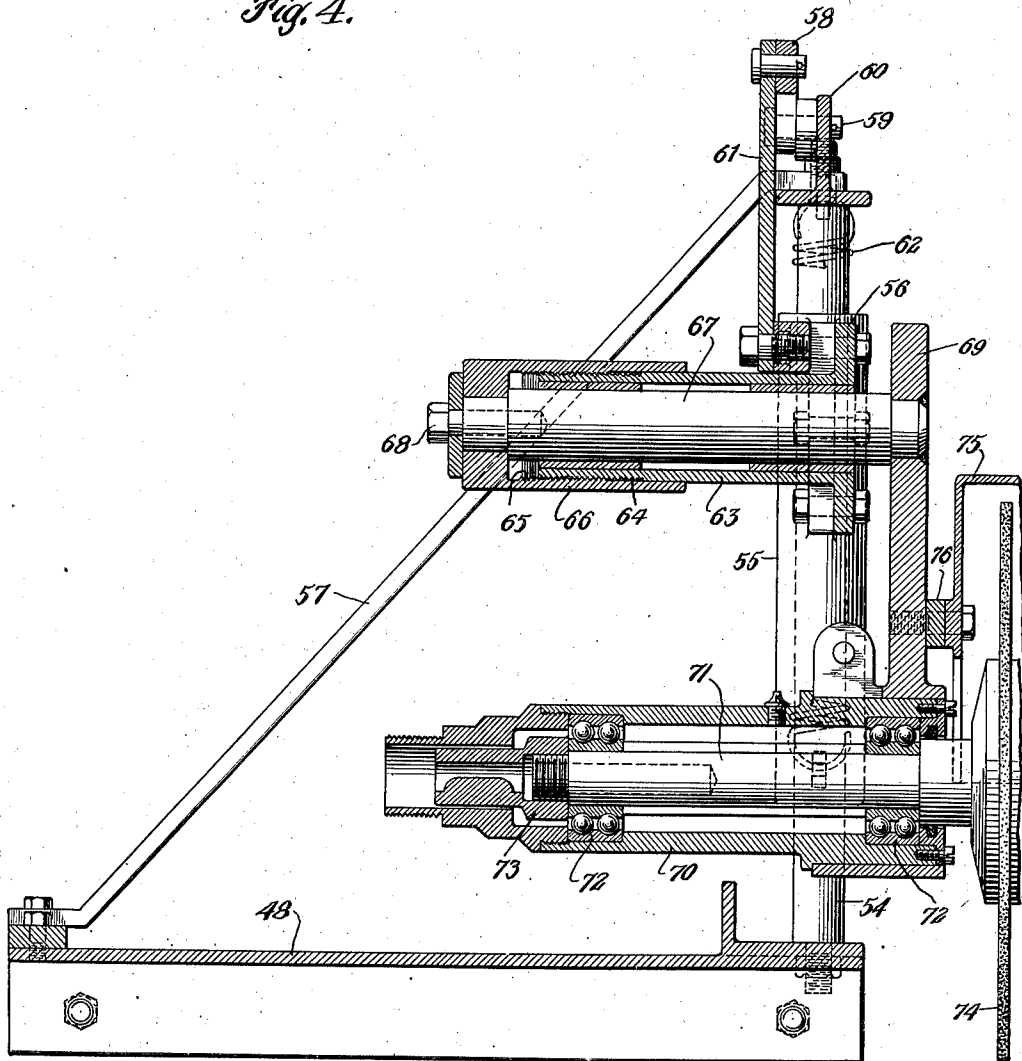
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Fig. 4.



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CUTTING OR GRINDING EQUIPMENT

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3 Claims. (Cl. 51—241)

This invention relates to cutting or grinding equipment and is more particularly concerned with a rail cross cutter, i. e., a machine incorporating a cutting wheel, such as an abrasive disk, which wheel is mounted to rotate in a plane transverse the axis of the rail.

The invention is especially concerned with novel adjustable mountings for wheels of this type.

