July 20, 1926.

1,593,423

R. A. BRADLEY

RAIL TIE PLATER

Filed Oct. 8, 1925

5 Sheets-Sheet 1

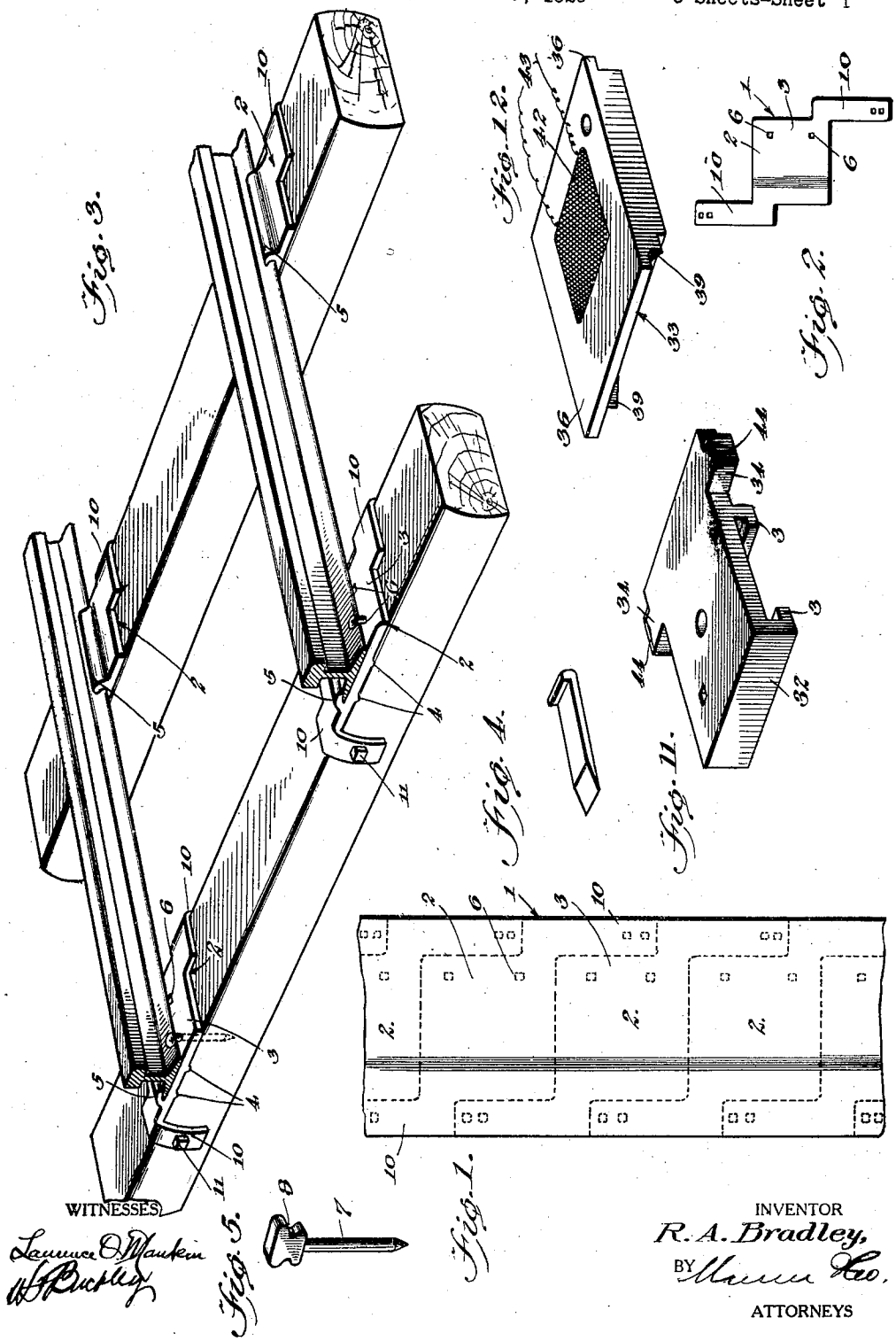


Fig. 3.

Fig. 12.

Fig. 2.

Fig. 4.

Fig. 11.

Fig. 1.

Fig. 5.

