Jan. 14, 1964 H. G. MILLER 3,117,530

RAIL ANCHOR APPLICATOR

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Fig. 1.

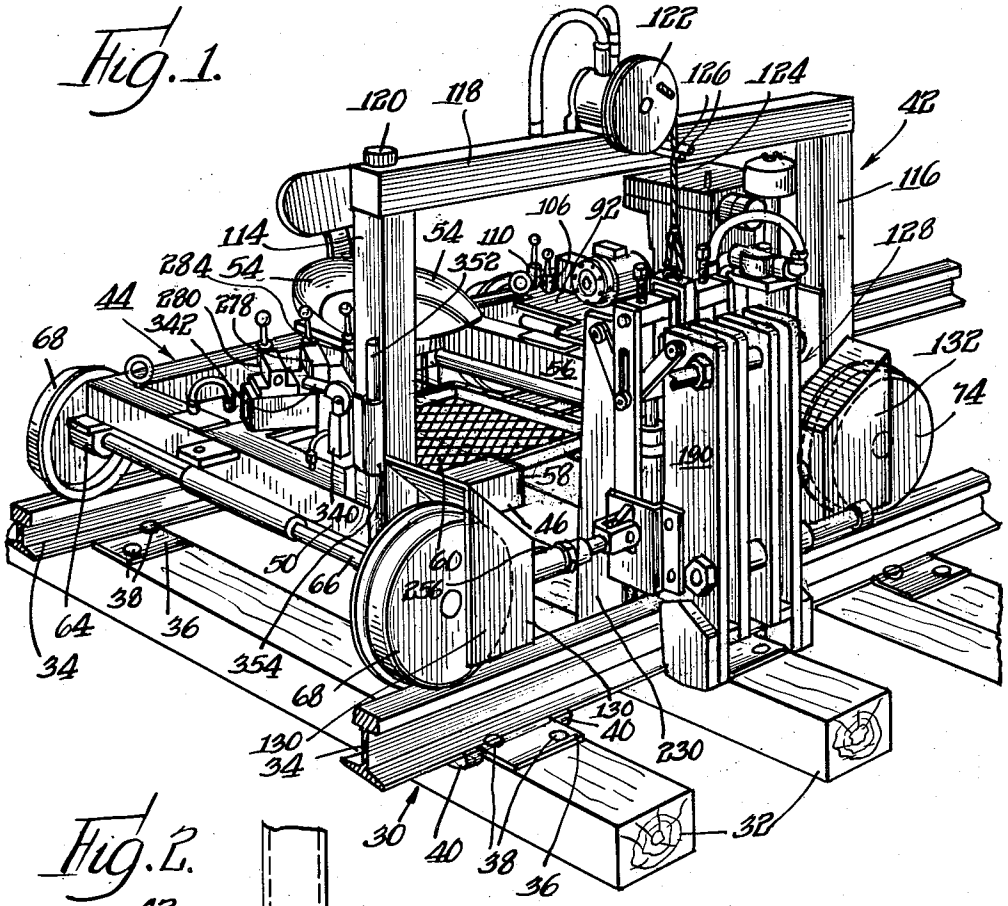
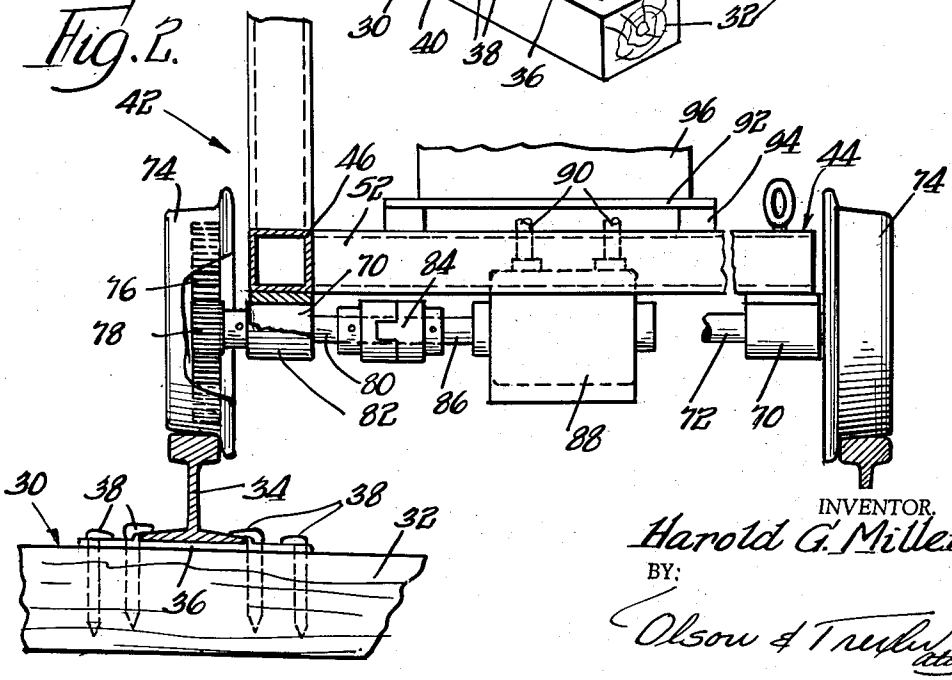


Fig. 2.



INVENTOR.
Harold G. Miller
BY:
Olson & Trueblood
Attys.

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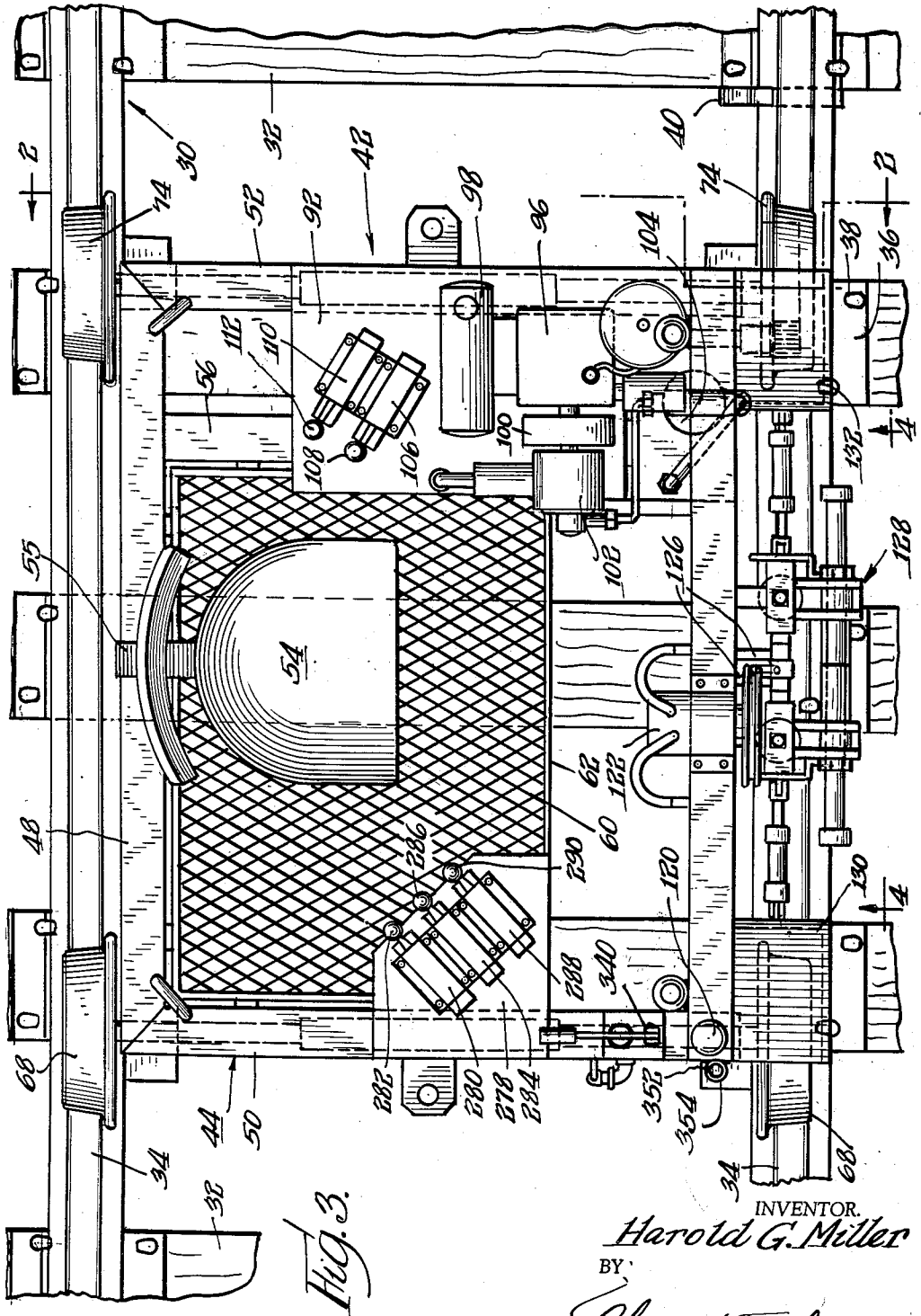