Briefly stated, the important features of the invention are concerned with a machine incorporating a frame adapted to be fixedly positioned with respect to a rail to be cut, and mounting mechanism carrying the wheel to rotate in a plane transverse the axis of the rail, which mounting mechanism incorporates means for adjusting the position of the wheel vertically, transversely across the rail, and in a direction axially of the wheel. The last-named adjustment is of especial importance, particularly in the manner in which it is carried out in accordance with this invention. With reference to this matter, it should be noted that the rails of a trackway, especially railroad rails, are laid with expansion spaces between the ends of adjacent rails so as to provide freedom for expansion and contraction in accordance with temperature variations. Constant use of the rails, especially when the traffic is heavy, causes the metal of the rail itself adjacent the ends to be deformed or pounded in a manner to at least partially close the expansion spaces.

The equipment of the present invention is peculiarly adapted to a situation of this type and provides accurate cutting out of the deformed metal so as to restore the desired inter-rail expansion space. The machine, of course, is also suitable for cross cutting rail heads for other purposes.

How the foregoing, together with other objects and advantages, are attained will be apparent from a consideration of the following description, referring to the accompanying drawings in which—

Figure 1 is an end view, with parts in section, of a machine constructed in accordance with this invention, a portion of a rail to be cut also being shown in the figure.

Figure 2 is a vertical sectional view taken substantially as indicated by the section line 2—2 on Figure 1.

Figure 2a is a fragmentary view of a portion of the mechanism shown in Figures 1 and 2.

Figure 3 is a view similar to Figure 1 but showing a modified form of construction.

Figure 4 is a view similar to Figure 2 illustrating the machine of Figure 3 in vertical section on the line 4—4.

In all figures a portion of the rail to be cut is indicated at R. The machine of Figures 1 and 2 is adapted to rest on and be positioned by the rail R, a frame generally indicated by the letter A being provided for this purpose. This frame includes a member 5 generally of channel shape adapted to receive the rail head.

A clamping device is provided in order to secure the machine to the rail. As shown in Figure 1 this device includes a fitting 6 fastened to one of the flanges 7 of the channel for receiving the rail head. A member 8 is threaded into the fitting 6 and within these two members a plunger 9 is provided having a point 10 projecting through the flange 7 to engage a side of the rail head. The plunger may be advanced by means of the hand operated lever 10a pivoted as at 10b which actuates the cam 10c bearing on the outer end of the plunger 9. A return spring 10d may be employed to move the plunger away from the rail head upon release by the lever 10a. The threaded engagement of the members 6 and 8 provides for adjustment of the clamp mechanism so as to accommodate it to the clamping of rail heads of different widths. Preferably the clamping point 10 of the plunger 9 is positioned at one side of the channel for engaging the rail head at a point intermediate a pair of members such as bolts or the like 5a mounted in the opposing flange of the channel. This provides a three-point clamping action.

A pair of uprights 11—11 are mounted at the ends of the cross member 5b, these uprights being tied adjacent the top by a pair of cross members 12. A transverse carriage, incorporating members 13 and 14, is mounted for vertical movement with respect to the uprights 11—11 by means of end members 15—15 carrying guide flanges 16—16 which are adapted to embrace and slide vertically on the guide portions 17—17 positioned at opposite sides of a central vertical aperture 17a in each of the uprights 11. This vertically movable carriage may be adjusted by means of the adjusting lever 18 which is pivoted to the main framing as at 19 and connected with the carriage by a depending link 20. Return springs 18a serve to raise the carriage with reference to the uprights 11—11, and in operation sufficient pressure must be applied to the hand lever 18 to overcome the power of the springs.

The lower cross member 14 of the carriage constitutes a guide and support for a second

carriage comprising a lower part 21, and an upper part 22 secured to each other as by bolts 23 and providing guide spaces therebetween to receive the edges of the guide 14. The upper part 22 is formed with a cylinder 24 having its axis paralleling the guide 14. This second carriage may be moved in a direction transverse the axis of the rail by means of the feed screw 27 which cooperates with an internally threaded sleeve 28. The feed screw is journaled, as by bushing 29—29 mounted on the blocks 16a of the first carriage which project through the apertures 17a in the uprights 11—11. A hand wheel 30 may be employed to effect this adjustment.