WITNESSES

INVENTOR

R. A. Bradley,

BY

ATTORNEYS

July 20, 1926. 1,593,423

R. A. BRADLEY

RAIL TIE PLATER

Filed Oct. 8, 1925 5 Sheets-Sheet 2

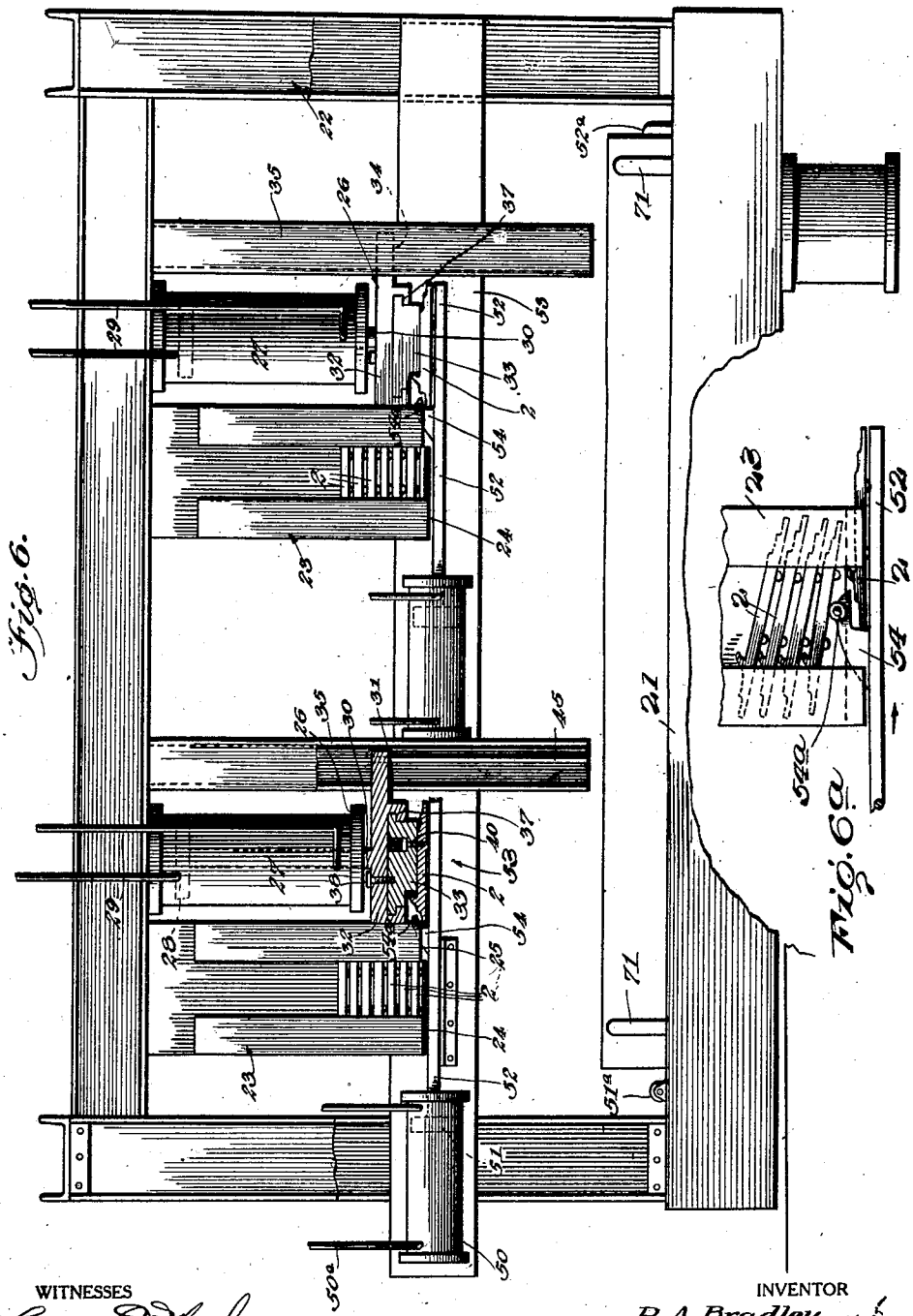


Fig. 6.

Fig. 6a.

WITNESSES

Lawrence D. Mankin

W. F. Buckley

INVENTOR

R. A. Bradley, 339-5

BY Munn & Co

ATTORNEYS

July 20, 1926. 1,593,423

R. A. BRADLEY

RAIL TIE PLATER

Filed Oct. 8, 1925 5 Sheets-Sheet 3

Fig. 7.

