June 3, 1941. A. H. GENTER 2,244,248

RAIL BOND

Filed April 30, 1940

Fig. 1.

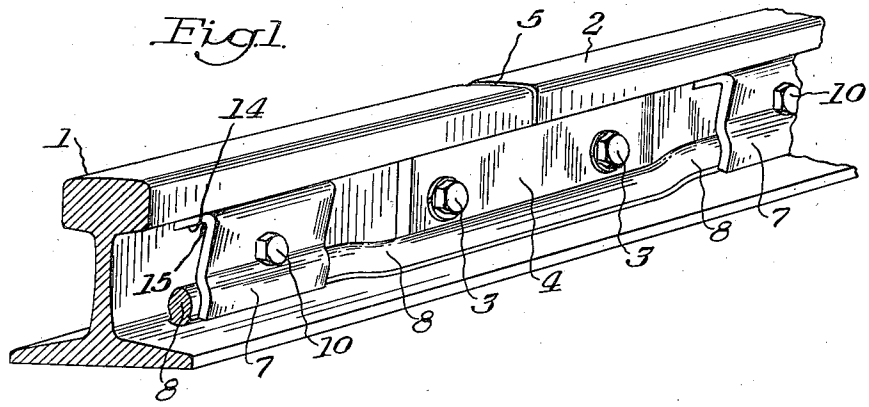


Fig. 3.

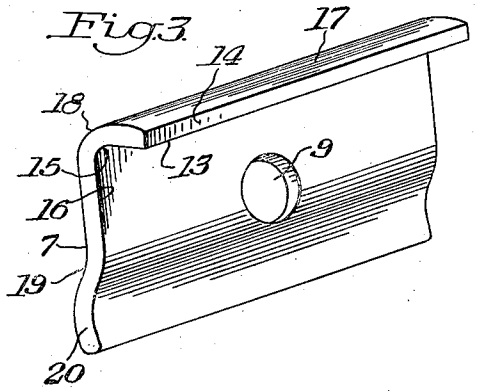
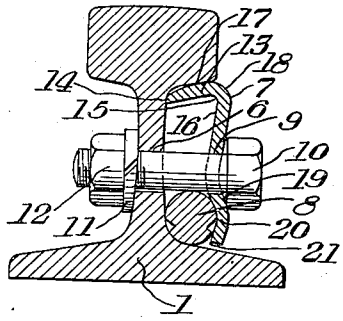


Fig. 2.



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RAIL BOND

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3 Claims. (Cl. 173—277)

This invention relates generally to rail bonds and more particularly to a temporary rail bond for use on track laid in rooms and branches of a coal mine, which track is allowed to lay only until the coal from that particular area has been removed, after which time the track is lifted and relocated.

The track laid in the main leads and entries of a coal mine is permanently constructed. In the larger mines a concrete track bed is provided and the rail bonds are welded or brazed to the rails in a manner similar to that of a surface road using electrical propulsion. The branch lines which extend from leads to rooms and remote places where the coal is being removed are laid with a temporary track to carry the digging and loading machinery to the place where operations take place and for removing coal therefrom. These temporary lines may only be used for a short period of time and it is therefore not economical to equip them with the standard trolley and bonding equipment.

Long extension cables attached to the digging and loading equipment are drawn down the branch to a principal lead where they are attached to the trolley or trolley feed wire for supplying electrical energy to the equipment. The return current is carried by the rails in the branch which may extend up to or into the rooms.

To provide good conductivity through the rails they must be bonded at the rail joints. If welded rails bonds are applied they are usually destroyed when the track is disjointed and removed to another branch. The rail bonds having a driving pin type terminal are also destroyed because they will not fit the standard holes provided in the web of the rails upon the second application and difficulties arise when wedges are used. Thus frequently the ends of the branch lines are not bonded due to the expense and time required to fit the old bonds to the rails in their new location.

The principal object of this invention is the provision of an improved removable bond terminal which is simple in structure and readily applied or removed without destroying its function.

Another object is the provision of a removable rail bond constructed principally of standard parts and is thus economical to produce and is easily applied.

Other objects and advantages appear hereinafter in the following description and claims.

In the accompanying drawing a practical embodiment illustrating the principles of this invention are shown wherein:

Fig. 1 is a perspective view of a rail joint with the rail bond applied thereto.

Fig. 2 is a vertical section taken through the rail, the clamping plate and the bond wire.

Fig. 3 is a perspective view of the inner or engaging face of the clamping plate.

Referring to the drawing the webs of the adjacent rail sections 1 and 2 are provided with holes for receiving the bolts 3 which pass through aligned holes in the fish plates 4 placed on each side of the rail webs for bridging the joint 5 between the rail sections. A lock washer and nut are used to clamp the fish plates in position. The upper and lower edge of the fish plates 4 engage the under side of the rail head and the top surface of the rail flange to provide rigidity in the joint.

