June 3, 1941. J. V. ZAPOTOSKY 2,244,038

TRACK RAIL GROUNDING CLAMP

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Fig. 1

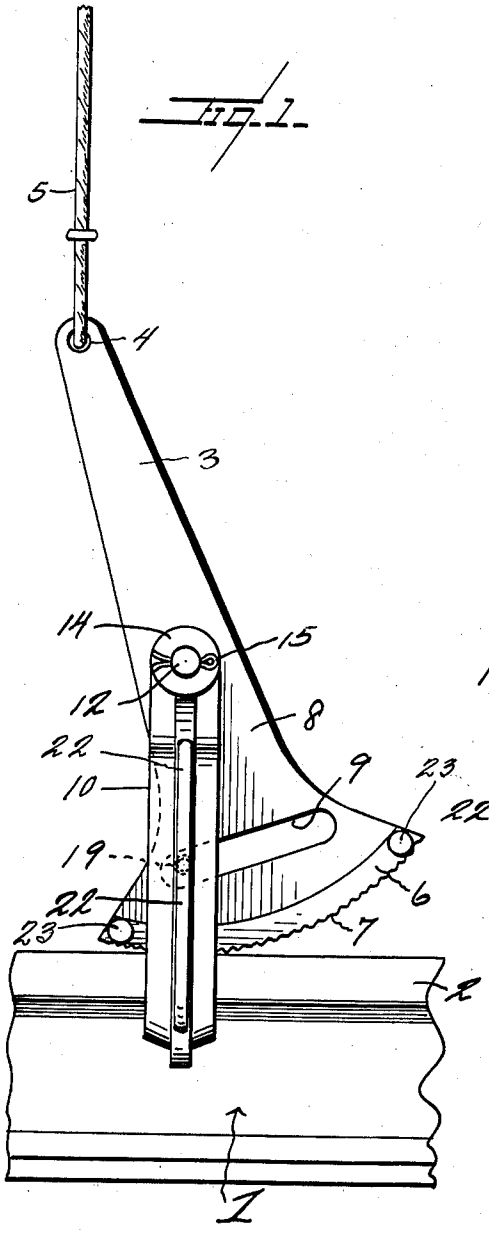
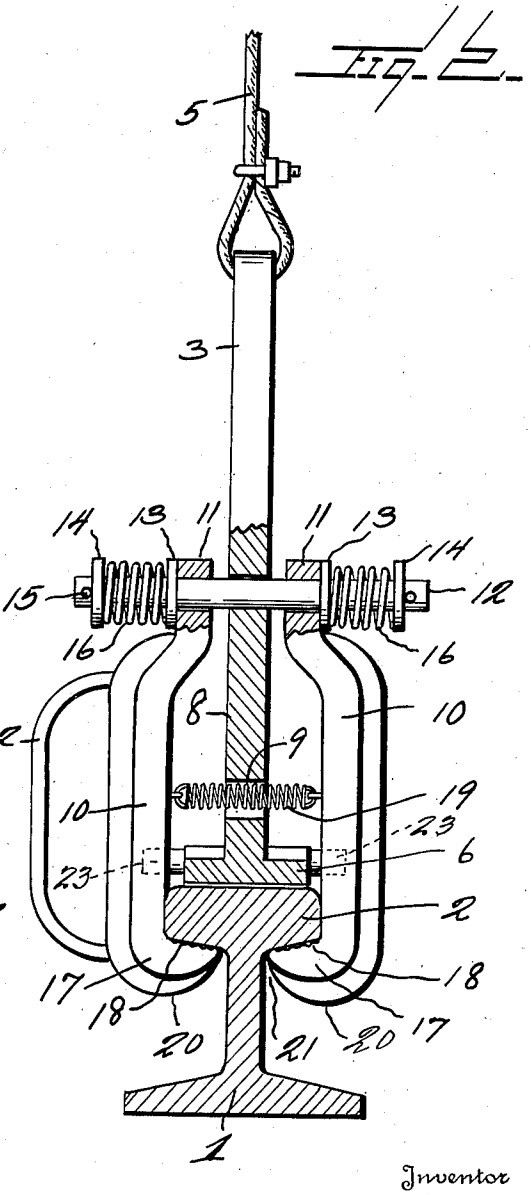


Fig. 2



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TRACK RAIL GROUNDING CLAMP

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8 Claims. (Cl. 173—273)

This invention relates generally to improvements in electric current conductor terminals and pertains particularly to an improved grounding terminal designed particularly for use in connection with electrically operated mine cars for grounding one side of the electric circuit with a track rail.