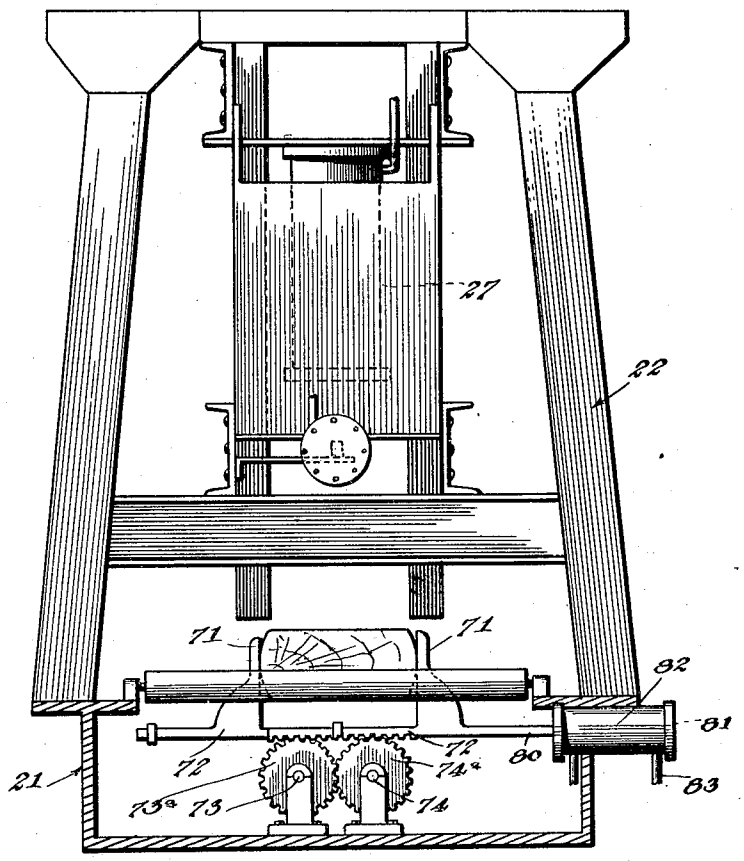
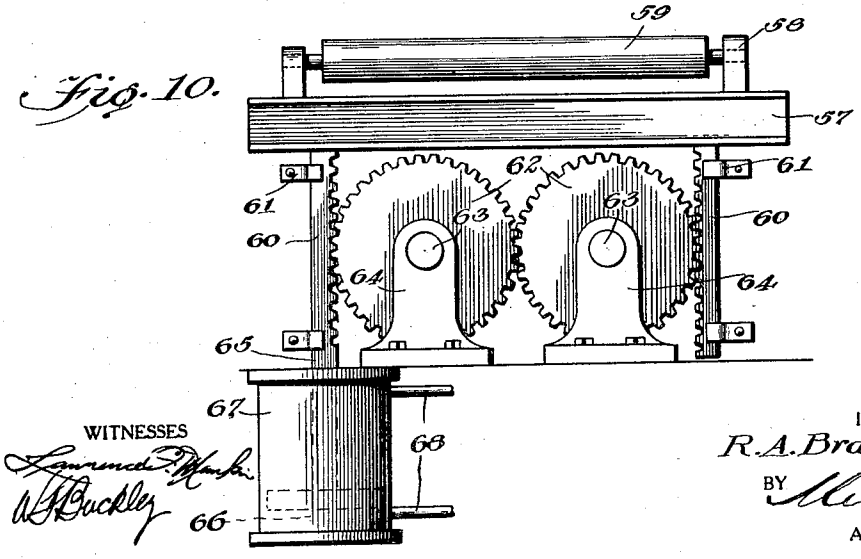


Fig. 10.



