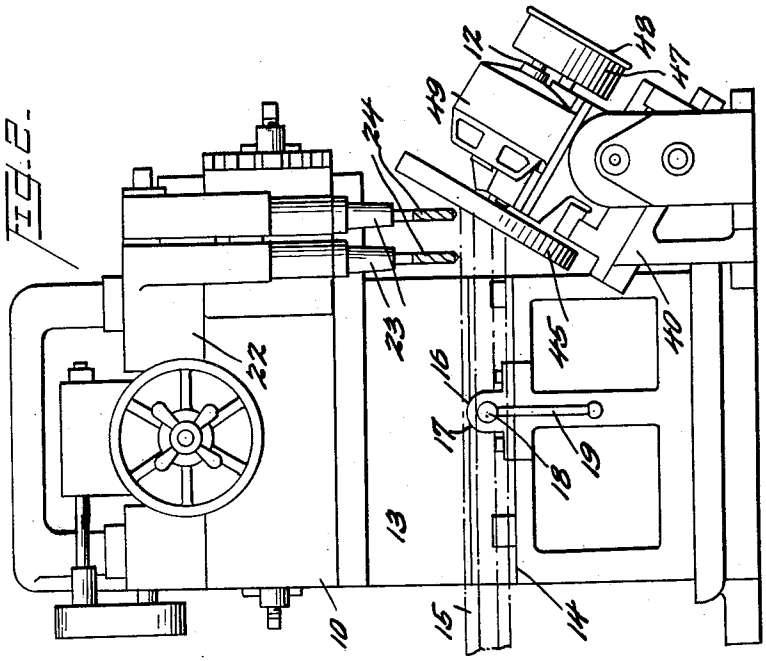
Nov. 14, 1933. J. A. McGREW 1,934,990

RAIL SAWING AND DRILLING APPARATUS

Original Filed Feb. 19, 1931 2 Sheets-Sheet 1

FIG. 2.