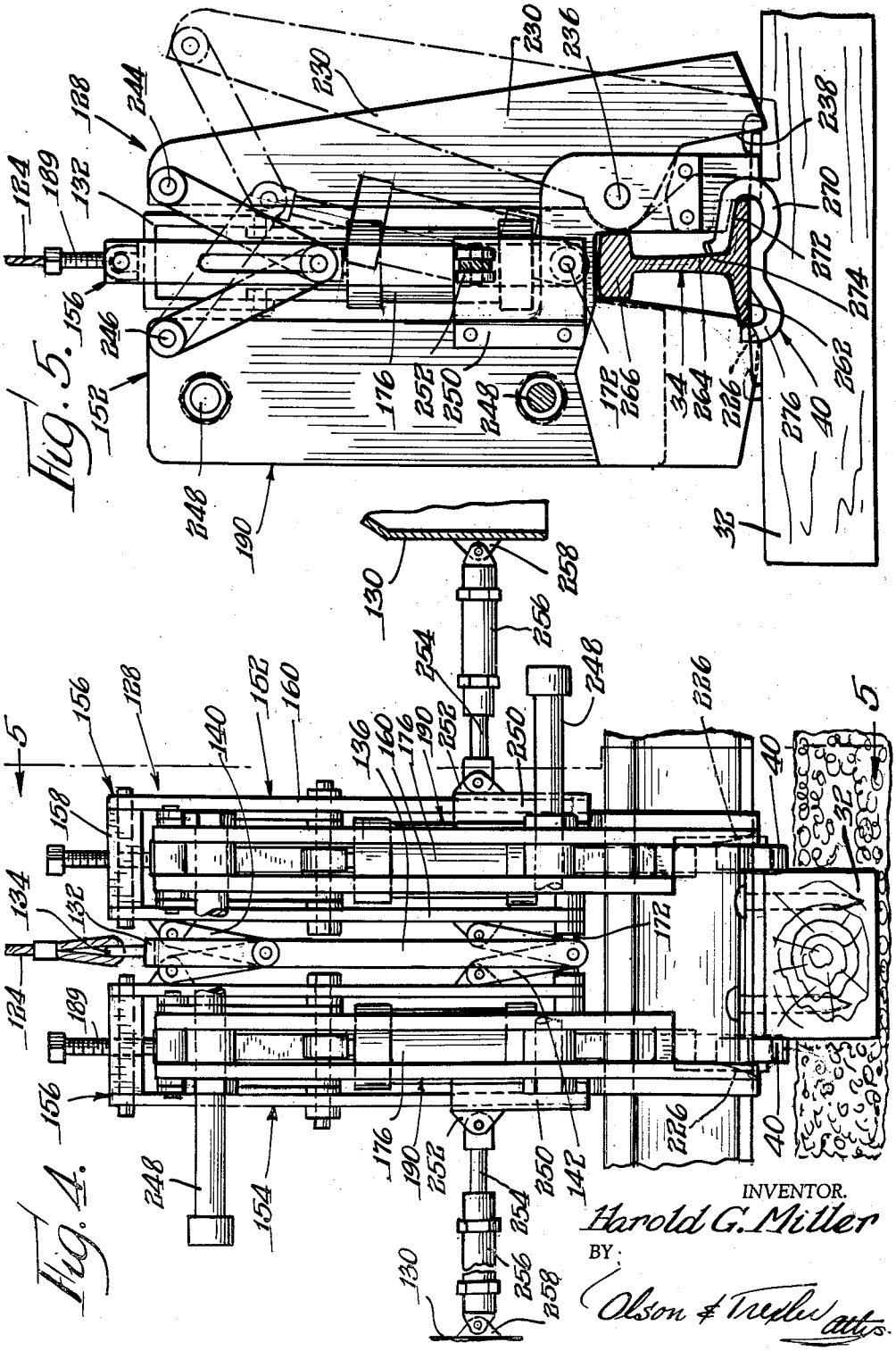
Fig. 3.

INVENTOR.
Harold G. Miller
BY
Olson & Trexler attys.

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Fig. 6.

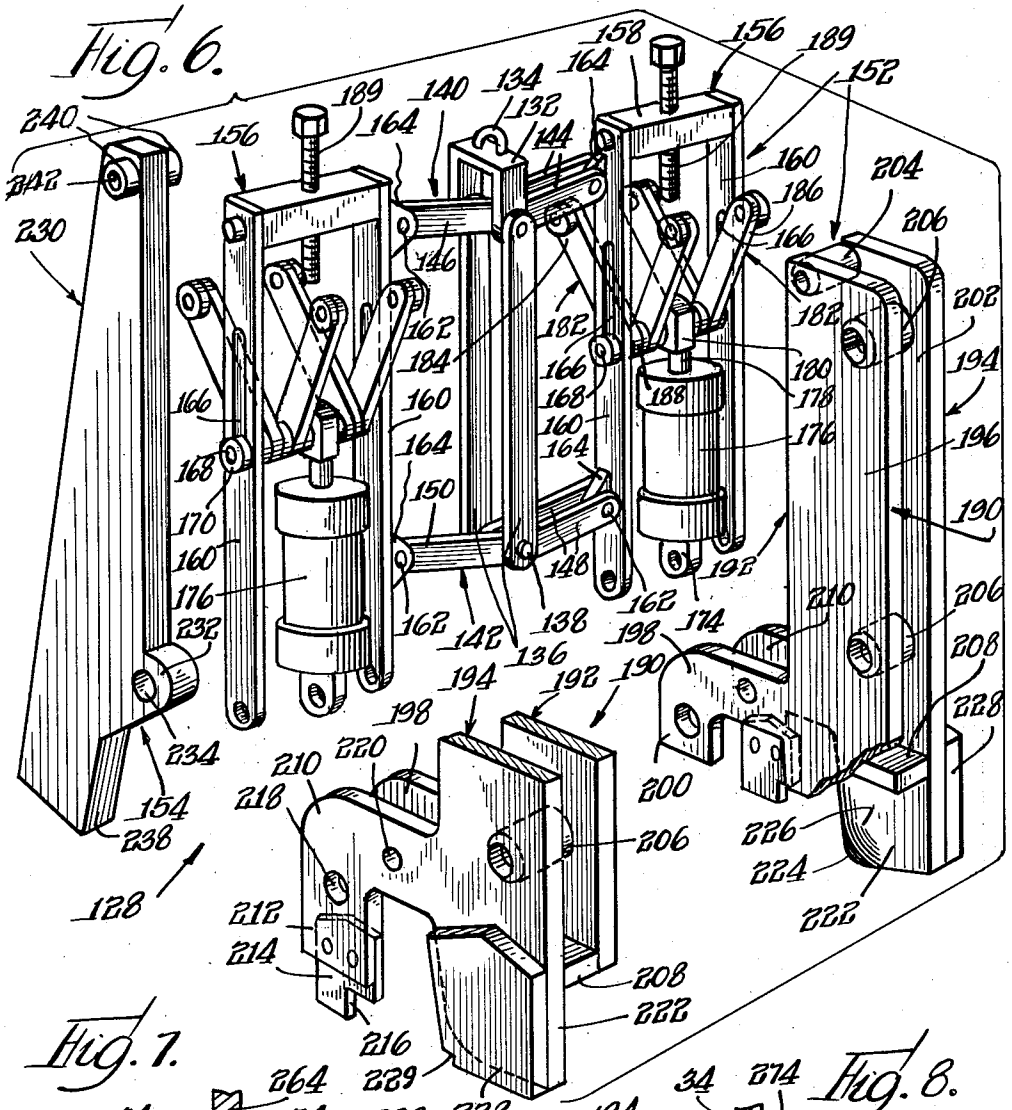


Fig. 7.