WITNESSES

INVENTOR

R. A. Bradley,

BY

ATTORNEYS

July 20, 1926. 1,593,423

R. A. BRADLEY

RAIL TIE PLATER

Filed Oct. 8, 1925 5 Sheets-Sheet 4

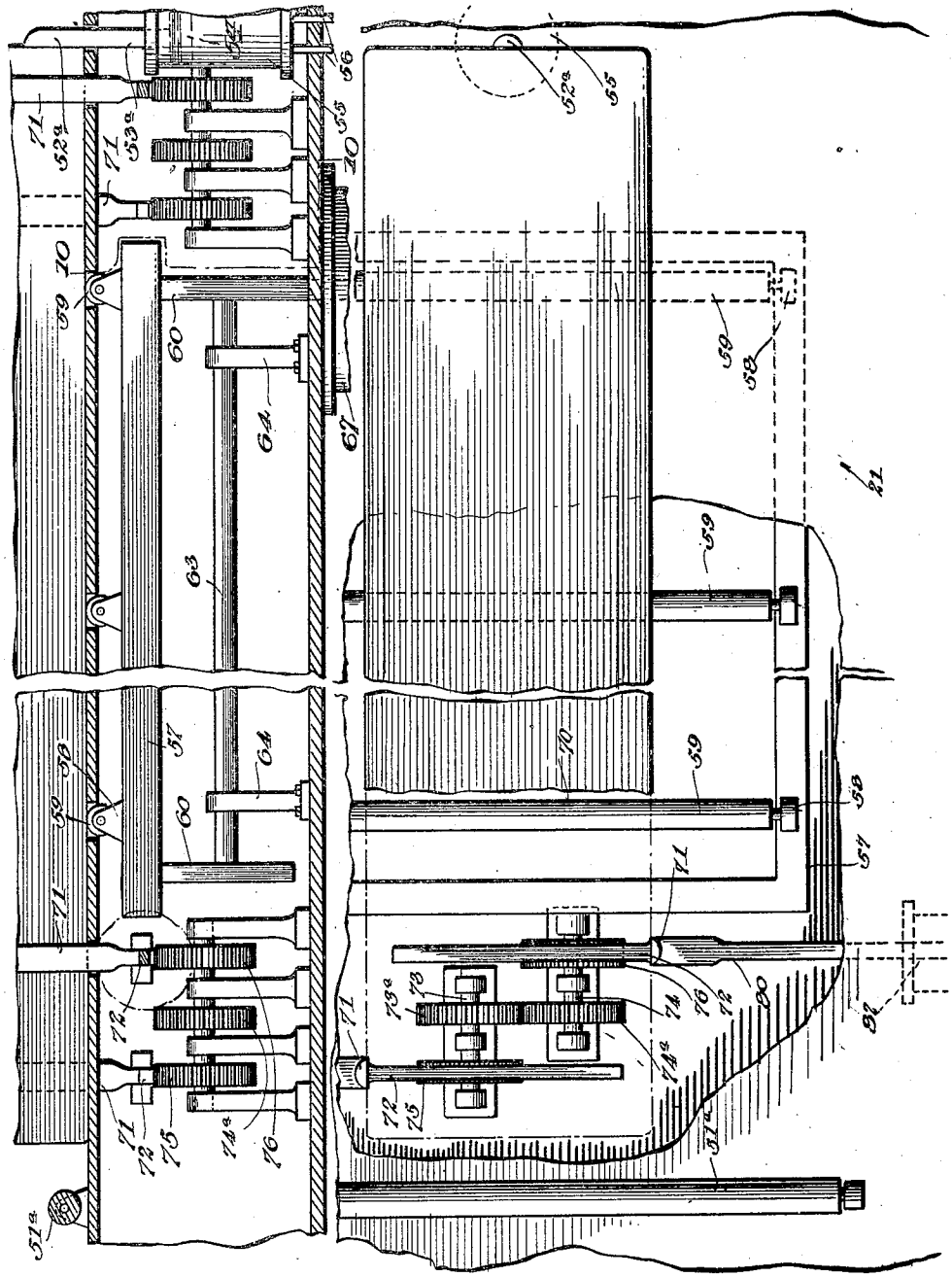


Fig. 9.

Fig. 8.

WITNESSES

INVENTOR

R. A. Bradley,

BY Munn & Co.

ATTORNEYS

July 20, 1926.