In the operation of mine cars, a set of current conductors is employed, one of the conductors being designed for connection with a current carrying wire for transferring current to the operating motor for the car while the other conductor is adapted to be connected along the line with a rail of the car track to establish a ground for the completion of the electric circuit. At the present time, the means employed for establishing this ground connection with the track rail is unsatisfactory in many ways, and it is an object of the present invention to provide a means for the establishment of the ground connection in a way which effectively overcomes the unsatisfactory conditions attendant upon the present method of making the connection.

The present invention has for its primary object to provide an improved grounding clamp or connector which is so designed that it may be securely attached to a rail of a car track by the simple operation of forcibly applying the connector to the ball of the rail as a result of which the connector functions to grip and hold the rail firmly and to establish the desired electrical connection therewith.

Another object of the invention is to provide a quick-acting grounding clamp designed to establish an electrical connection with the head or ball of a track rail, which is so designed that it may be easily and quickly released by the simple operation of imparting a twisting strain thereto.

Still another object of the invention is to provide a quick-acting grounding clamp adapted to be applied to the ball of a track rail in the manner stated, which is so designed that it cannot be accidentally pulled loose by the application of a strain thereto longitudinally of the track or transversely thereof but can only be removed by the application, by an operator, of a torsional twist to the portion of the clamp to which the grounding wire is attached.

Other objects and advantages of the invention will become apparent as the description of the same proceeds and the invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawing forming part of this specification, with the understanding, however, that the invention is not to be confined to any strict conformity with the showing of the drawing but may be changed or modified so long as such changes or modifications mark no material departure from the salient features of the invention as expressed in the appended claims.

In the drawing:

Fig. 1 is a view in side elevation of the clamp showing the same applied.

Fig. 2 is a view in front elevation partly in section.

Referring now more particularly to the drawing, the numeral 1 generally designates a track rail, the head or ball of which is indicated by the numeral 2.

The grounding clamp embodying the present invention is coupled with the ball 2 of the rail and this clamp comprises the elongated bar 3 constituting the main body portion of the clamp, in one end of which is formed an aperture 4 through which is connected an end of an electric current conducting wire 5.

At the opposite end of the bar 3 there is formed the arcuate gripper foot 6, the convex face of which is provided with transversely extending teeth 7. The bar 3 gradually increases in width toward the foot portion 6 so that at its foot end, it is fan-shaped as indicated at 8, and in this fan-shaped wide portion adjacent to the foot there is formed the slot 9 which extends lengthwise of the foot.

Disposed upon each side of the foot 6 and transversely of the same is a gripping arm 10. Each of these arms at its inner end has the inwardly offset terminal portion 11 which is provided with a suitable aperture for the reception of a supporting pivot shaft 12.

The shaft 12 passes through the bar 3 upon the side of the slot 9 opposite from the foot 6 and the inset ends 11 of the arms 10 bear against the adjacent faces of the bar 3.

Upon the outer side of each arm 10, the shaft 12 carries a washer 13 while at its outer end a similar washer 14 is retained in place by a pin or cotter key 15. Interposed between the adjacent washers 13 and 14 is a compression spring 16 which functions to constantly urge the adjacent arm 10 in against the adjacent side of the bar.

Each of the arms 10 at its outer end is turned inwardly to form a hook jaw 17. The inner face of each jaw 17 is serrated or toothed, as indicated at 18. The width of the foot 6 is such that it will maintain the arms 10 in spaced parallel

relation and the arms are constantly drawn together and against the opposite edges of the foot 6 by the contractile spring 19 which is connected between the opposite faces of the arms and extends through the slot 9, as shown.