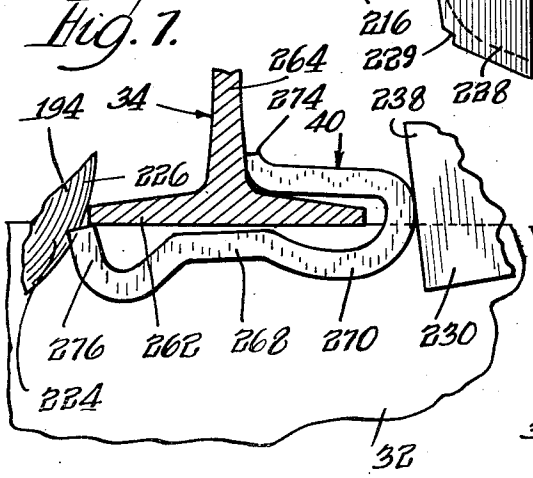
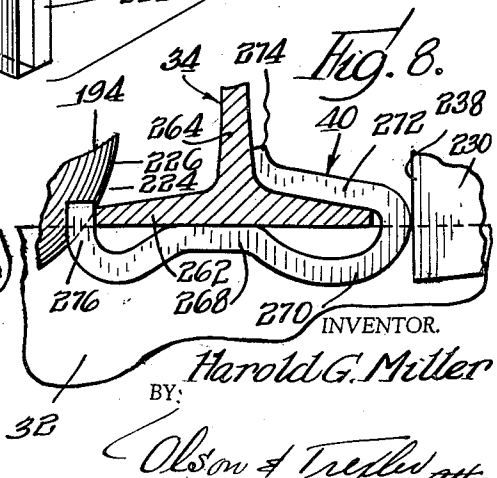


Fig. 8.



INVENTOR.
Harold G. Miller
BY:
Olson & Trexler attys.

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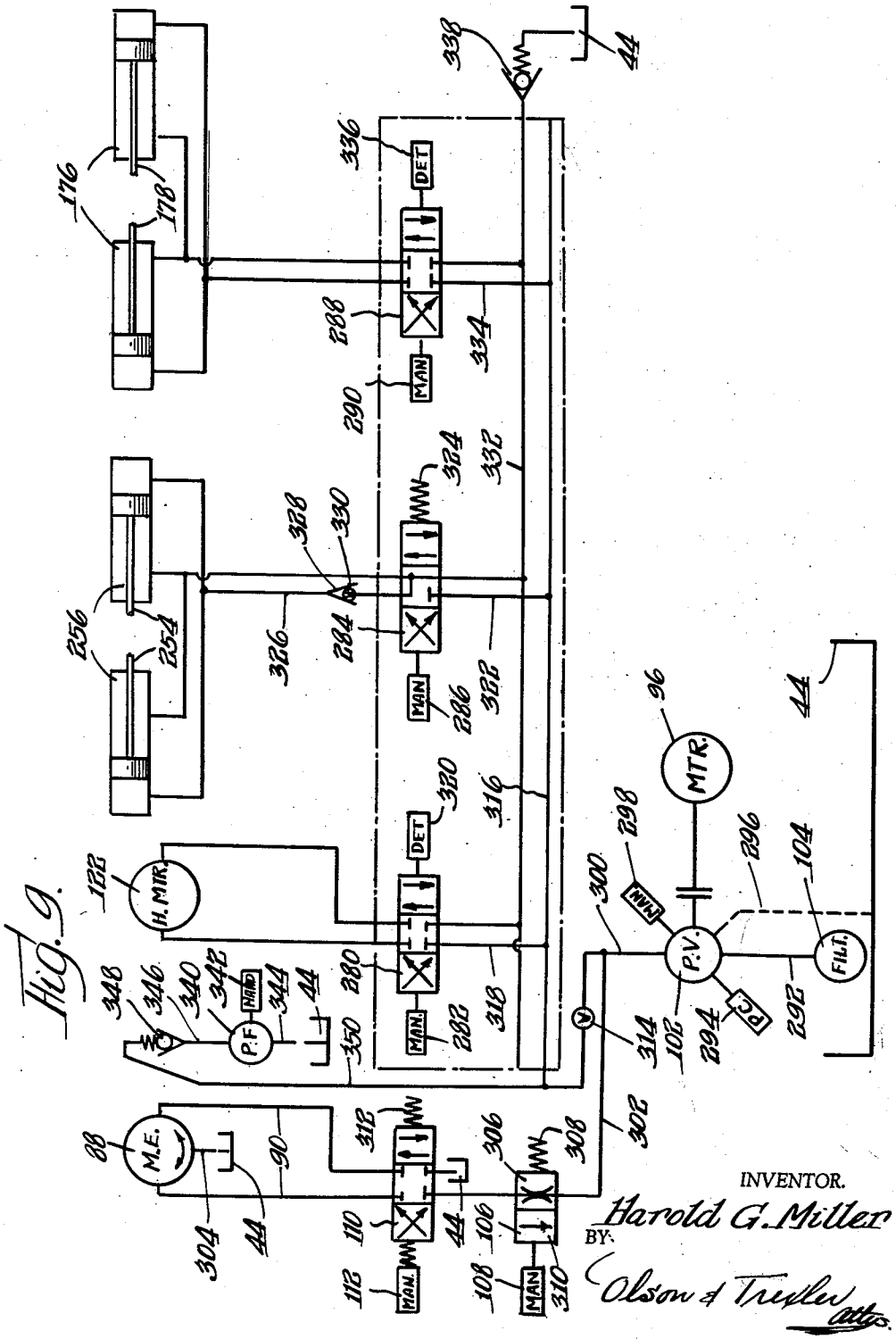


FIG. 9.

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Fig. 10.

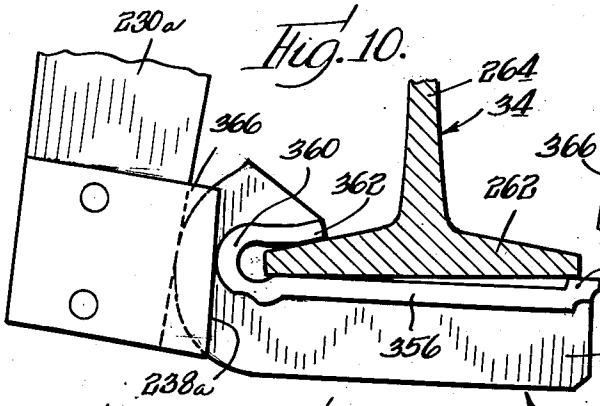


Fig. 11.

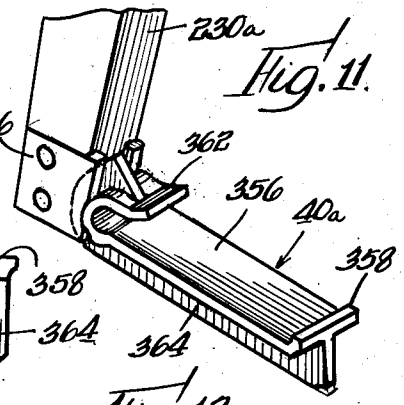


Fig. 12.

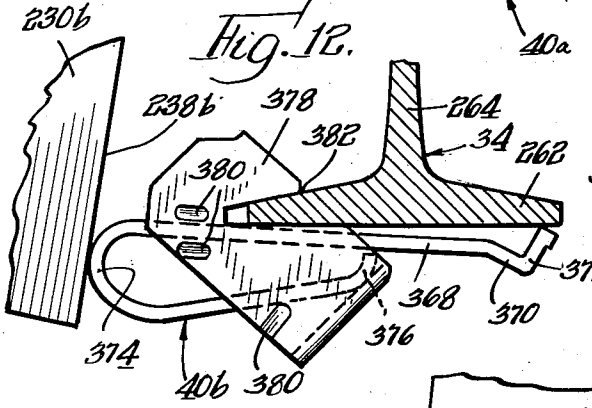


Fig. 13.

