May 8, 1923. 1,454,811

T. O. CULPEPPER

MACHINE FOR FORMING TRACK TERMINALS

Filed March 18, 1922 2 Sheets-Sheet 1

Fig. 1

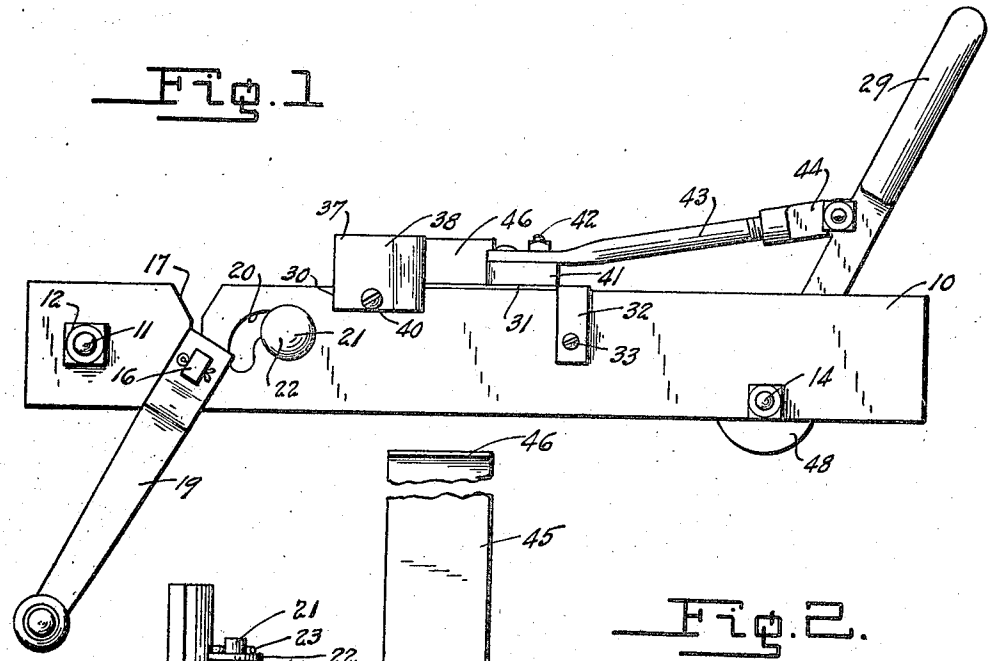
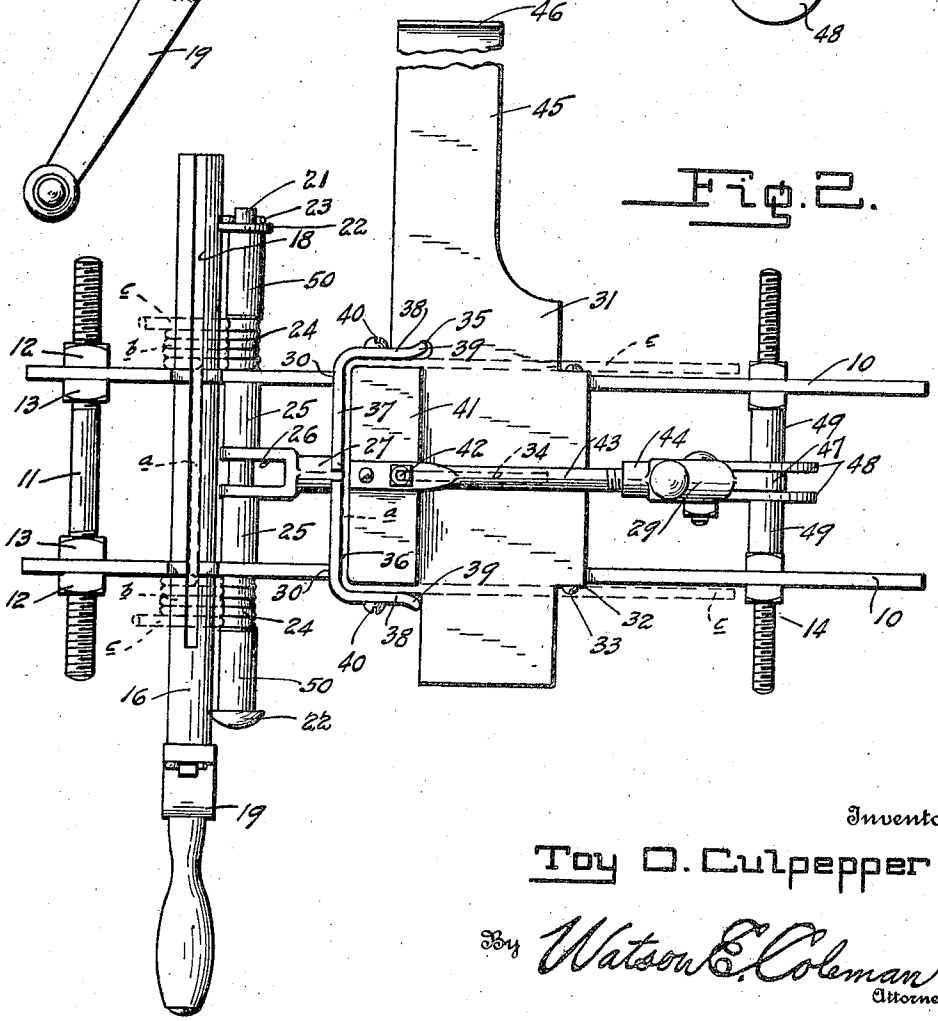