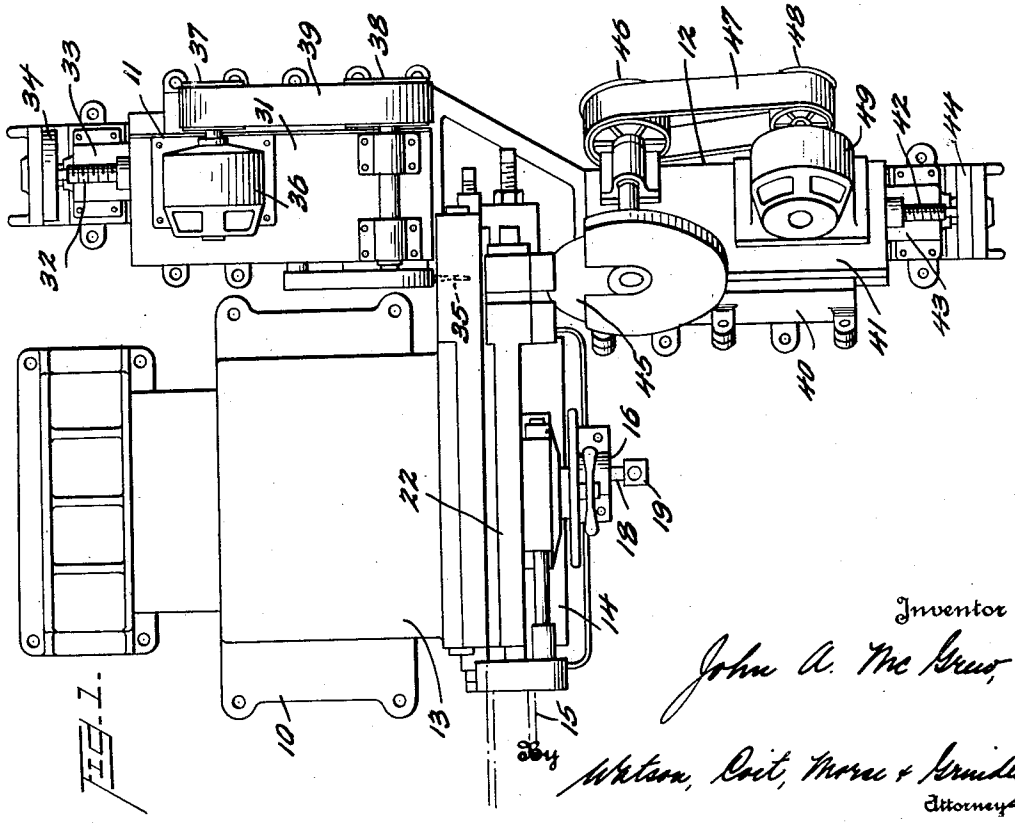


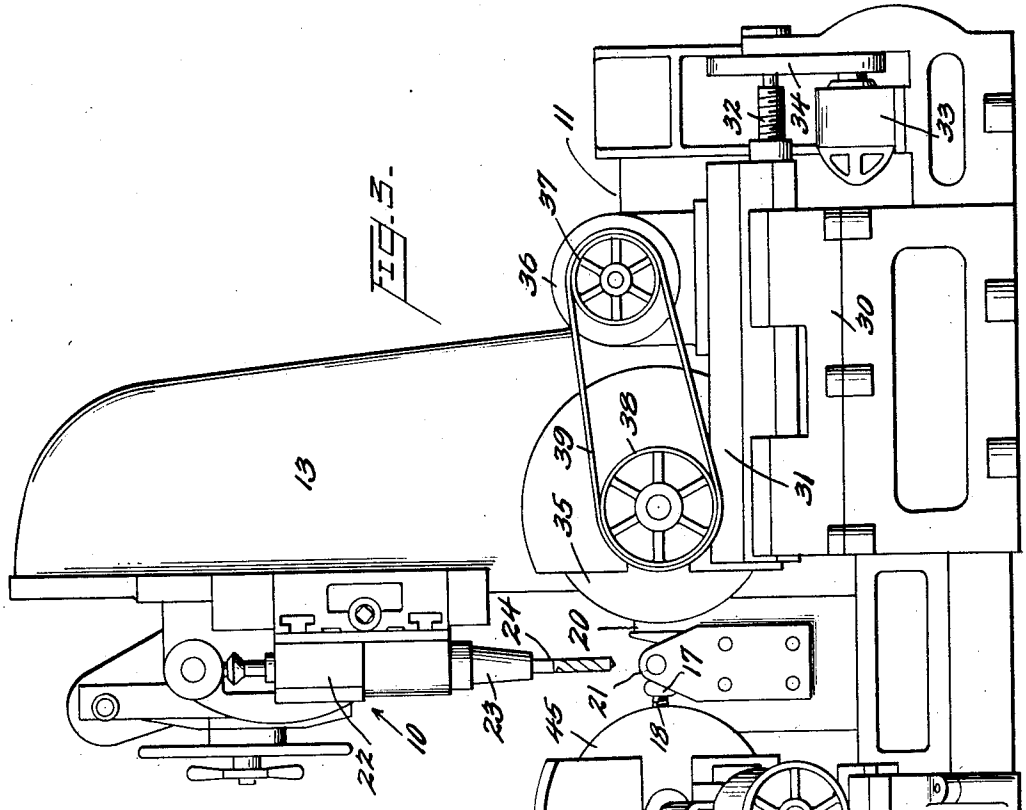
FIG. 1.