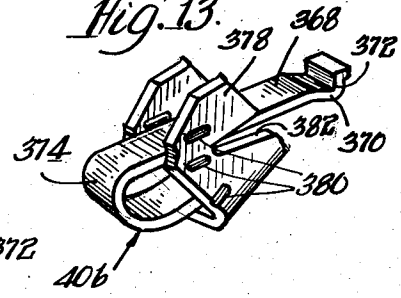


Fig. 14.

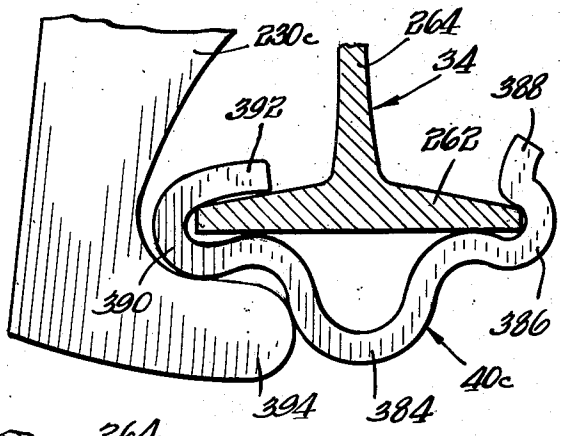
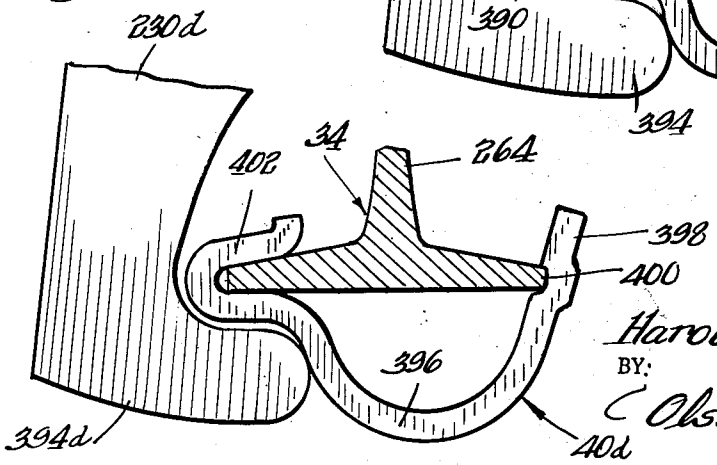


Fig. 15.

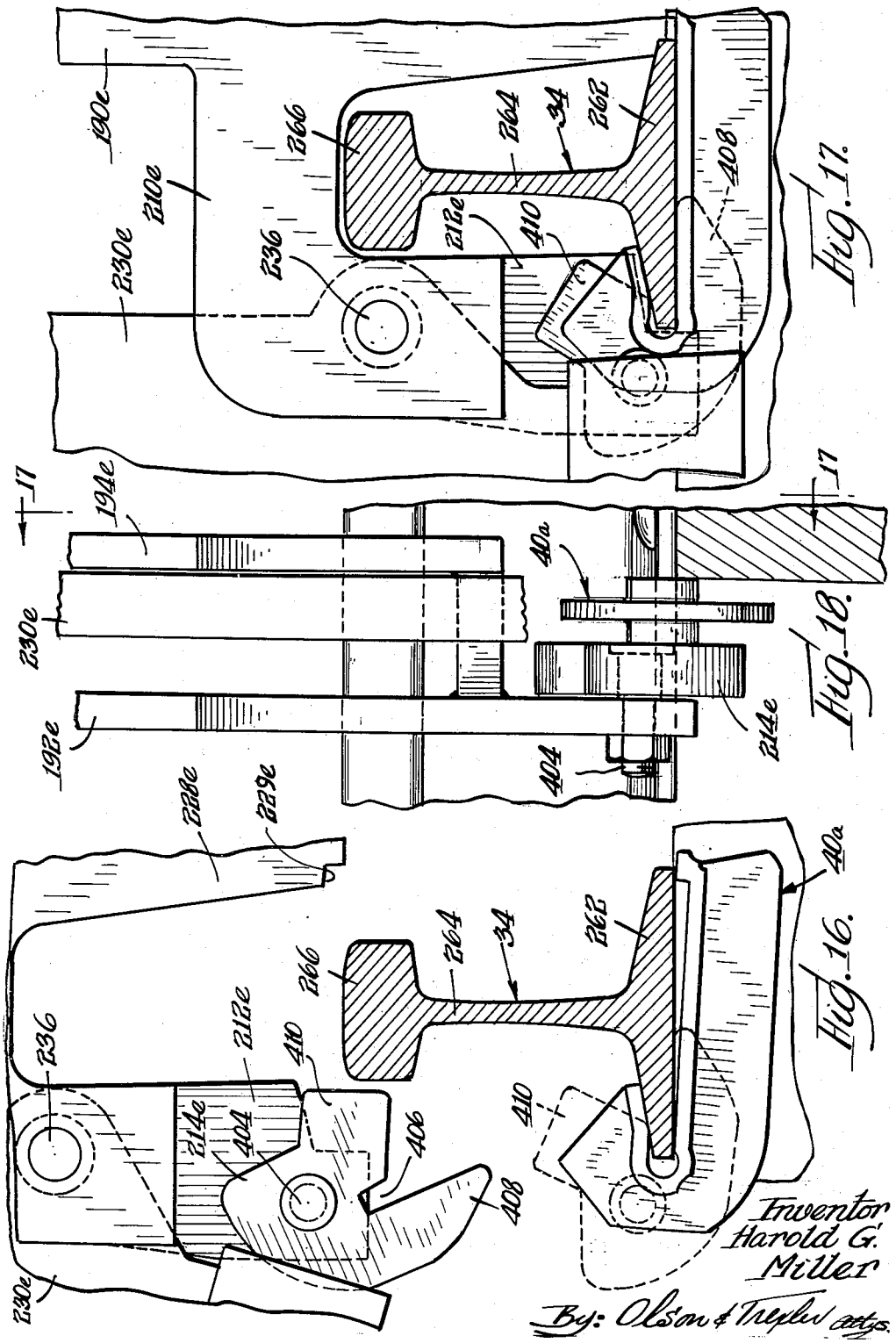


INVENTOR.
Harold G. Miller
BY:
Olson & Trexler
attys.

Jan. 14, 1964 H. G. MILLER 3,117,530

RAIL ANCHOR APPLICATOR

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United States Patent Office 3,117,530 Patented Jan. 14, 1964

3,117,530

RAIL ANCHOR APPLICATOR

Harold G. Miller, Racine, Wis., assignor to Racine Hydraulics & Machinery, Inc., a corporation of Wisconsin

Filed Aug. 4, 1958, Ser. No. 752,856
20 Claims. (Cl. 104—2)

This invention relates generally to the railway arts, and more particularly to a machine for securing rail anchors to rails.

As is well known, railroad rails are secured to ties, generally of wood, by plates and spikes. However, longitudinal forces on the rails, such as upon acceleration or deceleration of trains, or upon thermal expansion and contraction, cannot be successfully resisted simply by the spikes and plates. Accordingly, devices known as rail anchors are applied to the undersides of the rail flanges at longitudinally spaced positions. The rail anchors heretofore have generally been applied by hand, and closely abut adjacent ties to anchor the rails against creeping. Hand application of such rail anchors is a tedious and uncertain process, since the rail anchors must be driven into place by a sledge hammer, and often slip while being so driven. Furthermore, there is a certain element of danger in so mounting the rail anchors, since a sledge hammer blow that is not aimed precisely right may send the rail anchor or some other part flying into the air.

Accordingly, it is an object of this invention to provide a machine for applying rail anchors to the rails.

In addition, it is an object of this invention to provide a machine for applying rail anchors which applies them with a squeezing action, thereby avoiding the disadvantages of impact application.

It is yet another object of this invention to provide a machine for applying rail anchors to rails which positively abuts the rail anchors against adjacent ties and holds the anchors in position while they are applied to the rails.

Another object of this invention is to provide a machine for applying rail anchors to rails which exerts substantially no transverse force on the rails during such application, thereby avoiding loosening of the rails as held by the spikes and plates.

