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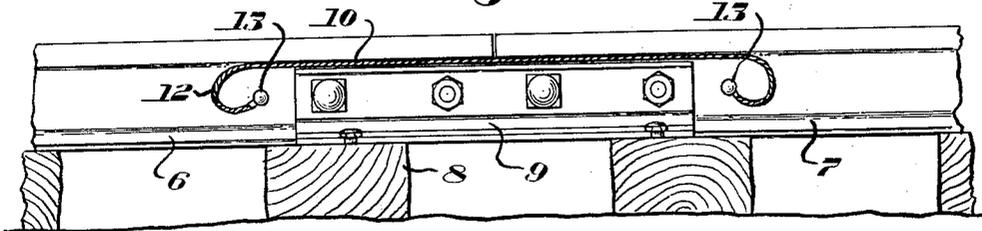
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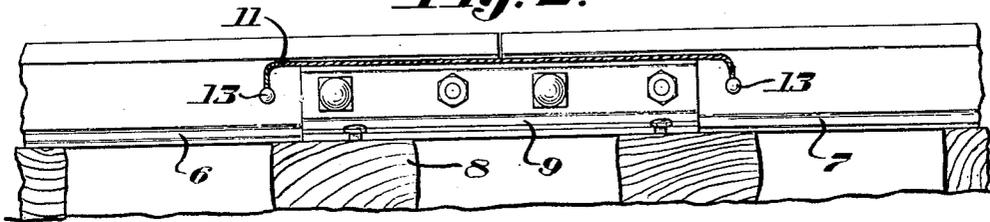
BENDING TOOL FOR RAIL BOND CONDUCTORS

Filed June 10, 1947

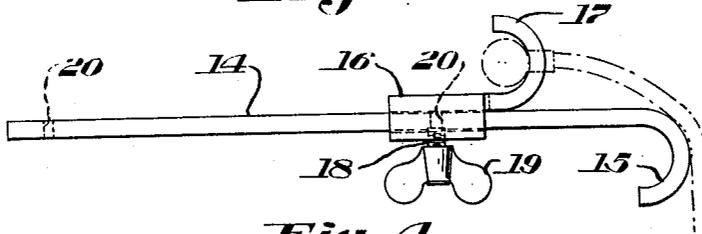
*Fig. 1.*



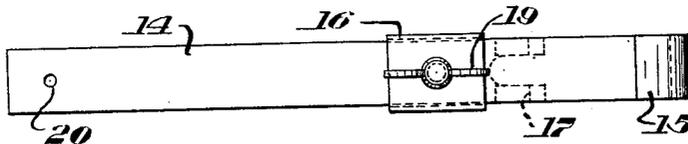
*Fig. 2.*



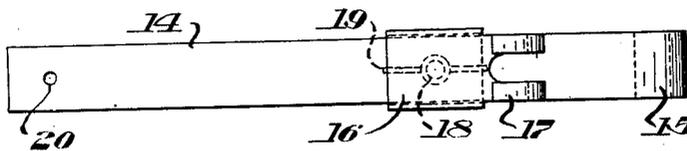
*Fig. 3.*



*Fig. 4.*



*Fig. 5.*



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# UNITED STATES PATENT OFFICE

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## BENDING TOOL FOR RAIL BOND CONDUCTORS

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2 Claims. (Cl. 81-15)

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This application relates to a bending tool for rail bonds, the purpose of which is to facilitate the proper bending of the conductors of rail bonds adjacent the terminals of the bonds. Rail bonds are used to electrically connect adjacent rails of a railway track so that current can be carried by the rails for signaling and other purposes. The bonds comprise a conductor (generally a stranded cable) having at each end a terminal of cylindrical shape which extends transversely to the conductor. The terminals have short studs or shanks which are driven into holes drilled in the rail webs or rail heads.

Large numbers of these bonds are required by railroads. For example, when new track is being laid as many as 200 bonds will be installed in a hour. Obviously it is important to decrease the amount of time required for the installation of each bond and, accordingly, the installation steps have been standardized. After splice bars have been bolted to adjacent rails, a prescribed distance is measured off from each end of the splice bar. A hole is drilled in the web or the head of each rail at this distance. The conductors of the rail bonds have been bent so that the terminals will fit into these holes and so that the conductor will fit over the splice bar but beneath the head of the rails. The terminals are then driven into the holes.

It is apparent that the rail bonds must be bent accurately so that time will not be required to individually fit each bond to each rail joint. It is also important that the bending operation does not affect the strength of the conductor. Traffic over the rails induces severe vibrational stresses in the bonds so that any nick or crack in the strands of the conductor will cause early failure of the conductor.

It has recently been proposed to make the conductor of strands of hard drawn steel wire so as to better withstand the vibration induced by traffic on the railroad. The use of hard drawn steel conductors has increased the problem of bending the conductors to install the rail bonds. The hard drawn steel conductors cannot be bent by hand and ordinary tools such as wrenches, pipe lengths, etc. will scratch or cut the strands and thus nullify the advantages which are gained by the use of hard drawn steel wire.

Any tool which is designed for bending the bonds must also be simple to operate and relatively inexpensive to manufacture. Once track is installed every track maintenance man must be supplied with one of these tools so that he can replace bonds which fall in service.