1,593,423

R. A. BRADLEY

RAIL TIE PLATER

Filed Oct. 8, 1925

5 Sheets-Sheet 5

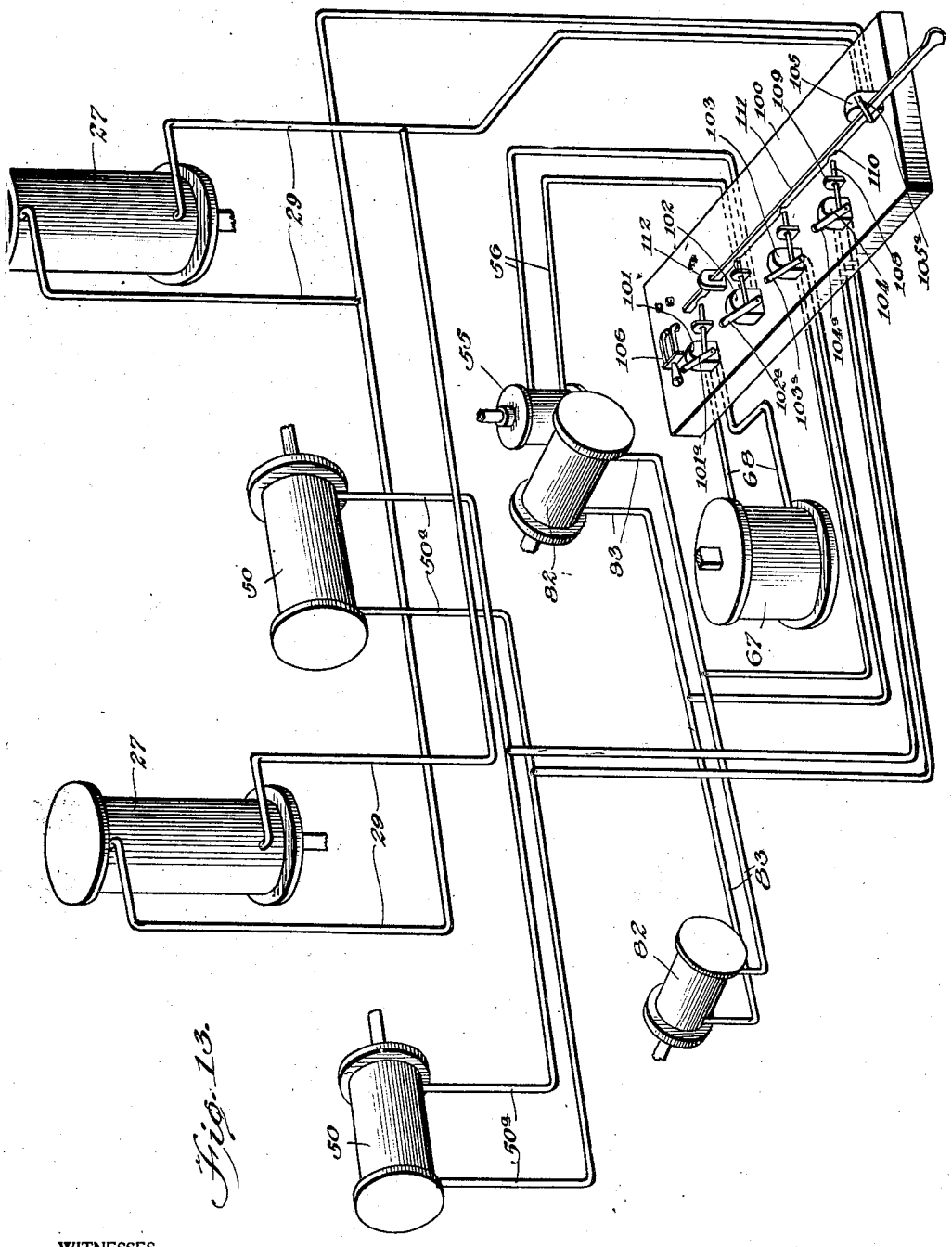


Fig. 13.

WITNESSES

Lawrence D. Mankin

W. J. Buckley

INVENTOR

R. A. Bradley,

BY Munn & Co

ATTORNEYS

Patented July 20, 1926. 1,593,423

UNITED STATES PATENT OFFICE.

ROBERT AULDOM BRADLEY, OF MERRITTON, ONTARIO, CANADA.

RAIL-TIE PLATER.

Application filed October 8, 1925. Serial No. 61,347.

This invention relates to an improvement in tie plates and machines for applying the same to the ties.

The object of the invention is to provide a tie plate of simple, durable and comparatively inexpensive construction and which is adapted to be organized with the tie in such manner as to resolve the pull on the rail spike (due to undulation caused by passing train or in any other way) into a lateral pull instead of the usual vertical pull. In other words the forces tending to pull the tie plate away from the tie are exerted transversely of the spikes and are resisted by the solid cross section of spike and tie and are not applied to the spike in such a way as to tend to pull the spike from the tie.

A further object is to combine with the tie plate an anti-creep device or wedge in a simple and practical yet highly effective manner.

Another object is to provide a machine which applies the tie plates to the ties before the ties are placed under the rails, the machine not only effecting proper positioning of the tie plates on the ties, but also facilitating handling of the ties.

Other objects and advantages reside in certain novel features of the construction, arrangement and combination of parts which will be hereinafter more fully described and particularly pointed out in the appended claims, reference being had to the accompanying drawings forming a part of this specification, and in which:

Figure 1 is a fragmentary plan view of a blank from which the tie plates are formed;

Figure 2 is a plan view of a tie plate;

Figure 3 is a fragmentary perspective view showing the tie plates associated with the rails and ties;

Figure 4 is a perspective view of the anti-creep wedge employed;

Figure 5 is a similar view of the special type spike;

Figure 6 is a view partly in longitudinal section and partly in elevation showing the machine used to apply the tie plates to the ties;

Figure 6[a] is a detail view showing the action of the roller provided on the ejector bar;

Figure 7 is a view thereof partly in end elevation and partly in transverse section;

Figure 8 is a fragmentary plan view of the base;

Figure 9 is a view thereof in longitudinal vertical section,

Figure 10 is a sectional view on line 10—10 of Fig. 9;

Figures 11 and 12 are detail perspective views of parts of the tie plate applying device, and

Figure 13 is a diagrammatic perspective view of the controls.

Referring to the drawings and more especially to Figure 1 the numeral 1 designates a blank from which the tie plates designated generally at 2 are formed, the plates 2 being cut from the blank along the lines shown.