Yet another object of this invention is to provide a machine for applying rail anchors to rails which machine is mounted for movement along the rails under power, and which remains on the rails while applying the anchors.

Other and further objects and advantages of the present invention will be apparent from the following description when taken in connection with the accompanying drawings wherein:

FIG. 1 is a perspective view of a machine constructed in accordance with the principles of this invention;

FIG. 2 is a fragmentary end view thereof with certain parts broken away for clarity of illustration as taken along the line 2—2 in FIG. 3;

FIG. 3 is a top view of the machine;

FIG. 4 is a detail view of a portion of the machine as taken along the line 4—4 in FIG. 3;

FIG. 5 is a vertical view partially in section as taken along the line 5—5 in FIG. 4;

FIG. 6 is an exploded perspective view of the mechanism of FIGS. 4 and 5;

FIG. 7 is a cross-sectional view through a rail showing the application of one form of rail anchor thereto;

FIG. 8 is a view similar to FIG. 7 after completion of the application of the rail anchor;

FIG. 9 is a schematic hydraulic diagram of the machine;

FIG. 10 is a view generally similar to FIG. 7 showing the application of a different type of rail anchor;

FIG. 11 is a perspective view showing application of the rail anchor of FIG. 10;

FIG. 12 is a cross-sectional view similar to FIGS. 7 and 12 showing the application of another type of anchor;

FIG. 13 is a perspective view of the anchor of FIG. 12;

FIG. 14 is a cross-sectional view showing yet another type of anchor, as applied;

FIG. 15 is a similar cross-sectional view of yet another type of anchor, as applied;

FIG. 16 is a detail sectional view showing the first step in the application of yet another form of rail anchor;

FIG. 17 is a view similar to FIG. 16 with the anchor applied, as taken along line 17—17 in FIG. 18; and

FIG. 18 is an end view of the portion of the mechanism shown in FIGS. 16 and 17, certain parts being broken away for clarity of illustration.

Referring now in greater particularity to the drawings, and first to FIGS. 1 and 3, there will be seen the usual railway track 30 comprising a plurality of transversely disposed ties 32. In accordance with American railway practice, the ties 32 are conventionally made of wood, and are mounted in a ballast of rock or the like, the ballast being omitted for clarity of illustration. A pair of spaced apart, parallel rails 34 is secured on the ties by means of the usual plates 36 and spikes 38. A rail anchor 40 will be seen in FIGS. 1 and 3, and a machine 42 for applying such anchors is shown as mounted on the rails 34.

In order to avoid possible confusion in discussing the relative positions of different parts, the directions of the machine will be considered relative to the direction in which the operator faces. Thus, the machine 42 comprises a frame 44 of generally rectangular outline having a front frame member 46, a rear frame member 48, a right side member 50, and a left side member 52. An operator's seat 54 is spring supported from the back frame member 44 as at 55, and faces toward the front of the machine, as heretofore indicated. The frame additionally includes an intermediate frame member 56 parallel to the side frame members 50 and 54. The front frame member 46 is interrupted from the intermediate frame member 56 to a position indicated at 58 in order to provide clearance for parts hereinafter to be set forth.

A wire mesh or screen 60 provided with a frame 62 is supported beneath the frame 44 to provide a floor for the operator which will provide support for the operator's feet and protect him from below, while yet not accumulating any substantial amount of dirt or debris.

Bearings 64 are secured beneath the right frame member 50 and journal an axle 66 carrying railroad wheels 68 at its opposite ends and disposed outside of the frame 44. These wheels are received on the rails 34 of the track 30. Similar bearings 70 are provided beneath the left frame member 52 and journal an axle 72 carrying left side wheels 74, which also are received on the rails 34 of the track 30. The left front wheel 74 is provided with an internal ring gear 76, and a pinion 78 meshes therewith. The pinion is fixed on a shaft 80 journaled in a drive bearing 82. The shaft 80 is coupled at 84 to the output shaft 86 of a fluid motor 88 supported beneath the frame and provided with hydraulic conduits 94 admitting and exhausting hydraulic fluid under pressure, as hereinafter will be set forth. As will be appreciated, the fluid motor acts through the pinion 78 and ring gear 76 to drive the left front wheel, and hence to drive the machine 42 along the track.

A plate 92 is supported on spacers 94 above the side frame member 52 and the intermediate frame member 56. A gasoline engine 96 is supported on this plate,

and is provided with a fuel tank 98. The engine acts through a suitable coupling 100 to drive a hydraulic pump 102. The interior of the frame 44, which is made of box sections, serves as a reservoir. Fluid passes from this reservoir through a filter 104 to the pump 102, and from this pump through various hydraulic pipes and lines discussed in connection with the diagram of FIG. 9 to the points of utilization, including the fluid motor 88.

A valve 106 having a manually engageable handle 108 thereon is mounted on the plate 92, and is arranged for passing hydraulic fluid to the motor 88, or for blocking hydraulic fluid therefrom whereby to control movement of the machine 42. An adjacent valve 110, having a manually operable handle 112, determines which of the conduits 90 conveys hydraulic fluid under pressure to the motor 88, and which serves to discharge fluid therefrom. Hence, the valve 110 determines the direction of movement of the machine.

The frame of the machine further includes an upstanding front portion comprising an upright 114 at the right front corner of the machine, an upright 116 at the left front corner, and a cross member 118 parallel to the front frame member 46 and spaced thereabove. A cap 120 is placed on a filler tube leading down into the right front upright 114 for introducing hydraulic fluid into the interior of the frame 44.

A hydraulic winch 122 is mounted on top of the front horizontal frame member 118 more or less centrally thereof. A wire cable or rope 124 on the hydraulic winch 122 is guided between a pair of guides 126 disposed substantially centrally of the upper cross member 118. This wire cable supports an applicator mechanism 128 hereinafter to be described in detail.

Shrouds or fenders 130 and 132 respectively partially cover the front wheels 68 and 74. The shrouds or fenders 130 and 132 open outwardly away from one another, and away from the center of the machine. As will be understood, since the active hydraulic portions of the machine are disposed more or less in the vicinity of the front rail 34, it is possible that a certain amount of hydraulic fluid under some circumstances might be deposited on this rail and picked up by the front wheels 68 and 74. The shrouds prevent such hydraulic fluid from being thrown up onto the machine. In addition, the shrouds or fenders serve as bases or fixed reaction members for hydraulic actuators on the applicator mechanism 128, as will be set forth shortly hereinafter.

The applicator device 128, as best may be seen in FIGS. 4–6, comprises a clevis 132 supported from the wire rope or cable 124 by a U-bolt 134. The clevis has pivoted thereto a pair of depending connecting links 136 which are secured at their bottom ends by a pin 138. A pair of toggles 140 and 142 is respectively pivoted on the clevis 132 and on the pin 138. The links 136 are in parallel spaced relation, being displaced axially of the pin 138 and clevis 132, and lying on opposite sides of the toggles 140 and 142. The toggle 140 comprises a pair of arms 144 extending to the left of the machine and pivoted on the clevis 132, and a single arm 146 pivoted on the clevis between the arms 144 and extending in the opposite direction therefrom. The lower toggle 142 is of similar construction, comprising a pair of arms 148 and a single arm 150.

The toggles 140 and 142 support a pair of nippers or clamp structures 152 and 154. The two nippers are of substantially identical construction, and hence the same numerals are used for duplicated parts. Each of the nippers 152, 154 includes a substantially inverted U-shaped frame 156 comprising a horizontal bight 158 and a pair of legs 160 depending therefrom. The frames 156 are arranged in a common plane parallel to the upstanding frame at the front of the machine. The frames 156 are spaced on opposite sides of the toggles 146 and 150, and are secured to the toggles by means of pins 162 passed through the toggle arms and through ears 164 on the adjacent frame legs 160. The legs 160 are provided with vertically elongated slots 166, and the two slots of each frame 156 slidably receive a pin 168. As will be apparent, the pair of slots 166 for each frame is aligned, and the pin 168 is horizontally disposed. Suitable enlarged fastening means or retainers 170 are provided on the ends of the pins 168 to prevent longitudinal shifting of the pins.