Fig. 2.



Inventor

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Fig. 3.

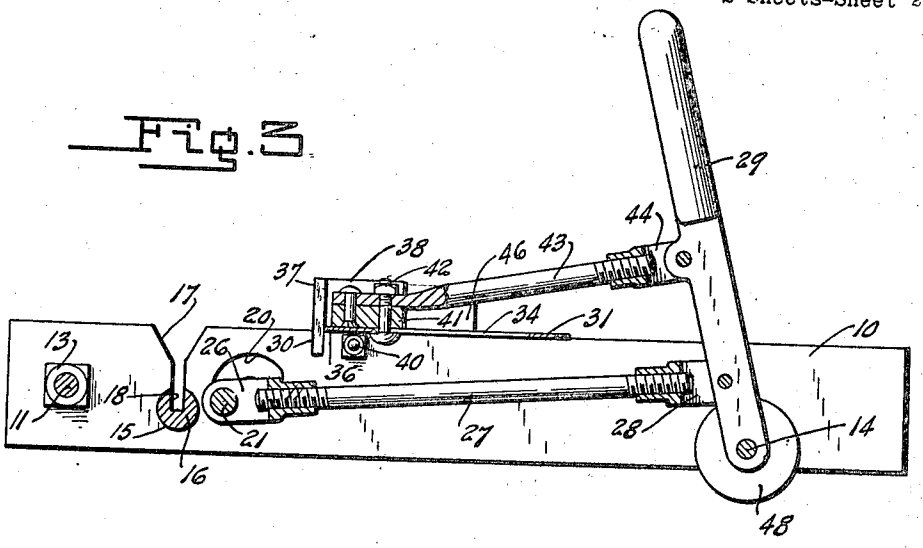


Fig. 4.

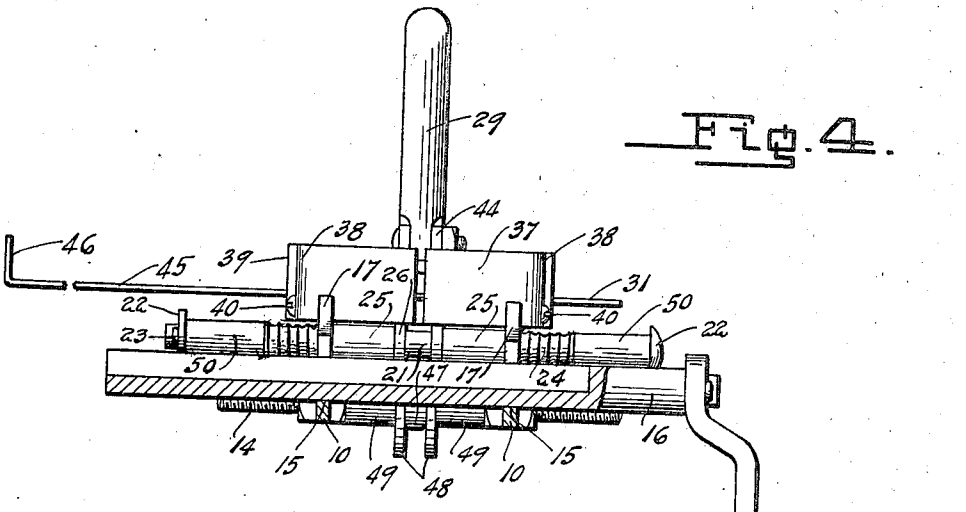
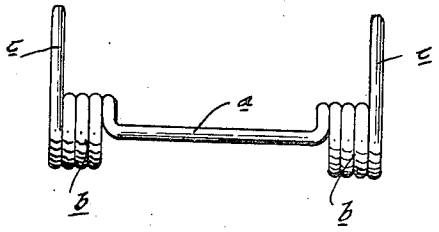


Fig. 5.