Each tie plate 2 has a body portion 3 on the bottom of which ribs 4 are formed. The ribs 4 are adapted to be embedded in the tie to prevent transverse movement of the plate on the tie. On top of the body portion a curved flange 5 is formed and is adapted to engage over one edge of the rail base. Spike receiving openings 6 are also formed in the body portion. Either ordinary spikes or spikes 7 having grooved heads 8 may be employed and as shown in Fig. 3, the spikes driven through the openings 6 are engaged with the edge of the rail base opposite the edge thereof engaged by the flange 5. The grooved heads 8 facilitate removal of the spikes. The openings 6 may be provided at different distances from the flange 5 to adapt the plate for use with rails having bases of different width. At diagonally opposite corners of the body portion wings 10 are integrally formed with the plate and are adapted to be extended down along the sides of the tie so that spikes 11 may be driven horizontally into the tie through openings 12 in the wings. These spikes 11 take the vertical pull exerted on the tie plate by the undulations caused by passing trains and such pull being exerted transversely of the spikes 11 is effectively resisted. The plates are constructed of metal having sufficient resiliency bendability or flexibility to permit the wings to be bent down along the sides of the tie.

The machine employed for applying the plates to the ties includes a hollow base designated generally at 21 and a frame designated generaly at 22 and overlying the base.

A pair of hoppers or stacks 23 are provided on the frame, each stack containing a plurality of tie plates 2 stacked or piled one on the other. The stacks 23 have a slotted bottom 24 and a discharge opening 25 in one side just above the bottom. The tops of the stacks are open to permit the tie plates to be placed therein.

A tie plate applying device designated generally at 26 is provided adjacent each stack 23. Each tie plate applying device includes a vertical power cylinder 27 in which a piston 28 is operatively fitted. The piston 28 is shifted in said cylinder by compressed air, steam or any fluid under pressure, the fluid pressure being supplied to and exhausted from the opposite ends of the cylinder by means of pipes 29 under the regulation of a control means to be hereinafter more fully described. The piston 28 has a piston rod 30 connected thereto and on the lower end of the rod 30 a head designated generally at 31 is mounted. The head 31 consists of two sections, a carrier or mounting section 32 and a plate block 33. The section 32 has lateral extensions 34 slidably fitted in vertical guides 35 to constrain the head to vertical movement. The block 33 is held to the carrier 32 by virtue of the engagement of its flanges 36 with ways 37 formed in the carrier and by means of a set screw 38. Inclined centering lugs 39 are provided on the block 33 and coact with the flanges 5 of the tie plates 2 to properly center the tie plates as they are delivered to the block 33. A spring-projected latch pin 40 is also provided on the block 33 and is cooperable with one of the spike receiving openings 6 to prevent lateral displacement of the tie plate. The block 33 is made of iron or other magnetic material and in this block electromagnetic means 42 is provided and is supplied with current through wires 43 electrically connected to the windings of the coils of the electro-magnetic means and to contact shoes 44 carried by the extensions 34 and having sliding electrical contact with conductor rails 45 mounted on the guides 35. Electric current is supplied to the rails 45 from any convenient source of current.

Means is provided adjacent each stack and its associated tie plate applying device for delivering the tie plates one by one from the stack to the head of the tie plate applying device and comprises a power cylinder 50 having a piston 51 operating therein. A piston rod 52 connects with the piston and has an extension 53 providing an ejector bar. On the bar 53 a beveled lug 54 is integrally formed and slides back and forth in the slot of the bottom of the stack, the lug engaging one edge of the lowermost tie plate in the stack on its outer stroke so as to carry such lowermost tie plate from the stack to the head 31. Fluid pressure is supplied to the opposite ends of the power cylinder 50 through pipes 50^a under the action of a control to be hereinafter more fully described. A roller 54^a is rotatably mounted in the lug 54 and is engageable with the next lowermost plate of the stack to maintain the same and the plates above elevated while the lowermost plate is being ejected.

To facilitate the placing of the tie on the base of the machine, the entire machine is inclined or tilted with respect to the horizontal and is firmly secured and supported in such position. At the high end of the machine a roller 51^a is provided and at the lower end thereof a vertically reciprocable tie stop 52^a is arranged, the tie stop 52^a being carried by a piston rod 53^a connected to a piston 54 fitted in a power cylinder 55. Fluid under pressure is supplied to the opposite ends of the cylinder 55 by means of pipes 56, the flow of fluid through the pipes being governed by a control to be hereinafter more fully described.

In order that the tie may be freely and easily rolled into position on the base and taken therefrom and yet held in position while the plates are being applied, a roller carrying frame 57 is mounted in the hollow base 1 and has bearing 58 in which rollers 59 are rotatably mounted.

Means is provided for raising and lowering the frame and comprises four vertical rack bars 60 operating in guides 61 and secured to the sides of the frame adjacent the ends thereof. The racks 60 mesh with twin gears 62 fixed on shafts 63 journaled in bearings 64. The twin gears mesh with each other and serve to constrain the shafts 63 to corresponding movement. One of the racks 60 is integrally formed with or suitably connected to a piston rod 65 extending from a piston 66 operatively fitted in a cylinder 67 to which fluid pressure is supplied by pipes 68 under the action of a control to be later described.