The lower extremities of the legs 160 are provided with apertures, and pins 172 are passed through the aligned apertures of each pair of legs, and through an aperture in an ear 174 at the bottom of a hydraulic piston arrangement 176 disposed between each pair of legs 160. The hydraulic piston arrangement is provided with a connecting rod 178 which is secured by means of a suitable fitting 180 to the pin 168, whereby the hydraulic piston arrangement 176 may raise and lower the pin 168 in each case. A pair of toggles 182 each comprising a rear arm 184 and a front arm 186 is pivotally mounted on each pin 168 and disposed on opposite sides of the connected rod fitting 180 and between the legs 160. Suitable spacers are provided as at 188 for spacing the connecting rod fitting and the toggles on each of the pins 168. An upstop 189 in the form of a threaded bolt is threaded through each of the horizontal members 158 and projects down between the pairs of legs 160 for engagement by the upper end of the respective connecting rod fitting 180 to limit upward movement thereof.

Each of the nippers 152 further includes a back up member or assembly 190. The back up member in each case comprises a pair of heavy steel plates, namely an inner plate 192 and an outer plate 194. Each inner plate 192 has a body 196 of vertically elongated, generally rectangular configuration and having a transverse arm 198 projecting rearwardly toward the machine frame in the bottom of the body 196. The arm 198 is provided with an integral depending ear 200. Each outer plate 194 is generally similar in configuration, having a vertically elongated body 202 spaced from the inner plate by a tubular spacer 204 adjacent the upper corner of the back up member, and by a pair of vertically spaced tubular spacers 206 of greater diameter positioned along the outer or front edge of the back up member. The plates are provided with aligned apertures communicating with the spacers. In addition, the pipes are spaced apart by transverse plates 208 along the lower edges of the inner plate bodies 196. As will be understood, all of the spacers preferably are welded in place.

Each outer plate 194 further is provided with a rearwardly extending arm 210 in alignment with the corresponding inner plate arm 198. Each arm 210 has at its outer end a depending ear 212 of greater height than the corresponding ear 200 of the inner plate. The ear 212 carries on its inner face a positioning plate 214 having a notch, cut out or internal shoulder 216 at its lower rear corner. The ears 200 and 212 are provided with relatively large aligned apertures 218, and the arms 188 and 210 are provided with somewhat smaller aligned apertures 220.

The outer plate 194 further has a depending body extension 222 having a rounded rear corner as indicated at 224. The rear corner 224 further is relieved into the inner face of the body extension 222 as is indicated at 226. A positioning member in the form of a small plate 228 is welded to the outer surface of the body extension 222, and provided at the rear corner thereof with a cut out, notch or internal shoulder 229.

In addition to the foregoing, each nipper includes a clamp or drive plate or arm 230. This arm is in the form of a heavy steel plate of substantially the same height as the back up member 190, and is provided with a forward extension or ear 232 having an aperture 234 therein. A pin 236 is passed through the apertures 218 of the back up member and through the aperture 234 pivotally to mount the arm 230 on the back up member. The arm

includes a driving face 238 substantially opposed to the body extension 222 and further is provided at the upper end with a pair of oppositely extending bosses 240. An aperture 242 extends through the bosses and through the arm 230. A pin 244 is passed through the upper ends of the rear toggle arms 184 and through the aperture 242 in the clamp arm 230, and a pin 246 is passed through the apertures in the upper ends of the forward toggle arms 186 and through the spacer 204 of the back up member.

The back up members 190, and hence the two nippers are held in alignment by means of rods 248 passed through the apertures extending through the plates of the back up member and through the spacers 206. The back up members are provided on the outer sides or faces thereof with brackets 250 having outwardly extending ears or lugs 252 to which are pivotally connected the connecting rods 254 of hydraulic piston devices 256. The opposite ends of the hydraulic piston devices are connected to lugs 258 on the fenders or shrouds 130.

A rail anchor 40 of conventional form is shown in FIGS. 5, 7 and 8. Specifically, this is the type of rail anchor known as the "Gautier" rail anchor. It is designed to snap onto the base or flange 262 of the rail 34, and to impinge against the web 264 of the rail. The rail head 266 is spaced substantially above the position at which the anchor is applied. More particularly, the rail anchor includes a body 268, somewhat in the form of a flattened letter W, having a flat rail body contacting center section 268, and a right arm 270 spaced downwardly therefrom and looped up over the rail body to form a retaining arm 272 terminated in a web abutting upwardly directed finger 274. The anchor also includes a left arm 276 adapted to engage the edge of the flange or body opposite to the supporting or clamping portion 272.

When the applicator device is held in raised position by the cable 124 and the hydraulic winch or hoist 122, the toggle 140 and the toggle 142 are held in substantially open position. Enlarged heads or ends on the guide rods or bars 248 prevent the toggles from opening completely.

When it is desired to apply a rail anchor 40, it is manually inserted in the position shown in FIG. 7 in close engagement with the side of a tie 32. The machine 42 then is run in the proper direction to centralize the applicator device 128 over a tie having anchors 40 on both sides thereof, as in FIG. 4. The hydraulic hoist or winch 122 then is run to lower the applicator device, which then rests on the rail. More particularly, the arms 198 and 210 of the back up member rest on top of the rail head. The cut outs or internal shoulders or notches 216 and 229 are positioned substantially on the base or body or flange of the rail, as best may be seen in FIG. 5. The two nippers at this time are spread apart from one another. Upon operation of the hydraulic piston devices 256, the nippers are forced toward one another, thereby engaging the sides of the rail anchor to force them against the sides of the tie 32 between them. More specifically, the depending positioning member 214 engages the arm 270 and clamping portion 272 of the anchor on each side.

Application of hydraulic pressure to the pistons 176 opens the associated toggles 182 forcing the arm 230 from the full line position shown in FIG. 5 to the broken line position, thus snapping the rail anchor into the installed position of FIGS. 5 and 8. The relieved face or corner 266 cams the end of the arm 276 into proper position against the tie and against the rail flange or base.

From the foregoing, it will be apparent that there is no tendency to displace a rail in any direction during the placement of a rail anchor thereon. The weight of the machine is far less than that of any railroad train and the vertical force both of the machine and of the nippers thus may be completely ignored. There are no transverse forces tending to displace a rail, since the back up members provide a reaction for the force of the applying arms. Furthermore, since the nippers do not depend any substantial distance below the rails, it is not necessary to dig out or crib the ballast in installing a rail anchor. In some instances it may be necessary to move a few stones of the ballast in order for the rail anchor to be slipped beneath the rail, but this is far simpler than the usual procedure. Furthermore, since the anchor is properly positioned by the depending extension and depending positioning plate of a back up member, there is no possibility of moving away from the tie during application. Since two anchors are simultaneously applied on opposite sides of a tie, there is complete cancellation of forces longitudinal of the rail. In addition, since the anchor is applied with a squeezing action, there is no danger of breaking of parts or of sending an anchor flying into the air, as is entirely possible with the usual impact application, as with a sledge hammer.

Reference previously has been made to the valves 106 and 110, and the accompanying handles 108, 112 for manual operation by the operator's left hand. A plate 278 is horizontally disposed on the frame 44 to the right of the operator's seat 54, and slightly forwardly thereof. This plate carries three closely spaced valves. The rightmost valve is identified by the numeral 280, and has a handle 282 thereon for controlling the operation of the hydraulic winch or hoist 122. An intermediate positioned valve 284 having a handle 286 controls sideways movement of the nippers, while the third valve 288, having a handle 290 for manual operation controls clamping of the rail anchor into position by squeezing of the nippers.

A hydraulic circuit for the machine is shown schematically in FIG. 9. Most of the parts therein have been referred to heretofore. Hydraulic fluid is picked up from the sump or reservoir in the frame 44 through the filter 104, and passes through a hydraulic line 292 to the pressure pump 102. This pump is provided with a built-in pressure relief valve 294 connected to a return line 296 to the sump. The pump further has a manual control 298 for engaging the drive from the motor 96.

The output of the pump is delivered through a pressure line 300 to a branch line 302 leading through the speed control valve 106 to the reversing valve 110, and hence through the line 90 to the motor 88. The motor 88 is provided with a drain line 304 to the sump. The valve 106 is provided with a restricted orifice portion 306 which is urged by a spring 308 into position in the line 302. The valve also includes a straight through portion 310 which is movable by means of a manually operable handle 108 into operative position.

The reversing valve 110 is urged by a spring 312 to closed position, and is manually moved to either forward or reverse position by the handle 112, thus, determining which of the lines 90 is the high pressure inlet, and which is the outlet line.