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I have invented a bending tool which meets the foregoing requirements.

In the accompanying drawings I have illustrated a present preferred embodiment of my invention, in which:

Figures 1 and 2 are side elevations of portions of adjacent rails of a track which have been electrically connected by rail bonds and illustrate the purpose of my bending tool;

Figure 3 is a side elevation of my bending tool; Figure 4 is a bottom view of my bending tool; and

Figure 5 is a plan view of my bending tool.

Figures 1 and 2 show two different joints which have been made between adjacent rails of a railway track. The rails 6 and 7 resting on ties 8 have been bolted to a splice bar 9. An electrical connection between the two rails has been completed by bonds 10 (Figure 1) and 11 (Figure 2). The bond 10 comprises a flexible stranded conductor 12 with terminals 13 secured at each end, the terminals having been driven into holes drilled in the webs of the rails. As shown in Figure 1 the conductor 12 is considerably longer than the distance between the terminals 13, being extended beyond each terminal and bent back to the terminal. This manner of installing the bond provides slack between the terminals 13 so that relative movement of the rails will not break the cable. In the bond 11 (Figure 2) the conductor is made considerably shorter: It extends from the terminals upwardly towards the rail head and is there bent at substantially a right angle so as to extend along the top of the splice bar. This bond permits a small amount of relative movement between the adjacent rails without breaking the conductor but if the rails separate to such an extent as to derail a train passing over the joint, the conductor will break thus affecting the railway signaling system and giving warning of the separation. It is apparent that whichever type of bond is used, extreme accuracy in bending the conductor is required so that the terminals will align with the holes which have been previously drilled in the rails and at the same time the conductor will clear the splice bar without extending above the rail head.

Figures 3, 4 and 5 show a bending tool constructed in accordance with my invention which comprises an elongated handle 14 which may be made from flat steel bar. One end of the handle is curved substantially in a semi-circle to form a shaping head 15. A sleeve 16 enclosing the handle 14 has a sliding fit therewith so that it can be placed in any desired position along the

length of the handle. The side of the sleeve 16 which is on the side of the handle 14 away from the shaping head 15 extends beyond the sleeve in the direction of the shaping head and is bent upwardly and rearwardly substantially in a semi-circle of approximately the same diameter as the semi-circle formed by the shaping head 15. This extension of the sleeve is slotted to form a two-pronged fork 17.

A set screw 18 having a wing head 19 is threaded into the side of the sleeve opposite from the side which forms the fork 17. The set screw 18 may be turned against the handle 14 to retain the sleeve and fork at any selected position along the length of the handle 14. To further secure the sleeve at a selected position on the handle, holes 20 may be drilled along the handle 14. The diameter of these holes is slightly greater than the diameter of the base of the threads cut in the set screw 18 so that when the screw is turned inwardly its end will extend slightly into one of the holes 20. For example, the diameter of the base of the threads may be  $\frac{1}{4}$  inch and the diameter of the holes  $\frac{3}{8}$  inch. This further secures the sleeve at a selected position on the handle since the screw holding the sleeve acts in shear rather than in compression. However, in the distribution of my tool I have found it preferable to sell it without any holes drilled in the handle. The user can readily drill holes in the handle at any position he desires depending upon the particular bond which is being installed.

Figure 3 also shows the manner in which my bending tool is used. The sleeve and fork are first secured at whatever position on the handle will give the required bend to the conductor of a bond. Thereafter as shown in chain lines in Figure 3, a terminal of the bond is placed in the fork, the conductor extending between the two prongs of the fork along the handle towards the shaping head. The end of the tool away from the shaping head is then held in one hand and the conductor of the bond is held in the other hand at a point sufficiently removed from the terminal in the fork to supply leverage for bending the conductor. The conductor is then bent around the shaping head 15 until the desired configuration is obtained.

My bending tool thus meet all of the special requirements of a tool of this class. It is easy to operate and is relatively inexpensive to manufacture. It provides a firm grip on the terminal when the conductor is being bent around the shaping head 15 and the smoothly rounded surface of the shaping head will not cut the strands

of the conductor during the bending operation.

While I have illustrated a present preferred embodiment of my invention, it is to be distinctly understood that it may be otherwise embodied within the scope of the appended claims.

I claim:

1. A tool for bending the conductor of a rail bond having a terminal extending perpendicular to the conductor, said tool comprising an elongated handle having one end curved downwardly from the plane of the handle and rearwardly in the form of a smooth faced shaping head for the conductor, a fork having prongs extending upwardly from the plane of the handle and rearwardly, said prongs lying in a line extending perpendicular to the longitudinal axis of said handle and being capable of engaging a terminal of the bond and restraining movement of the terminal when the conductor of the bond is bent around said shaping head.

2. A tool for bending the conductor of a rail bond having a terminal extending perpendicular to the conductor, said tool comprising an elongated handle having one end curved downwardly from the plane of the handle and rearwardly to form a substantially semi-circular flat faced shaping head for the conductor, a fork having prongs extending upwardly from the plane of the handle and rearwardly, said prongs lying in a line extending perpendicular to the longitudinal axis of said handle and being capable of engaging a terminal of the bond and restraining movement of the terminal when the conductor of the bond is bent around said shaping head, said fork being movable along said handle, and means for holding said fork in adjusted position on said handle.

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