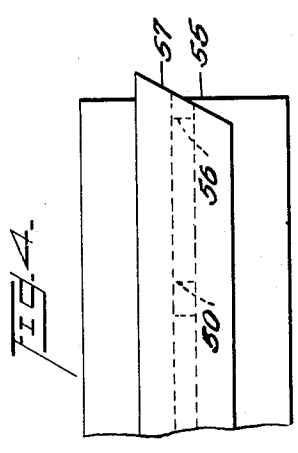
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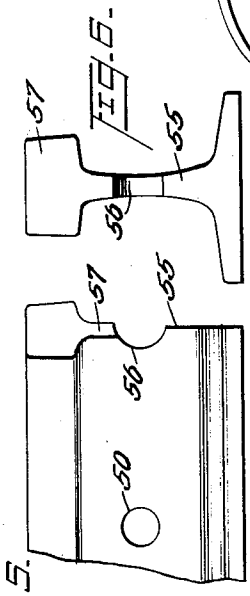
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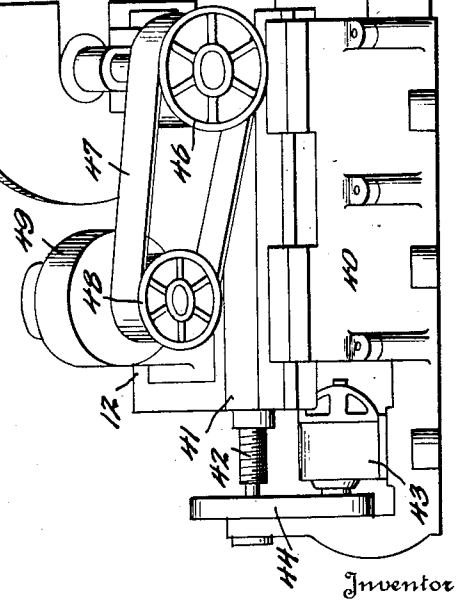
RAIL SAWING AND DRILLING APPARATUS

Original Filed Feb. 19, 1931 2 Sheets-Sheet 2









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RAIL SAWING AND DRILLING APPARATUS

John A. McGrew, Albany, N. Y.

Original application February 19, 1931, Serial No. 517,056. Divided and this application September 22, 1931. Serial No. 564,444

4 Claims. (Cl. 29—33)

The present invention relates to machines for cutting and drilling rails.

In my application Serial No. 517,056, filed February 19, 1931, of which the present application is a division, is disclosed and claimed a novel method of severing rails and shaping the ends thereof. The present invention relates particularly to a machine for carrying out practically, quickly, and economically the method set forth in the patent application referred to.

It has heretofore been proposed that the ends of railroad rails may advantageously be cut or shaped in such manner that the parallel, mutually facing surfaces of the abutting ends of such rails, after they are assembled in a track structure, extend diagonally relatively to the rail axes rather than transversely thereto, that is, so that the parallel upper edges of the tread surfaces of abutting rail ends are oblique to the direction of travel of the wheels rather than transverse, as is customary. By virtue of such a construction, the wheels of cars passing along the track are prevented from pounding upon the rail ends as they pass over the joints, thus promoting noiselessness of travel and prolonging the life of the road bed. It has been found in actual practice that by severing the heads of the rails along planes which are not normal or transverse to the rail axes, so that the abutting edges of the rail heads are not transverse to the direction of travel of the wheels over the same, the life of the rails has been considerably prolonged.

Heretofore likewise it has been suggested that it may be advantageous to so shape each rail end that the end surface of its head portion is disposed in a transverse vertical plane which makes an angle to the rail axis while the end surface of the base portion is disposed in a vertical plane transverse to this axis, the result being that pressure of one rail against the end of an adjacent rail, which may develop from any cause, does not result in lateral displacement of the rail ends, this longitudinally exerted force or pressure being transmitted from one rail to the other across surfaces which are normal to the direction of the line of pressure, all tendency of the rails to wedge out or laterally displace themselves being thereby obviated.

Notwithstanding that the advantages of a track structure built up of rails having their ends formed in this manner have been repeatedly suggested, such track structures have not come into usage. This has been largely because of the difficulties met with in devising a means for advantageously and at small cost cutting the rail ends in the desired manner.

In accordance with the present invention, an apparatus is provided by means of which a rail end may be quickly shaped in the manner indicated above and at only slight expense additional to that now met with in merely severing the rail ends along a transverse plane at right angles to the axis.