When the frame 57 is raised or elevated the rollers 59 project above the base, the top of the base having transverse slots 70 permitting the raising and lowering of the rollers.

Means is provided for properly positioning the tie laterally with respect to the tie plate applying devices and comprises two sets or pairs of tie positioning dogs 71. Each dog 71 has a rack bar 72.

Each pair of dogs 71 are operated independently but the members of each pair of dogs are constrained to partake of corre-

sponding movement by means of two shafts 73 and 74 on which meshing twin gears 73[a] and 74[a] are fixed to cause the shafts 73 and 74 to rotate together. On the shaft 73 a gear 75 is fixed and meshes with one of the rack bars 72 and the other rack bar 72 meshes with a gear 76 on the shaft 74.

One of the rack bars 72 of each pair is integrally formed with or suitably connected to a piston rod 80. Each rod 80 connects with a piston 81 fitted in a cylinder 82 supplied with fluid pressure by pipes 83 under the regulation of a control to be presently described.

As illustrated in Fig. 13, the various instrumentalities of the machine are governed from a single control board designated at 100 and on which controlling valves designated at 101, 102, 103, 104 and 105 and a switch 106 are arranged. Valve 101 controls the flow of fluid pressure through the pipe 68; valve 102 controls the flow of fluid pressure through the pipes 56; the valve 103 controls the flow of fluid pressure through the pipes 83 leading to the cylinders 82; the valve 104 controls the flow of fluid pressure through the pipes 50[a] leading to the cylinders 50; and the valve 105 controls the flow of fluid pressure to the pipes 29. The switch 106 regulates the flow of electricity through the coils of the electro-magnets 42. The valves 101 to 105 inclusive have operating handles designated at 101[a], 102[a], 103[a], 104[a] and 105[a] respectively, fixed to their axes and serving as a convenient means whereby the valves may be adjusted. Each handle is provided with a rod 108, the rods being pivoted to the handles and being slidable through guides 109 mounted on the control panel. The free ends of the rods 108 are adapted to be received in notches 110 provided in an interlock or longitudinally shiftable bar 111. The interlock 111 is constrained to proper movements by a guide 112 and is controlled manually. Adjacent one end the interlock is pivotally connected to the handle 105[a] of the valve 105. The valves may be of any suitable type and may be supplied with either compressed air or steam in any suitable manner.

With this arrangement when a pair of plates are to be applied to a tie the handle 102[a] is pulled to the left as shown in Fig. 13 to disengage its rod 108 from the interlock and to cause fluid under pressure to flow through the pipes 56 so as to elevate the piston in the cylinder 55 and consequently elevate the stop 52[a]. The dogs 71 are then spread by swinging the handle 103[a] to the right and the rollers 59 are elevated by swinging the handle 101[a] to the right in which position the handle 101[a] is engaged with the interlock. The tie is then rolled over the roller 51[a] and the rollers 59, the inclination of the machine greatly facilitating this operation. The rollers 59 are lowered by swinging the handle 101[a] to the left in which position the handle 101[a] is disengaged from the interlock. The inward movement of the tie into the machine is limited by the engagement of its inner end with the stop 52[a]. The tie is next centered and properly positioned by swinging the handle 103[a] to the left as viewed in Fig. 13 which causes the dogs to be moved toward each other to shift the tie as may be necessary and to hold the tie in proper position. As a result of this swinging of the handle 103[a] the rod 108 connected thereto is disengaged from the interlock. The next phase of the operation resides in the transferring of the tie plates from the stacks to the tie applying devices and this is accomplished by first swinging the handle 104[a] to the right to bring the tie plates under the heads 32, then turning on the electric current by shifting the switch 106 and finally withdrawing the ejector bars from under the heads 32 by swinging the handles 104[a] to the left as viewed in Fig. 13. The rods 108 of all of the handles of the valves are now disengaged from the interlock since the machine is ready to have the tie applying devices to descend and apply the tie plates to the ties. The ties may have been previously prepared to receive the ribs 4 of the tie plates or the machine may be constructed to force the tie plates against the ties with sufficient force to cause these ribs to become embedded in the tie. The tie applying devices are operated by shifting the valve handle 105[a] and this may be easily carried out since the interlock 111 is no longer held by any of the bars 108. While the tie plates are held against the ties the wings are hammered down and the spikes are driven. To remove a tie after the application of the tie plates thereto, the dogs are spread following the elevation of the tie applying devices, the rollers are raised and the tie withdrawn.

I claim:

1. A machine for applying tie plates to ties comprising a base, a frame over the base, a pair of tie plate stacks, mounted on the frame, a tie plate applying device adjacent each stack, means adjacent each stack for delivering the tie plates one by one to the adjacent tie plate applying device, and means for properly positioning the ties on the base and under the tie plate applying devices.