The arc for the working face of the foot 6 is struck from the center of the shaft 12 from which the arms 10 are suspended and, therefore, when these arms swing on the shaft, the faces 18 of the jaws, which extend inwardly partway across the working face of the foot, will maintain the same spaced relation with the working face of the foot in any position to which they may be swung.

The outer sides or faces of the jaws 17 are of arcuate form, as indicated at 20, and the curvature of these faces extends around to and joins the working faces of the jaws so that the curved faces together define an inwardly constricted entrance opening at 21 for the reception of the head of the rail.

One of the arms 10 has secured to its outer side the handle 22 which facilitates the application of the clamp to a rail by the process of pulling the jaws open to receive the rail head instead of forcing the rail head between the jaws by striking the clamp downwardly against the track.

In applying the grounding clamp, the operator, holding the bar 3 above the shaft 12, drives the clamp down against the head of the rail in such manner as to strike the rail head simultaneously with both curved surfaces 20 of the jaws. Since these curved surfaces are arranged in the manner illustrated, they will tend to move apart when striking the rounded head of the rail, thus separating the arms and opening the jaws so as to permit the rail head to move into position between the foot, which engages the top of the rail head and the two jaws 17 which engage the under side of the head at the sides of the web portion of the rail. Since the space between the working faces of the jaws 17 and the working face of the foot 6 is designed to snugly receive the rail head, it will be readily apparent that after the jaws 17 have engaged the head upon its underside and the foot 6 is in engagement with the top surface of the head, the latter will be placed firmly in electrical connection with the clamp and the wire 5 which is attached thereto. If a strain is applied to the bar 3 through the wire 5, either longitudinally of the rail or transversely thereof, it will be readily apparent that the grip of the clamp cannot be broken. When, however, it is desired to release the clamp from the rail, the operator grasps the bar 3 and twists the same on its long axis, thereby tending to throw the jaws 17 apart and move the arms outwardly against the tension of the springs 16, thus facilitating the release of the rail.

In the case of persons who are not familiar with the method of applying the clamp to the rail, use may be made of the handle 22 to facilitate the attachment of the clamp by pulling out upon the arm 10 to which the handle is attached while engaging the jaw or the other arm with one side of the rail head, thus separating the arms sufficiently to permit the rail head to be entered between the jaws and the foot 6. Of course, it will be understood that the apertures through the ends of the arms and through the bar 3 will be of sufficient diameter with respect to the shaft 12 to permit of the necessary relative movement between the bar and the arms.

In order to limit the swing of each of the arms upon the shaft 12, the foot body 6 is provided at each end and upon each side with a short laterally projecting pin 23 which extends out sufficiently far to be struck by the adjacent arms when the latter swing on the shaft thereby limiting their movement in the manner stated.

What is claimed is:

1. A grounding clamp, comprising a pair of relatively movable jaw members adapted to position upon opposite sides of a track rail to engage the under side of the head thereof, a cooperating gripping member extending across the space between the jaw members and adapted to engage the top surface of a rail head, and means coupling the gripping member with the jaw members facilitating relative movement of the jaw members with respect to the gripping member and relative movement of the jaw members with respect to each other in planes extending both longitudinally and transversely of an engaged rail and the gripping member, said gripping member being electrically connected with a current conductor.

2. A track rail engaging grounding clamp, comprising an elongated body member having a foot at one end, said foot having an arcuate gripping face, a pair of arms between which said member is disposed, rigid means pivotally joining the arms to said member for supporting the arms to swing on an axis extending transversely thereof, means normally urging said arms inwardly toward the member and permitting their outward movement therefrom, and a jaw member forming a part of each arm and having a working face disposed in opposed spaced relation with the working face of said foot, said jaw members being alined transversely of the clamp.