The high pressure line 300 leads through a manual shut off valve 314 to a high pressure line 316. A branch 318 from this line leads to the winch or hoist 122 through the valve 280. The hoist or winch valve 280 is reversible for raising or lowering the applicator device, and is provided with a detent mechanism 320 for holding the valve in whichever position is manually set by the handle 282.

Another branch line 322 from the pressure line 316 leads to the valve 284 for bringing the nippers toward one another longitudinally of the track. This valve is urged by a spring 324 to a position in which the nippers are not urged toward one another. The pressure line 326 from the valve 284 to the piston arrangements 256 is provided with a valve 328 having a restrictive orifice 330. Hence, hydraulic fluid can force the nippers toward one another only relatively slowly. However, when the connections are reversed by the valve 284 to allow the nippers to move apart as urged by the toggles 140, 142 the valve will be unseated to allow rapid flow of hydraulic fluid back to the drain line 332.

The pressure line 316 further is connected by a branch line 334 to the clamping valve 288. This valve is pro-

vided with a detent mechanism 336 for holding the clamping parts of the nippers apart, or for urging the clamping arm toward the back up member as determined by movement of the handle 290.

The drain line 332, previously mentioned, is connected through a spring urged valve 338 to the sump.

The machine is also provided with manual pressure applying means so that rail anchors can be applied in the event of failure of the engine 96, or of the pump 102. Such means comprises a pump 340 seen in the hydraulic diagram of FIG. 9, and also seen near the right front corner of the machine in FIGS. 1 and 3. This pump is provided with a manually operable handle 342, and is provided with a pickup line 344 from the sump in the frame 44. The pressure outlet line 346 of the hand pump 344 is connected through a spring loaded valve 348 to a pressure line 350 leading through the manual valve 314 to the pressure line 300. Normally, when pressure is applied by the pump 102, the spring loaded valve 348 maintains pressure away from the hand pump 340. When it is desired to use the hand pump, the valve 314 is closed, whereby to avoid loss of hydraulic pressure in the line 302 and in the motor driven pump 102. Thus, pressure developed in the hand pump 340 is applied to the pressure line 316 for operating the hydraulic hoist or winch, and for operating the cylinders connected to the applicator mechanism. As will be seen in FIGS. 1 and 3, there is an extension 352 secured on the right upright 114 by a bracket 354, whereby greater leverage may be applied to the handle 342.

There are several different types of rail anchors in addition to the "Gautier" anchor previously discussed. The machine is equally adapted to apply such anchors, but the clamping face or portion of the applicator arm or clamping arm 230 is varied somewhat in accordance with the type of anchor to be applied. Such variations or modifications are shown in FIGS. 10–16 and it will be understood that the parts are identical in those figures with those heretofore described, similar numerals being used with various suffixes, except for particular differences specificially pointed out.

Thus, in FIG. 10 and FIG. 11 there is shown a rail anchor 40*a* of the type known as the "Fair" type of rail anchor. This rail anchor has a flat, horizontally disposed body 356 with a step 358 at one end. This end is illustrated as being at the right end, but corresponds to the left end in FIGS. 7 and 8, for example. The anchor 40*a* is provided at the left end of the body with an enlarged loop or bight portion 360, and an overlying clip or clamping portion 362. A flange 364 disposed at right angles to the body 356, loop 360, and clamp 362 extends longitudinally substantially from end to end of the anchor. The distinguishing feature of the invention, in order to accommodate this type of anchor, comprises a pair of plates 366 secured on opposite sides of the clamp arm 230*a*, whereby to provide abutting or clamping surfaces 238*a* which will engage the bight portion 360 with the arm 230 abutting the flange 364 where it lies between the plates 366. In this form of the invention, it will be apparent that the clamp arm 230*a* is held sufficiently far away from the back up member when in rest position that it will clear the flange 364 where it rounds the loop 360, until such time as the arm is urged toward the back up member to clamp the anchor in position. Otherwise it is substantially identical with that heretofore described.

Another form of rail anchor 40*b* is shown in FIGS. 12 and 13. This is the "Bulldog" type of anchor. It comprises a steel strap having a body 368 designed to underly the base or flange of the rail, and to abut this portion of the rail closely. At the right end of the body there is a slight downward offset 370, and an upward projection 372 adapted to engage against the side of the rail flange. At the left end, the body 368 curves downwardly in a loop portion 374, and finally comes back substantially into engagement with the central portion of the body as at 376. A U-shaped retainer 378 is secured on the body by means of displaced sections 380 with the bight of the retainer underlying the section 376. The sidewalls of the U-shaped portion 378 are provided with notches or slots 382 adapted to receive the rail flange. The abutting portion 238*b* of the clamp arm 230*b* is substantially identical with the first form of the invention disclosed, except that this face is more nearly vertical when engaging the anchor. It will be observed that in the first form of the invention this clamping face is inclined slightly downwardly in order to snap the anchor on in the proper fashion.

The rail anchor 40*c* shown in FIG. 14 is of the type known as the "Woodings." This rail anchor also is made of somewhat springy steel strap, and includes a U-shaped central body portion 384 having a horizontally and then upwardly directed right arm 386 with an upwardly directed inset arm 388 for camming over the edge of the rail flange. The "Woodings" anchor 40*c* also has a left arm 390 extending more or less horizontally, and then curled up over the rail flange in a retaining tip 392. The distinguishing feature of the machine in this instance lies in the lower portion of the clamping or applicator arm 230*c* which is somewhat hook shaped, having a round nosed projection 394 adapted to pass beneath the left arm 390 and abut the U-shaped body portion 384 for clamping the anchor in position.

The so called "Unit type" of rail anchor is shown at 40*d* in FIG. 15. This type of rail anchor has a rather wide U-shaped body portion 396 with a diagonally upwardly directed right arm 398 having a notch or offset portion 400 therein for receiving the side of the rail flange 262. On the left side of the body, there is a more or less U-shaped clip portion 402 adapted to clip on to the opposite side of the rail flange or base. The arm 230*b* in this instance is substantially the same as that shown in FIG. 14, including a round nosed projection 394*d* for engaging the body of the anchor to snap it into position.

In FIGS. 16–18 there is illustrated an improved type of back up member for applying the "Fair" type of rail anchor 40*a*. In particular, the depending portion 212*e* on the back up member is provided with a pivotally mounted positioning member 214*e* mounted on a pivot pin 404. This pivot member is provided with a slot 406 adapted to be substantially complementary to one side of the rail flange or base, and has a finger 408 projecting past the slot adapted to engage the under side of the rail. Above the slot, the pivot member is provided with a counterweight 410. The counterweight normally causes the pivoted member 214*e* to hang in the solid line position shown in FIG. 16. However, upon lowering of the nippers into position on the rail, the counterweight 410 hits the top of the rail flange or body 262, whereby to pivot the member 214*e* into position on the side of the rail flange or body, as shown in dotted lines in FIG. 16, and as also shown in FIGS. 17 and 18. The "Fair" clip 40*a* thus may be pushed against the tie and held properly in position to be engaged by the clamping face of the clamp 229*e*.

It will be understood that the various forms of the invention as shown and described herein are set forth by way of illustration. Various changes in structure will no doubt occur to those skilled in the art, and will be understood as forming a part of the invention insofar as they fall within the spirit and scope of the appended claims.

The invention is claimed as follows:

1. A machine for applying rail anchors to the rails of a track comprising a frame, a plurality of wheels, means rotatably mounting said wheels on said frame with said wheels adapted to be on said track for movably supporting said machine, anchor applying means, means supporting said anchor applying means from said frame, means for operating said supporting means to lower and raise said applying means into and out of engagement with a rail, said applying means including back up means engageable with one side of a rail and fur-

ther having a substantially horizontal portion engageable with the top of the head of a rail for supporting said applying means when lowered into engagement with a rail, and pressure applying means disposed on the opposite side of said rail and movable toward said back up means transversely of said rail to engage a rail anchor for forcing said rail anchor into substantially permanent association with said rail without application of substantial side thrust to said rail.

2. A machine for applying rail anchors as set forth in claim 1 and further including a second back up means and pressure applying means of similar construction and disposed on the opposite side of a tie from the first mentioned back up means and pressure applying means, and means acting on said two sets of applying means for urging the same toward one another for accurate positioning on opposite sides of a tie.