2. A machine for applying tie plates to ties comprising a tie plate stack, a tie plate applying device, means for delivering the tie plates from the stack to the tie plate applying device, and means for properly positioning the ties relative to the tie applying device.

3. A machine for applying tie plates to ties comprising a tie plate stack, a tie plate

applying device having an electromagnetic head and means for shifting the same, means for delivering the tie plate from the stack to the head, and means for properly positioning the ties relative to the applying device.

4. A machine for applying tie plates to ties comprising a tie plate stack, a tie plate applying device having an electromagnetic head and means for shifting the same, means for centering the tie plates relative to the head, means for delivering the tie plate from the stack to the head, and means for properly positioning the ties relative to the applying device.

5. A machine for applying tie plates to ties comprising a tie plate stack, a tie plate applying device having an electromagnetic head and means for shifting the same, means for centering the tie plates relative to the head, a spring projected latch on the head engageable with the tie plate, means for delivering the tie plate from the stack to the head, and means for properly positioning the ties relative to the applying device.

6. A machine for applying tie plates to ties comprising a tie plate stack, a tie plate applying device having an electromagnetic head and means for shifting the same, a spring projected latch on the head engageable with the tie plate, means for delivering the tie plate from the stack to the head, and means for properly positioning the ties relative to the applying device.

7. A machine for applying tie plates to ties comprising a tie plate stack, a tie plate applying device, means for delivering the tie plates from the stack to the tie plate applying device, including a reciprocable bar having a beveled lug engageable with the lowermost plate in the stack, and means for properly positioning the ties relative to the tie applying device.

8. A machine for applying tie plates to ties comprising a tie plate stack, a tie plate applying device, means for delivering the tie plates from the stack to the tie plate applying device, including a reciprocable bar having means engageable with the lowermost plate and also including a roller engageable with the next lowermost plate to hold the same and the plates above elevated while the lowermost plate is being ejected, and means for properly positioning the ties relative to the tie applying device.

9. A machine for applying tie plates to ties comprising a tie plate stack, a tie plate applying device, means for delivering the tie plates from the stack to the tie plate applying device, and means for properly positioning the ties relative to the tie applying device including a plurality of pairs of tie engaging dogs, means for constraining the dogs to corresponding movement, and means for moving the dogs.

10. A machine for applying tie plates to ties comprising a tie plate stack, a tie plate applying device, means for delivering the tie plates from the stack to the tie plate applying device, and means for properly positioning the ties relative to the tie applying device including a plurality of pairs of tie engaging dogs, each dog having a rack bar connected thereto, gears meshing with the rack bars, shafts on which the gears are fixed, twin gears constraining the shafts to corresponding movement and means for rotating one shaft.

11. A machine for applying tie plates to ties comprising a base, a frame over the base, a pair of tie plate stacks, mounted on the frame, a tie plate applying device adjacent each stack, means adjacent each stack for delivering the tie plates one by one to the adjacent tie plate applying device, means for properly positioning the ties on the base and under the tie plate applying devices, said base being inclined relative to the horizontal, rollers to facilitate movement of the ties on the base and a shiftable stop to limit the movement of the ties in one direction.

12. A machine for applying tie plates to ties comprising a base, a frame over the base, a pair of tie plate stacks, mounted on the frame, a tie plate applying device adjacent each stack, means adjacent each stack for delivering the tie plates one by one to the adjacent tie plate applying device, means for properly positioning the ties on the base and under the tie plate applying devices, a roller carrying frame mounted in the base, said base having slots through which the rollers may be raised and means for raising and lowering said roller carrying frame.

13. A machine for applying tie plates to ties comprising a base, a frame over the base, a pair of tie plate stacks, mounted on the frame, a tie plate applying device adjacent each stack, means adjacent each stack for delivering the tie plates one by one to the adjacent tie plate applying device, means for properly positioning the ties on the base and under the tie plate applying devices, a roller carrying frame mounted in the base, said base having slots through which the rollers may be raised and means for raising and lowering said roller carrying frame and comprising vertical rack bars connected to the roller carrying frame, gears meshed with the rack bars and power operating shafts actuating the gears.

14. A machine for applying tie plates to ties comprising a base, a frame overlying the base, a pair of tie plate stacks mounted on the frame, a tie plate applying device on the frame adjacent each stack, means for delivering the tie plates singly from each stack to its device, means cooperable with the base to facilitate the placing of the tie

thereon, and means for properly positioning the tie on the base.

15. A machine for applying tie plates to ties comprising a tie plate stack, a tie plate applying device, means for delivering the tie plates from the stack to the tie plate applying device, means for properly positioning the ties relative to the tie applying device, fluid pressure actuated mechanisms for driving the tie plate applying device, the delivery means and the positioning means, valves controlling said mechanisms and an interlock for said valves.

ROBERT AULDOM BRADLEY.