3. A track rail head gripping clamp, comprising an elongated body having a foot member at one end provided with an arcuate gripping face, a pair of arms disposed upon opposite sides of the body and extending in spaced relation across said foot, means pivotally coupling the arms with the body to swing on an axis extending transversely thereof, a gripping jaw forming a part of each arm and having a working face in spaced relation with the arcuate face of the foot, the arc for said working face of the foot being struck from the pivotal center for the arms, said body member having a slot formed therethrough and extending lengthwise of the foot, a contractile spring connecting said arms together transversely of the body and extending through said slot, and means coupled with said arms facilitating their lateral movement with respect to the body upon turning of the body on its long axis when the clamp is engaged with a rail head.

4. A track rail grounding clamp comprising an elongated body one end of which constitutes a handle, the other end of the body forming a rail head engaging foot, a pair of arms between which the body at the foot end thereof is disposed, means coupling the arms together and to the body, intermediate the ends of the body, by which separation of the arms and rocking of the arms on an axis extending perpendicular to the body may be accomplished, the arms having jaw forming ends extending lengthwise of the body beyond said foot to cooperate with the foot in gripping a rail head, and said arms at the jaw ends being shaped to form camming faces facilitating separation of the jaws upon forcible application of the said faces to the top edges of a rail head.

5. A track rail grounding clamp comprising an elongated body one end of which constitutes a handle, the other end of the body being formed to provide a rail head engaging foot, a pin member extending transversely through the body, a pair of arms each pivotally supported upon the pin member at a side of the body whereby the body is positioned between the arms, means carried by the body limiting swinging movement of the arms on said pin, said arms being formed at their other ends to provide rail head gripping jaws which are positioned beyond the adjacent rail head engaging foot of the body to cooperate therewith, said arms being shiftable relative to the body axially of the pin, and resilient means normally urging said arms to move together.

6. A track rail grounding clamp comprising an elongated body one end of which constitutes a handle, the other end of the body being formed to provide a rail head engaging foot, a pin member extending transversely through the body, a pair of arms each pivotally supported upon the pin member at a side of the body whereby the body is positioned between the arms, means carried by the body limiting swinging movement of the arms on said pin, said arms being formed at their other ends to provide rail head gripping jaws which are positioned beyond the adjacent rail head engaging foot of the body to cooperate therewith, said arms being shiftable relative to the body axially of the pin, and a spring member encircling the pin adjacent each of its ends and disposed upon the side of the adjacent arm remote from the body, each of said spring members being operatively coupled with the pin and constantly urging the adjacent arm to move toward the body.

7. A track rail grounding clamp comprising an elongated body one end of which constitutes a handle, the other end of the body being formed to provide a rail head engaging foot, a pin member extending transversely through the body, a pair of arms each pivotally supported upon the pin member at a side of the body whereby the body is positioned between the arms, means carried by the body limiting swinging movement of the arms on said pin, said arms being formed at their other ends to provide rail head gripping jaws which are positioned beyond the adjacent rail head engaging foot of the body to cooperate therewith, said arms being shiftable relative to the body axially of the pin, resilient means normally urging said arms to move together, and each of said arms having the said other end thereof formed to provide a rounded camming surface facilitating the shifting of the arm laterally with respect to the body when such surface is applied to the outer edge of a rail head to effect the separation of the arms for the insertion between said jaws and the foot of the rail head.

8. A track rail grounding clamp comprising an elongated body one end of which constitutes a handle, the other end of the body having a relatively long arcuate rail head engaging foot, a pin secured to and extending transversely of the body and to the length of the foot, a pair of arm members having the foot portion of the body disposed therebetween and each pivotally attached at one end to said pin to oscillate thereon lengthwise of the foot, each of said arms having an inwardly directed jaw at its other end which has a gripping face arranged in spaced opposed relation with the rail head engaging face of the foot, means carried at the ends of the foot limiting the oscillatory movement of the arms on the pin, spring means carried by said pin at each end and engaging the adjacent arm to normally force the arm inwardly toward the body, and a contractile spring forming a yielding coupling between the arms intermediate their ends and passing through a slot in the lower part of the body, the slot having a length extending in the direction of the length of the foot.

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