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Patented May 8, 1923. 1,454,811

UNITED STATES PATENT OFFICE.

TOY OWEN CULPEPPER, OF TOCCOA, GEORGIA.

MACHINE FOR FORMING TRACK TERMINALS.

Application filed March 18, 1922. Serial No. 544,937.

To all whom it may concern:

Be it known that I, TOY OWEN CULPEPPER, a citizen of the United States, residing at Toccoa, in the county of Stephens and State of Georgia, have invented certain new and useful Improvements in Machines for Forming Track Terminals, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to wire bending machinery, and particularly to a machine for making track terminals, or as they are commonly called "boot legs," which are used to carry electricity to the rails to operate automatic signals on railroads.

The general object is to provide a very simple, manually operable mechanism of this character by which the relatively heavy copper wire forming these track terminals may be readily bent, and particularly to provide a machine of this character which will bend the wire so as to provide an axially disposed, longitudinally extending portion having off-set ends, close coils at the ends of the longitudinally extending portion, and angularly extending terminal portions.

A further object is to provide a machine by which a straight length of wire may be initially bent into a U-shape and which will then, by a proper manipulation of the machine, bend the legs of the U-shaped member into coils disposed axially with reference to the cross bar of the U-shaped member.

Other objects will appear in the course of the following description.

My invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a side elevation of a wire bending machine constructed in accordance with my invention;

Figure 2 is a top plan view thereof, the guard being broken away;

Figure 3 is a longitudinal sectional view of the machine;

Figure 4 is a transverse sectional view thereof, the section being taken through the mandrel;

Figure 5 is a plan view of the track terminal after it is formed in this machine.

Referring to these drawings, it will be seen that my machine includes the longitudinally extending supporting bars 10 which form the base of the machine and which extend parallel to each other and which are connected at one end by a transverse bolt 11 having nuts 12 on its outer ends and spacing nuts 13. The opposite ends of these bars 10 are connected by a transverse bolt 14 of like character. Any other suitable connecting means may be used for holding these bars in parallel spaced relation to each other. Adjacent one end these bars are each formed with a circular aperture 15 providing a bearing for a rotatable mandrel 16. Extending down from the upper edges of the bars 10 are downwardly converging slots 17 which intersect the circular aperture and form throats through which the wire to be operated on may be inserted in the longitudinally extending slot 18 of the mandrel. This slot 18 extends to the center of the mandrel and the mandrel is circular in cross section and provided at one end with a crank handle 19 whereby it may be rotated. Inward of the bearing apertures 15 the bars 10 are each formed with an angular slot 20 having one leg extending downward and the other horizontally in a direction away from the slot 17. These angular slots 20 are sligthly curved. Disposed in these angular slots is a transversely extending rod 21 formed with a head 22 at one end and having an aperture for a cotter pin 23 at the other. This rod 21 is longer than the distance between the bars 10 and disposed upon the ends of the rod 21 which project beyond the bars are the sleeves 24. Disposed inward of the bars 10 are the sleeves 25 which are spaced from each other to receive the fork 26 of a connecting rod 27. This rod carries at its outer end a forked head 28 which embraces and is pivoted to a lever 29, this lever 29 being operatively pivoted for rocking movement upon the bolt 14.

The upper edges of the bars 10 are vertically slotted, as at 30, and resting upon the upper edges of the bars between these slots 30 and the lever 29 is a plate 31. This plate projects beyond the bars and the margin of the plate adjacent the lever 29 is slotted and bent downward, as at 32, and held to the bars 10 by means of screws, bolts or rivets 33. This plate is longitudinally slotted, as at 34. The plate on one side is longitudinally slotted, as at 35, and at the other side projects but slightly beyond the adjacent bars 10. The medial portion of the plate 31 projects toward the mandrel 16, as at 36. Bounding this projecting portion 36 of the plate 31 is a wall 37 which is

approximately U-shaped in plan and is formed of a relatively wide strip of metal bent into U-shape so as to provide a transverse portion disposed in the slots 30 and side portions 38 which extend parallel to the bars 10 and which at their ends confronting the lever 29 are flared outward, as at 39. One of these side portions 38 extends into the slot 35 and the other extends along the margin of the projecting portion 36 of the plate. This metal wall 37 is held in place by screws 40 or any other suitable means.