The part 21 of the second carriage has a cylindrical aperture therein whose axis substantially parallels the axis of the rail and in this aperture a bearing support 31 is mounted for sliding movement. Relative rotation of the part 21 and the bearing support 31 is prevented by means of the key 32 secured to the part 21 and movable in the key slot 33 formed in the bearing support. The bearing support in turn serves to mount shaft 34 as by bearings 35—35 and the shaft carries the cutting wheel 36 which, as before stated, may suitably comprise an abrasive disk. At the other end of the shaft 34 a fitting 37 is arranged, this fitting being configured to cooperate with a drive mechanism such as a flexible shaft, the casing for which may be attached to the threaded connection 38 formed on the end closure 39 for the bearing support 31.

Axial movement of the bearing support and the parts carried thereby (including the wheel) may be effected and controlled by the micrometer adjustment device which includes a sleeve 40 surrounding the bearing support and externally threaded as at 41 to cooperate with the internal threads 42 formed in the cylindrical aperture of member 21. At its outer end the sleeve 40 is provided with an externally knurled ring 43 which, at its outer side, is adapted to abut against the flange 44 of the closure member 39 in order to effect movement of the bearing support in a direction to the left in Figure 2. For the purpose of effecting movement of the bearing support to the right, this support and the ring 43 are provided with inter-engaging shoulders 45 as clearly seen in Figure 2.

A wheel guard 46 may conveniently be carried on the member 21 as by bolts 47, this guard preferably being of sufficient width to accommodate a substantial axial movement of the wheel in response to the micrometer adjustment as effected by rotation of the knurled ring 43.

From the foregoing it will be seen that the machine of this invention, in addition to providing for vertical movement of the cutting wheel and lateral movement thereof across the rail, further provides a positive and accurate adjustment in a direction axially of the wheel. In operation, therefore, and assuming that the machine is to be used to restore an expansion space between adjacent rail ends, the machine is first brought to approximately the proper position with respect to the joint and then secured to the rail by means of the rail clamping mechanism. The micrometer adjustment may now be employed to accurately position the cutting wheel and it should be noted in this connection that the invention eliminates the necessity for using the rail clamp to accurately position the cutting wheel and it should be noted in this connection that the invention eliminates the neces-

sity for using the rail clamp to accurately position the machine. Inaccuracies which might arise from the act of tightening the rail clamp are thus obviated.

The mechanism is further of advantage by virtue of the fact that the micrometer adjustment is closely associated with the wheel itself. Note that this adjustment is interposed between the bearing support for the wheel and the immediately cooperating mounting structure. Thus, even though this immediately cooperating mounting structure is in turn arranged for various other adjustments, an accurate positioning of the plane of rotation of the wheel may be effected.

Attention is now called to the fact that the mechanism shown in Figures 1, 2 and 2a provides an additional movement so that the plane of rotation of the cutting wheel may be twisted angularly about an upright axis. In this way rail cuts may be made at angles other than a right angle with respect to the longitudinal axis of the rail.

With this in mind, the base structure or channel 5 is provided with a pad 79 having a circular recess therein adapted to receive the boss 80 formed on the base member 5b of the machine. As before noted, the member 5b serves to support the uprights 11 for carrying the remaining adjustable mechanism and the cutting disk. The base member 5b and the uprights 11 and therefore the machine as a whole are rotatable about a vertical axis passing through the center of the boss 80. The machine may be fixed in any adjusted position by means of bolts 83 taking into the pad 79 and projecting through arcuate grooves 84 formed at opposite sides of the boss 80 and concentric therewith. Upon loosening the bolts the base structure 5b and the machine parts carried thereby may be turned to any desired position and thereafter fixed in that position by tightening the bolts 83.

With this arrangement it will be noted that accurate feed of the cutting wheel in a direction axially thereof may be obtained, and, in combination with this movement, the wheel may be set accurately to any desired transverse angle in cutting the rail. The machine is, therefore, readily adaptable to a wide variety of different cutting conditions.