Inasmuch as the head of the rail is to be severed along a plane which makes an angle with the plane along which the base of the rail is severed, I preferably provide two saws, disposed in planes which make an angle to each other, and also furnish mechanism for causing these saws to simultaneously approach the rails in opposite directions, one approaching the head of the rail and the other the base of the rail. I also provide means which, as a preliminary step, removes a portion of the web of the rail, preferably toward the center or neutral axis thereof, and the opposed saws are caused to advance from the sides of the rail until their cutting edges enter this central aperture, thus completely severing one portion of the rail from another. The means for removing a portion of the center of the rail web may vary, but I have found it particularly desirable to employ a drill for performing this function inasmuch as the drill in its operation may form a cylindrical aperture in the rail web of considerable size, yet quite quickly and at small expense.

The apparatus suggested above and hereinafter particularly described may be considerably varied to suit rails of different shapes and characteristics, and it will be understood that that form of the invention which is illustrated in the accompanying drawings is set forth by way of example only.

In the drawings:

Figure 1 is a plan view of a rail sawing and drilling apparatus embodying the features of the invention;

Figure 2 is a side elevation of the same;

Figure 3 is a front elevation; and

Figures 4, 5, and 6, respectively, illustrate, in plan, side elevation and end elevation portions of a railroad rail, the end of which has been shaped in the manner suggested.

The rail cutting machine comprises essentially three major portions, one portion generally indicated at 10 by means of which, as a preliminary step, some portion of the web of the rail is removed (and additional apertures formed in the rail web if desired), a sawing mechanism gener-

ally indicated at 11 and by means of which the base portion of the rail is severed, and also the adjacent web portion up to the aperture already formed, along a line transverse to the rail axis, and a second sawing mechanism generally indicated at 12 designed and constructed to sever the head of the rail and that portion of the web between the head and the preformed aperture, along a plane oblique to the rail axis. These three mechanisms may be intimately associated insofar as mounting and energization are concerned, or I may, as I suggest in the accompanying drawings, form them separately, actuate them from separate power sources, and control them separately.

In the drawings the frame of a drill press of the vertical type is indicated at 13, and this frame is provided with a horizontal table or work rest 14 upon which a rail may be laid, as indicated at 15. The rail is placed on its side with its end positioned intermediate the two sawing devices and is clamped in this position by means of a clamp indicated generally at 16. This clamp rigidly confines the rail in the position shown and comprises a threaded member 18 which may be advanced or retracted by rotation of a hand lever 19. A stationary rail base engaging abutment is indicated at 20, and a stop to enable the operator to accurately position the rail longitudinally of the machine is indicated at 21.

Mounted upon the frame 13 of the drill press is a slide 22 carrying spindles 23, and in each of these spindles, which are disposed in parallel relationship, is mounted a drill bit 24. The slide 22 may be raised or lowered under the close control of an operator by any suitable means well-known in the art, and the spindles 23 may be driven from any suitable source of power, the details of the drill press, insofar as its actual construction and mode of operation are concerned, being susceptible of wide variation without departure from the invention. When a rail is positioned as shown in the drawings, and the slide 22 is lowered with the spindles rotating, the drill bits 24 form two cylindrical apertures in the rail web at approximately the neutral axis of the rail.

The saw mechanism 11 comprises essentially a stationary base 30 which comprises a rest or guide for the sliding saw carriage 31. This carriage is caused to move on its guide, toward or away from the rail as desired, by rotating a feed screw 32 which is driven by an electric motor 33 to which it is connected by means of gearing housed within guard 34. Motor 33 is reversible so that the slide 31 may be power-operated in either direction. Mounted on the slide 31, so as to be rotatable about a horizontal axis parallel to the axis of the rail, is a circular saw 35. This saw is driven at high speed by an electric motor 36, the motor shaft being connected to a pulley 37 and the saw shaft having a pulley 38 secured thereon and a belt 39 operatively connecting the two pulleys. By a suitable control mechanism, not shown, the saw 35 may be caused to rotate at the desired speed.