It is common practice to use fish plates having only two bolt holes for most coal mine rail equipment although in some sections where the traffic is heavy and the road is permanent, longer fish plates having holes for receiving four bolts are sometimes used. However it is standard practice to provide two bolt holes through the web adjacent each end of every rail section. The inner holes 6 which are not ordinarily used for securing the rail joint are therefore employed for fastening the clamping plate 7 and the rail bond 8 in place.

The clamping plate 7 is provided with a centrally disposed hole 9 which may be aligned with one of the holes 6 for receiving the bolt 10. A lock washer 11 and a nut 12 are applied to the bolt 10 on the other side of the rail web for drawing and securing the plate in clamping position.

An inwardly projecting flange 13 is formed along the upper longitudinal edge of the plate to produce a fulcrum or web engaging surface 14. The included angle 15 formed by the flange 13 with the surface 16 is less than 90° to permit the formation of the outer arcuate surface 17 extending from the fulcrum 14 to the exterior rounded surface 18 of the angle formed by the flange. The section of the plate coextensive with the surface 16 is straight and the next adjacent section 19 is bent outwardly to form the offset portion shown at 20. The offset portion 20 is substantially parallel with the section coextensive with the surface 16. The offset portion produces a channel 21 longitudinally of the inner face of the plate and is arranged to receive the bond wire 8 and force it up the inclined surface of the

rail flange into clamping position against the web and the flange. The size of the bond wire should be such that it is forced into engagement with the stem of the bolt 10 when it is clamped in position. The bond wire thus engages the rail web and flange, the bolt and the clamp plate and cannot be moved by vibration.

The arcuate surface 17 on the flange 13 of the plate 7 should engage the under surface of the head of the rail with little or no clearance between the upper portion of the hole 9 and the bolt 10 when the latter is disposed in a horizontal plane. The force acting against the stem of the bolt by its engagement with the bond wire 8 is opposed by the spaced reaction surfaces provided by the hole 6 in the web and the hole 9 in the plate which are disposed on opposite sides of the application of the load forces. The overall width of the plate 7 from the arcuate surface 17 to the lower marginal edge thereof should be approximately equal to the height of the web of the rail and the hole 9 should be aligned with the hole 6 in the web of the rail to maintain a symmetrical balance in the applied and reactive forces. It is therefore preferable to provide a plate which is the proper size for the rail to which it is applied.

The size of the bond wire 8 is also selected to provide proper engagement with the bolt, the plate and the web and flange of the rail. A section of two or four naught solid hard drawn trolley wire has been found satisfactory for this purpose. A bare section of number two to six flexible mining machine or locomotive cable also produces a good bond. Short lengths of the trolley wire or cable whether new or old are easily obtainable around a mine and may be used to advantage for this purpose. The economical advantage in using scrap of this character is obvious.

If the surface of the flange and web of the rail are dirty or oxidized they should be cleaned before the bond wire is applied.

The plate 7 should be sufficiently long to provide adequate contact between the bond wire and the rail for the transmission of the electric current required to operate a mining locomotive and the mining machinery. A plate three inches in length has been found to be satisfactory for this purpose. The plate is preferably made of steel one quarter of an inch thick to provide the proper strength.

These plates may be made by rolling this shape in the form of a long strip and then punching the holes 9 and shearing them to their proper length. They may be readily heat treated after the punching and shearing operation. These plates may also be formed from a strip of steel the width of which is that of the selected length of the plate. In the process the strip is fed to a machine having two dies in tandem. The first die punches the hole 9 and may partially preform the blank. The second die shears the plate from the strip and presses it into shape, thereby completing the forming operation.

I claim:

1. In a rail bond joint, the combination of a rail section having a head and a flange connected by a web, a rail bond conductor, a clamping plate having a longitudinally disposed flange arranged to bear against the web and the adjacent under side of the head of the rail to form a fulcrum and having a longitudinally disposed arcuate portion spaced from the flange and arranged to engage the bond conductor, and means intermediate of the flange and the arcuate portion for swinging the plate on the fulcrum to clamp the bond conductor against the web and the flange surfaces of the rail.

2. In a rail bond joint, the combination of a rail section having a head and a flange connected by a web, a rail bond conductor, a clamping plate having a longitudinally disposed flange arranged to bear against the web and the adjacent under side of the head of the rail to form a fulcrum and having a longitudinally disposed arcuate portion spaced from the flange and arranged to engage the bond conductor, and means intermediate of the flange and the arcuate portion for swinging the plate on the fulcrum to clamp the bond conductor against the web and the flange surfaces of the rail, said means engaging the bond conductor from above to aid the plate in forcing it into engagement with the rail.

3. In a rail bond joint, the combination of a rail section having a head and flange connected by a web and having a bolt hole through the web, a rail bond conductor, a clamping plate having a longitudinally disposed upper portion arranged to engage and fulcrum on the upper portion of the rail and having an offset portion adjacent the lower end arranged to engage the bond conductor, said plate having a bolt hole intermediate the offset and upper portions registering with the bolt hole in the web, and a bolt disposed in said holes for supporting the plate in spaced relation to the rail flange and for swinging the plate on its fulcrum to clamp the bond conductor against the web and flange surface of the rail.

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