Slidingly mounted upon the upper face of the plate 31 is a relatively flat plunger 41 having a length equal to the distance between the side portions 38 of the wall 37 and having a pin or bolt 42 which extends through the slot 34 and is guided therein and prevents any lifting of this head or plunger 41. To the upper face of this plunger 41 is attached the rod 43 which, at its rear end, carries the bifurcated head 44 embracing and pivoted to the lever 29. It will be seen now that upon a forward movement of the lever 29 the plunger 41 will be forced into the form constituted by the wall 37 and its wings 38 and that a wire disposed across the ends of these wings 38 will be bent into U-shape by the plunger.

In order to provide means for gauging the position of the stock from which the track terminal is to be formed, I preferably extend one end of the plate 31 outward, as at 45, and form at the end an upwardly extending flange 46 constituting a stop so that when one end of the length of wire is disposed against this top 46, the wire will be directly centered with relation to the axial center of the machine. The lever 29, as before stated, is mounted on the bolt 14 and has an eye 47 which surrounds this bolt. On each side of the lever are disposed the washers 48 and on each side of the washers are the spacing sleeve 49, the lever thus being held in its medial position.

The stock used for forming track terminals is ordinary #6 steel copper-clad wire and these terminals are formed, as illustrated in Figure 5, with a transverse, axially disposed portion and the radially extending arms *c*. In order to form such a terminal upon the machine which I have described, a piece of copper-clad wire of suitable length is laid upon the plate or table 31 with the middle of the wire coincident with the medial plane of the table and the ends of the wire extending beyond the ends 39 of the wings 38 and with one end abutting against stop 46. Then the lever 29 is forced forward and the plunger 41 bends this wire into a U-shape, providing a cross bar *a* and two radially extending arms. The wire thus formed is removed from the table 31 and the cross bar is inserted in the slot 18 of the mandrel 16. The mandrel is then rotated until the arms of the U-shaped blank come in engagement with the projecting sleeves or rollers 24. Then the lever 29 is shifted to carry the bar 21 with its rollers 24 rearward and into the downwardly extending portions of the slots 20. This acts to bend the wire tightly against and around the mandrel. With the forming rollers 24 in this position, the mandrel may be then rotated to form the coils *b* which will closely embrace the mandrel. Preferably the forming rollers 24 are formed with spiral grooves, as illustrated in Figure 2, so as to guide the stock as it is being coiled and cause the convolutions of the coils to closely approach each other. Of course, power may be used for rotating the mandrel if desired.

By providing the angular slots 20, the forming rollers are held against the pressure of the wire while the wire is being bent around the mandrel and no strength has to be exerted by the operator to hold lever 29 thrown over. When the coils *b* have been completely formed, these coils usually embody five turns. The rod 21 is retracted and with it the rollers 24 and then the mandrel is slipped longitudinally through the coils *b* and through the bars 10 and the completed terminal removed through the slots 17. Almost all terminals now used on railroads are eight inches long, but ordinarily, and as designed by me, this machine will make terminals of six-inch length, thus giving two more inches protection in case of a broken rail near the joint. These terminals are bonded in the web of the rail as close to the joint as possible. It will be obvious that a six-inch terminal can be put two inches closer to the joint than an eight-inch terminal, thus giving two inches more protection. Obviously machines may be made to form terminals of any length and the number of turns in each coil *b* will depend upon the total length of the wire and the number of turns given to the mandrel.

The machine which I have illustrated in the drawings is designed to be adjustable so as to make terminals of three lengths, six-inch, seven-inch and eight-inch. To this end, the bolts 14 are made sufficiently long so that by adjusting the nuts 12 and 13 the bars 10 may be adjusted nearer to or further away from each other and the mandrel 16 is long enough to permit this adjustment and the rod 21 is sufficiently long to permit the rollers 24 to be adjusted outward or inward by the interposition of suitable sleeves 50 which may be used to properly position the rollers 24 by removing these sleeves 50, shifting the rollers outward, and replacing the sleeves 50 by other sleeves of a shorter length but of the same character. Thus it is an easy matter to adjust these rollers 24 to

any desired position in accordance with the adjustment of the bars 10 upon the bolts 14.