The saw mechanism 12 comprises essentially a base 40 which comprises a support or rest for a slide 41 which is generally similar to slide 31 of the companion sawing mechanism but which is disposed at an angle to the horizontal. This slide can be advanced toward the rail or retracted by means of a feed screw 42 driven from a reversible electric motor 43 by means of gearing housed within a guard or casing 44. Mounted upon the upper surface of the inclined slide is a circular saw 45, the axis of which is substantially parallel to the inclined upper surface of the slide, that is, so as not to be parallel to the axis of the rail, as may be clearly observed from Figures 1 and 2 of the drawings. Upon the end of the saw shaft is mounted a pulley 46 which is connected, by means of a belt 47, with a pulley 48 mounted on or connected to the shaft of an electric motor 49. Saw 45 may, therefore, be revolved at the desired speed by the motor.

In carrying out the improved method, a rail is first placed in the machine so as to occupy the position in which it is shown in the drawings. The slide 22 of the drill press is then lowered and two cylindrical apertures formed in the rail web. One of these apertures, indicated at 50 in Figure 4, is located at a point rather remote from the rail end and is designed and intended to receive the shank of a bolt when the rail is placed in a track structure. The second aperture, which is closely adjacent the rail end, lies directly between the saws 35 and 45; that is, it is intersected by a horizontal line lying in the plane of both saws.

Either during the time that the drilling operation is being performed or immediately thereafter, the two slides 31 and 41 are caused to move toward the rail lying between them and the saws caused to sever the base and head of the rail, respectively, advancement of both saws continuing until they have reached the cylindrical aperture intermediate them, which has previously been formed in the rail web. At this point the motions of the saws are halted so that they do not come in contact with each other. The drilling operation requires less time to complete than does the sawing, and it is therefore possible to initiate the movements of the drills and saws simultaneously without danger of the saws striking the drill. A small portion of the end of the rail is thus severed from the main portion, and the rail end presents two different end faces oblique to each other, a lower face indicated at 55 extending from the bottom of the rail up to a semi-circular aperture 56 and a second face 57 extending from the rail tread down to this aperture 56, the surface 55 being exactly transverse to the rail axis and the surface 57 being vertical but inclined to the rail axis. In this condition the rail is finished and ready for assembly in a track structure, provided, of course, that its opposite end has been similarly shaped.

The operation is very quickly performed, and the expense involved is only slightly greater than that involved in making a simple transverse cut as is now commonly practiced. As a result of the use of rails having their ends cut as shown in Figures 4 and 5, however, the riding qualities of the resulting track structure are greatly improved, and furthermore the length of life of the track structure is greatly increased, the rail ends not being subjected to the pounding of the wheels as they pass over the joints, which in most cases has been the most active destructive agency tending to destroy the rails.

The details of construction of the drill press and sawing mechanisms may be varied to suit operating conditions.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:—

1. Apparatus for cutting and shaping rail ends comprising means for holding a rail, means for forming an aperture in the rail web, a saw for cutting the rail head and web up to and intersecting said aperture, in a plane oblique to the rail axis, and a saw for cutting the rail base and

web up to and intersecting said aperture, in a plane normal to the axis of the rail.

2. Apparatus for cutting and shaping rail ends comprising means for holding a rail, means for drilling a cylindrical hole transversely through the web of the rail, a saw for cutting the rail head and web up to and intersecting said hole, in a plane oblique to the rail axis, and a saw for cutting the rail base and web up to and intersecting said hole, in a plane normal to the axis of the rail.

3. Apparatus for cutting and shaping rail ends comprising, in combination, means for holding a rail, two saws positioned respectively on opposite sides of the rail and movable toward the rail, one saw being disposed at an angle to the other, and means for forming an aperture in the rail web, which aperture lies in the path of movement of both saws.

4. Apparatus for cutting and shaping rail ends comprising means for holding a rail, means for simultaneously drilling two cylindrical apertures in the rail web, said apertures being spaced from each other longitudinally of the rail, a saw disposed to cut the rail head and web up to and intersecting one of said apertures, in a plane oblique to the rail axis, a saw for cutting the rail base and web up to and intersecting this same aperture, and means for advancing and retracting said saws.

JOHN A. McGREW.