3. A machine for applying rail anchors as set forth in claim 2 and further including means connecting said supporting means to the two sets of applying means and automatically operable to move said applying means away from one another and away from said tie upon movement of said supporting means to raise said applying means out of engagement with said rail.

4. A machine for applying rail anchors as set forth in claim 3 wherein the means for automatically moving the applying means away from one another includes a toggle connected to said supporting means and to the two sets of applying means.

5. A device for applying rail anchors to the rails of a track comprising a vertically elongated back up member having a lower end adapted to be disposed on one side of a rail and further having a lateral projection adapted to rest on top of the head of a rail with a depending section at the end thereof adapted to lie on the opposite side of said rail for accurately positioning said back up member to said rail, a clamping member pivotally mounted on said back up member and having a depending clamping arm adapted for positioning adjacent a rail on said opposite side thereof and further having an upstanding lever arm, and means operatively engaging said lever arm and said back up means and acting therebetween for pivoting said clamping member to force said clamping arm into engagement with a rail anchor transversely of a rail for forcing said rail anchor into substantially permanent association with said rail without application of substantial side thrust to said rail.

6. A device for applying rail anchors to the rails of a track comprising a vertically elongated back up member having a lower end adapted to lie along one side of a rail, said lower end having a notch engageable with the rail base and further having a cam surface adapted to be engaged by the end of a rail anchor as it is forced into position for camming said end of said rail anchor against a tie, a lateral projection on said back up member adjacent the lower end thereof adapted to rest on top of a rail and having a depending portion adapted to lie on the opposite side of said rail, said depending portion having a notch engageable with the opposite side of the rail base, a lever pivotally mounted on said back up member and adaped to engage a rail anchor on said opposite side of said rail for forcing said anchor into permanent association with said rail, and power means acting between said back up member and said lever for pivoting said lever transversely of said rail to apply a rail anchor.

7. A device for applying rail anchors to the rails of a track comprising a back up member having a bifurcated lower end adapted to straddle and embrace a rail, said bifurcated lower end having a positioning member pivoted thereon, said positioning member including an elongated finger normally extending downwardly from said back up member and adapted to be pivoted into horizontal position underlying a rail, said pivoted member having a projection thereon engageable with the rail base upon lowering of said bifurcated end of said back up member over sid rail for pivoting said positioning member to move said finger into horizontal position beneath the rail base, a lever pivoted on said back up member and engageable with a rail anchor on the opposite side of said rail adjacent said positioning member, and power means operatively connected to said back up member and to said lever for pivoting said lever transversely of said rail against a rail anchor to force said rail anchor into substantially permanent association with said rail without application of substantial side thrust to said rail.

8. A device for applying rail anchors as set forth in claim 7 wherein the projection on the positioning member comprises a counterweight, there being a slot between said counterweight and said finger for accepting the edge of the base of said rail.

9. A device for applying rail anchors to the rails of a track comprising a back up member having a lower end adapted to depend along one side of a rail in engagement with at least the base flange thereof and having a transverse portion adapted to rest on top of the head of a rail with said lower end depending therefrom in flange-engaging position, a lever pivoted on said back up member and having a straight edge portion facing said rail on the opposite side thereof from said back up member lower end, and power means operatively connected to said back up member and to said lever and acting therebetween for pivoting said lever to bring said straight edge transversely of said rail into engagement with a rail anchor to force said rail anchor into substantially permanent association with said rail.

10. A device for applying rail anchors as set forth in claim 9 and further including a pair of plates secured to the opposite sides of said lever and projecting past said straight edge toward said rail whereby to engage spaced portions of a rail anchor.

11. Mechanism for applying rail anchors to the rails of a track comprising a pair of nippers spaced apart longitudinally of a rail and each comprising a back up member having a portion adapted to rest on the head of a rail with another portion thereof engaging one side of said rail, and a pressure applying member mounted on said back up member and advancing toward said back up member on the opposite side of said rail transversely of said rail for engagement with a rail anchor to force the same into substantially permanent engagement with the base of a rail without application of substantial transverse thrust to said rail, and means connecting said pair of nippers for movement toward and away from one another longitudinally of said rail for precise positioning about a tie and for subsequent movement away from said tie.

12. Mechanism for applying rail anchors as set forth in claim 11 wherein the means connecting the pair of nippers comprises a toggle support which automatically moves the nippers away from one another upon raising of said support to lift said nippers from said rail.

13. Mechanism for applying rail anchors as set forth in claim 12 wherein the nippers each further include an inverted U-shaped frame supporting the back up member and pressure applying means, and further including a toggle interconnecting said back up means and said pressure applying means for moving said pressure applying means to force a rail anchor into position on a rail.

14. A machine for applying rail anchors to the rails of a track comprising a frame, a plurality of wheels, means rotatably mounting said wheels on said frame with said wheels adapted to roll on said track for movably supporting said machine, rail anchor applying means, said rail anchor applying means having a portion thereof adapted to rest on top of the head of a rail for supporting said applying means in anchor applying position and further having a depending portion therefrom along one side of a rail and engageable therewith as a backup means, said anchor means further having pressure means adapted to engage a rail anchor on one side of the rail to apply a rail anchor to a rail, and means operably connected to

said pressing means and said back-up means for causing said pressure applying means to exert pressure on a rail anchor without exerting side thrust on a rail, means supporting said applying means from said frame, and means for operating said supporting means to lower and raise said applying means into and out of engagement with a rail.

15. A machine as set forth in claim 14 wherein the backup means has a portion adapted to engage the head of a rail from one side thereof and an additional portion offset laterally thereof relative to a rail and adapted to engage the base flange of a rail from the same side thereof.

16. A machine for applying rail anchors to the rails of a track comprising, a frame, a plurality of wheels, means rotatably mounting said wheels on said frame with said wheels adapted to roll on said track for movably supporting said machine, rail anchor applying means, means supporting said applying means from said frame means, and means for operating said applying means simultaneously to apply a pair of rail anchors to a rail on opposite sides of a rail supporting tie, said applying means comprising a pair of rail anchor abutment means spaced apart longitudinally of a rail and relatively movable toward one another substantially simultaneously to engage a pair of rail anchors for urging said rail anchors toward one another and into abutment with opposite sides of a tie, said rail anchor applying means further including pressure means spaced apart longitudinally of a rail coincident with said first mentioned spaced means and movable therewith, said pressure means being simultaneously engageable with a pair of rail anchors on opposite sides of a tie and movable transversely of a rail simultaneously to apply a pair of rail anchors on opposite sides of a tie.

17. A machine as set forth in claim 16 and further including two different means respectively connected to move said spaced apart means toward one another.

18. A machine as set forth in claim 16 wherein the first mentioned spaced apart means lie on both sides of a rail and are simultaneously engageable with both ends of a pre-positioned rail anchor to effect flush engagement of each rail anchor with the adjacent tie.

19. A machine for applying rail anchors to the rails of a track comprising a frame, a plurality of wheels, means rotatably mounting said wheels on said frame with said wheels adapted for rolling engagement on said track for movably supporting said machine, anchor applying means, said anchor applying means including spaced apart abutment means relatively movable toward one another to engage a pair of rail anchors on opposite sides of a tie securely to position said anchors against said tie and further including pressure means movable laterally of said rail to force said rail anchors into permanent association with said rail on opposite sides of said tie, means supporting said anchor applying means from said frame, means interconnecting said supporting means and said abutment means for automatically moving said abutment means apart upon raising of said anchor applying means by said supporting means, and means for operating said supporting means to lower and raise said applying means toward and away from a rail.

20. A machine as set forth in claim 19 wherein the means interconnecting the supporting means and the abutment means comprises inverted toggle means with ends thereof pivotally connected to the abutment means and the center thereof connected to said supporting means.

References Cited in the file of this patent

UNITED STATES PATENTS

2,575,535	Talboy et al.	Nov. 20, 1951
2,669,041	Fox et al.	Feb. 16, 1954
2,730,962	Wright	Jan. 17, 1956

OTHER REFERENCES

Railway Age, page 20, Feb. 17, 1958.

Railway Track and Structures, pages 23–27, February 1958.

Railway Track and Structures, page 51, December 1957.