In order to permit the adjustment of the bars 10, the U-shaped member 37 is preferably formed in two parts, each of which is attached to one of the bars 10, and three detachable plungers 41 are designed to be used for each length of terminal. The plate 31 may also be made in three different sizes. Of course, it is to be understood that the bars 10 will be disposed in a vise or mounted upon a work bench or otherwise supported. Of course, the lengths of the crank arm 19 and of the lever 29 will depend entirely upon the gauge of wire which it is intended to use.

Where track terminals have been made by hand by winding the wire by hand around a piece of pipe or other like mandrel, the cross bar *a* between the coils is disposed in line with the periphery of the coils, but it will be obvious that with my machine the slot 18 in the mandrel permits the cross bar *a* to be disposed in the axial center of the coils which gives an improved form to these track terminals.

While I have illustrated certain details of construction and certain arrangement of parts which I have found thoroughly effective for the purpose intended, yet I do not wish to be limited to these details, as it is obvious that many changes might be made therein without departing from the spirit of the invention.

I claim:—

1. A machine for forming track terminals including manually operable means for bending a length of wire into U-shape, a rotatable mandrel having a longitudinally extending groove into which the cross bar of the U-shaped blank is adapted to be disposed, and forming rollers manually shiftable toward or from the mandrel.

2. A machine of the character described including a supporting plate, a forming wall U-shaped in plan and extending upward from said plate, a plunger mounted upon the plate and movable into said wall, the plunger having a length less than the width of the U-shaped wall, manually operable means for reciprocating said plunger, a rotatable mandrel having a longitudinal slot to receive the cross bar of the U-shaped blank formed by the plunger, and coil forming rollers movable toward or from the mandrel and into engagement with the legs of the U-shaped blanks disposed therein, the coil forming rollers being operatively connected to the plunger shifting means.

3. A machine of the character described including a supporting plate, a forming wall U-shaped in plan and extending upward from said plate, a plunger mounted upon the plate and movable into said wall, the plunger having a length less than the width of the U-shaped wall, manually operable means for reciprocating said plunger, a rotatable mandrel having a longitudinal slot to receive the cross bar of the U-shaped blank formed by the plunger, coil forming rollers movable toward or from the mandrel and into engagement with the legs of the U-shaped blanks disposed therein, the coil forming rollers being operatively connected to the plunger shifting means, and means for holding the rollers against reverse movement when they have been forced toward the mandrel.

4. A track terminal forming machine of the character described comprising a support including two parallel, vertically disposed webs having aligned mandrel apertures and vertical slots extending from the upper edges of the webs and into said apertures, said webs on one side of the apertures being formed with angular slots having vertically disposed legs adjacent the apertures, a mandrel removably disposed in the apertures and having a longitudinally extending slot longer than the distance between the webs, a rod extending through said angular slots and projecting beyond the webs and having forming rollers mounted upon the projecting ends thereof, means for rotating the mandrel, and means for shifting said forming rollers into the forward portions of the slots and toward the mandrel.

5. A track terminal forming machine of the character described comprising a support including two parallel, vertically disposed webs having aligned mandrel apertures and vertical slots extending from the upper edges of the webs and into said apertures, said webs on one side of the apertures being formed with angular slots having vertically disposed legs adjacent the apertures, a mandrel removably disposed in the apertures and having a longitudinally extending slot longer than the distance between the webs, a rod extending through said angular slots and projecting beyond the webs and having forming rollers mounted upon the projecting ends thereof, means for rotating the mandrel, and means for shifting said forming rollers into the forward portions of the slots and toward the mandrel including a lever pivoted to said base.

6. A track terminal forming machine of the character described comprising a support including two parallel, vertically disposed webs having aligned mandrel apertures and vertical slots extending from the upper edges of the webs and into said apertures, said webs on one side of the apertures being formed with angular slots having vertically disposed legs adjacent the apertures, a mandrel removably disposed in the apertures and having a longitudinally extending slot longer than the distance between the webs, a rod extending through said angu-

lar slots and projecting beyond the webs and having forming rollers mounted upon the projecting ends thereof, means for rotating the mandrel, means for shifting said forming rollers into the forward portions of the slots and toward the mandrel, a supporting plate mounted upon said webs and bounded at one end by a wall U-shaped in plan and having laterally disposed wings, the distance between said wings being greater than the distance between the webs, a plunger operating on said plate and into the space between the wings and having a length less than the distance between the wings, a lever operatively connected to the rod carrying the forming rollers whereby the rod may be shifted into the forward portions of the angular slots, and a connecting rod between the plunger and the lever.