In many general respects the modification of Figures 3 and 4 resembles the arrangement of Figures 1 and 2. The modified machine incorporates a base frame 48 having means 49 adapted to engage a rail, which means, as in the first form, is equipped with a clamping mechanism comprising parts essentially similar to those described above in connection with Figure 1, i. e., a fitting 6 receiving a threaded member 8 in which a plunger 9 is mounted for actuation by means of cam 10c which may be rotated by the hand lever 10a. It will be noted that portions of this mechanism are shown in section in Figure 3 and comparison of Figures 1 and 3 will clarify the arrangement of the parts incorporated in the clamp.

The base frame carries uprights 54 serving as guides for the sleeves 55 which, in turn, carry the vertically movable carriage 56. The uprights may be braced to the base frame 48 by means of diagonal straps 57.

Vertical movement of the carriage 56 may be provided by a lever 58 pivoted at 59 to the cross-tie 60 which extends between the upper ends of the uprights 54. A link 61 again serves to inter-

connect the vertically movable carriage and the operating lever 58. Return springs 62 serve to raise the carriage unless the pressure applied to the lever 58 is sufficient to overcome the power of the springs.

The carriage 56 is provided with a cylindrical part 63 externally threaded as at 64 to cooperate with the internal threading 65 of the cup 66. This cup is attached to the shaft 67 by means of bolt 68 and rotation thereof serves to move the shaft 67 axially with respect to the cylindrical member 63. At its other end shaft 67 serves as a pivot support for the depending link 69. At its lower end the link carries a bearing support 70 in which the wheel shaft 71 is mounted for free rotation, as by bearings 72—72. As in the prior form already described, one end of shaft 71 is provided with a connection 73 adapted for ready coupling and uncoupling with respect to a flexible driving shaft or other equivalent drive mechanism. At its other end, shaft 71 serves to carry the cutting wheel 74 which may again be protected by the housing 75, in this instance secured to the depending link 69. An operating arm 76 is also attached to the link 69 and serves as the means for swinging the link back and forth transversely of the rail during operation.

In certain respects the mechanism of Figures 3 and 4 is of relatively simple construction and is of advantage for this reason. The swinging link 69 constitutes an effective means for feeding the cutting wheel transversely of the rail.

The screw threaded or micrometer adjustment element 66 here serves, as in the arrangement of Figures 1 and 2, to provide for feed of the wheel or accurate adjustment thereof in a direction paralleling the axis of the wheel. Thus, with this form of mechanism also, the machine may be clamped to the rail in the approximate position required and thereafter an adjustment made

so as to produce a cut exactly positioned at the desired point.

It may be noted that, if desired, the swivel arrangement for the machine as shown in Figures 1, 2 and 2a, providing for movement about a generally upright axis, may be employed in the arrangement of Figures 3 and 4.

I claim:

1. A rail cross cutter including a frame, means for securing the frame to the rail to be cut, a cutting wheel mounted on said frame to rotate in a plane transverse to the axis of the rail, means for adjusting the plane of rotation of the wheel about a generally upright axis, and a threaded mechanism for shifting the wheel in an axial direction with respect to the frame.

2. A rail cross cutter including a frame, means for securing the frame to the rail to be cut, a support mounted on said frame with freedom for angular adjustment with respect thereto about a generally upright axis, a cutting wheel mounted on the support to rotate in a plane generally transverse to the axis of the rail, means for raising and lowering the cutting wheel, and means providing for shifting of the wheel in an axial direction with respect to the support.

3. In a machine for working railway track rails, a clamp mechanism for securing the machine to the rail, said mechanism including opposed clamp elements one adapted to be positioned at each side of a rail, one of said elements taking the form of a plunger, a sleeve in which the plunger is mounted for axial movement, said sleeve being mounted for movement toward and away from said rail, and cam means for actuating the plunger, the cam means being arranged to react between said sleeve and the plunger to advance the plunger toward the rail.

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