7. A track terminal forming machine of the character described comprising a support including two parallel, vertically disposed webs having aligned mandrel apertures and vertical slots extending from the upper edges of the webs and into said apertures, said webs on one side of the apertures being formed with angular slots having vertically disposed legs adjacent the apertures, a mandrel removably disposed in the apertures and having a longitudinally extending slot longer than the distance between the webs, a rod extending through said angular slots and projecting beyond the webs and having forming rollers mounted upon the projecting ends thereof, means for rotating the mandrel, means for shifting said forming rollers into the forward portions of the slots and toward the mandrel, a supporting plate mounted upon said webs and bounded at one end by a wall U-shaped in plan and having laterally disposed wings, the distance between said wings being greater than the distance between the webs, a plunger operating on said plate and into the space between the wings and having a length less than the distance between the wings, a lever operatively connected to the rod carrying the forming rollers whereby the rod may be shifted into the forward portions of the angular slots, and a connecting rod between the plunger and the lever, said plate having a portion extending upward and over the body of the plate to form a guard.

8. Means for forming coils on the ends of a U-shaped wire blank comprising parallel webs having oppositely disposed, circular bearing apertures, slots extending from the edges of said webs into the bearing apertures, the webs being formed with angular slots adjacent to the bearing apertures, each of the angular slots having a downwardly directed portion terminating adjacent the bearing aperture, a mandrel disposed in the bearing apertures and having a longitudinal slot extending beyond the webs when the mandrel is in place, a rod extending transversely across the webs and through the angular slot therein and projecting beyond the webs, forming rollers mounted upon the extremities of the rod, and manually operable means for shifting the rod forward into the forwardly and downwardly extending portions of the angular slots to bring the rollers adjacent the mandrel or retracting said rod upward and away from the mandrel.

9. Means for forming coils in the ends of a U-shaped wire blank comprising parallel supports adjustable toward or from each other and having oppositely disposed circular bearing apertures, slots extending from the edges of said webs into the bearing apertures, the webs being formed with angular slots adjacent the bearing apertures, a mandrel disposed in the bearing apertures and having a vertical slot extending beyond the webs when the bearing mandrel is in place, said mandrel being relatively long to permit the adjustment of the bars toward or from each other, a relatively long rod extending transversely across the webs and through the angular slot therein and projecting beyond the webs, adjustable forming rollers mounted upon the rod, removable spacing members mounted upon the rod and holding the forming rollers in adjusted positions, said forming rollers being formed with spiral grooves upon their faces, and manually operable means for shifting the rod forward into the forwardly and downwardly extending portions of the angular slots to bring the rollers adjacent the mandrel or retracting said rod away from the mandrel.

10. A track terminal forming machine comprising two parallel supporting members adjustable toward or from each other and having aligned mandrel apertures and vertical slots extending from the upper edges into said apertures, said supporting members on one side of the apertures being formed with angular slots, a relatively long mandrel removably disposed in the apertures and having a longitudinally extending slot, a rod extending through the angular slots and projecting beyond said supporting members and having forming rollers detachably mounted upon the projecting ends thereof, means for adjusting said forming rollers toward or from each other, means for rotating the mandrel, means for shifting the forming rollers into the forward portions of the angular slots toward the mandrel, a supporting plate mounted upon said supporting members, a U-shaped wall having laterally disposed wings bounding the forward edge of said plate and being formed in two sections adjustable toward or from each other, a plunger operating on said plate and into

the spaces between the wings, means whereby the rod carrying the forming rollers may be shifted into the forward portions of the angular slots, and means for forcing the plunger into the space between the wings of the U-shaped wall.

11. A machine for forming track terminals including a rotatable mandrel having a longitudinally extending groove into which the cross bar of a U-shaped blank is adapted to be disposed, forming rollers manually shiftable toward or from the mandrel, and means independent of the manually shiftable means for holding the forming rollers into operative relation with the mandrel and against the strain to which they are subjected.

12. A machine for forming track terminals including a rotatable mandrel having a longitudinally extending groove into which the cross bar of a U-shaped blank is adapted to be disposed, forming rollers manually shiftable toward or from the mandrel, and members through which said forming rollers extend and by which they are supported having slots in which the rollers operate, said slots being substantially angular and having the portions adjacent the mandrel extending approximately at right angles to the plane of movement of the forming rollers toward and from the mandrel.

In testimony whereof I hereunto affix my signature.

TOY OWEN CULPEPPER.