Aug. 15, 1967 W. R. HAMILTON, JR 3,335,954

INSULATED RAIL JOINT

Filed March 17, 1966

FIG. 1.

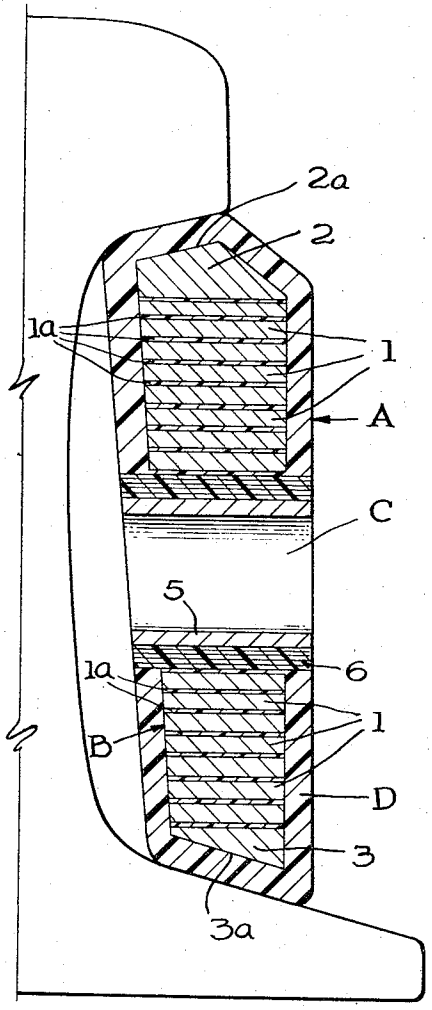
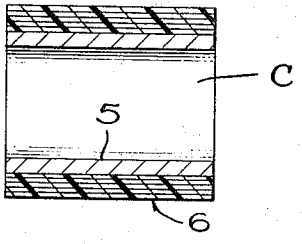


FIG. 3.



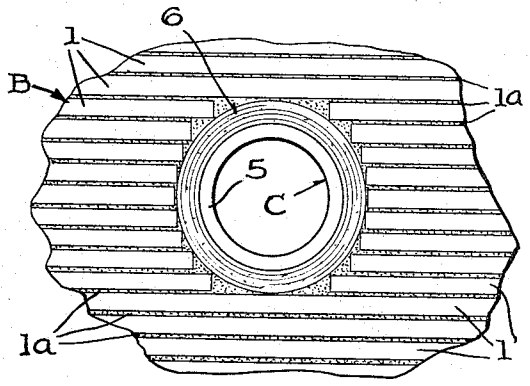
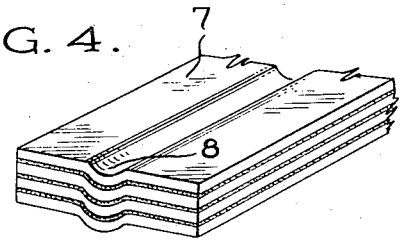


FIG. 2.

FIG. 4.



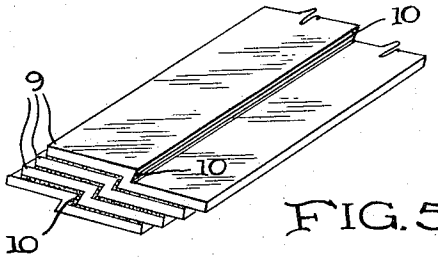


FIG. 5.

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United States Patent Office 3,335,954 Patented Aug. 15, 1967

3,335,954

INSULATED RAIL JOINT

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Filed Mar. 17, 1966, Ser. No. 535,206
5 Claims. (Cl. 238—243)

ABSTRACT OF THE DISCLOSURE

An insulated rail joint comprising a plurality of metal strips bonded together to form a core and encapsulated with a non-conductive coating.

This invention relates to rail joints, and more particularly to joint bars of the insulated type which may be assembled to meet a selected rail section and then completed ready for use as individual units, even though such units may be, for production reasons, made in apparatus producing more than one complete unit at a given time.

As well known, now and heretofore, it has been the custom to manufacture bars for insulated joints in a rolling mill according to rigid specifications. This practice requires turning up and maintaining occasionally used expensive roll sets whose costs are reflected in the individual units primarily because the number of insulated bars are so relatively few as compared with standard bars used merely to connect conductively adjoining rails in jointed track. The bars rolled in long sections are cut to the length desired, usually 24" or 36", and subsequently have bolt holes punched in their webs after re-heating.

Accordingly, one of the objects of the present invention is to provide a unit including a prefabricated laminated metal core which may be changed as to size to fit different size rails and then encapsulated or otherwise enclosed in an appropriate synthetic plastic coating or cover, to suit a wide range of particular individual specifications and installation needs. Other means of enclosing the core may comprise, for example, dipping, wrapping with a pre-impregnated plastic material, or winding with a plastic filament.

Another object of the invention is to provide a novel metallic core including a plurality of special relatively thin metal strips, and also special arrangements thereof, to accommodate insulated bolt holes, and provide maximum resistance to bolt pressures incident to installing the bars in place.

A further object is to combine a plurality of thin strips into a core having upper and lower cap pieces whose rail facing portions are inclined either 13° or 14° to fit rails above and below 100# to the yard.

With these and other objects in view which will more readily appear as the nature of the invention is better understood, the invention consists in the novel construction, combination, and arrangement of parts hereinafter more fully described, illustrated, and claimed.

A preferred and practical embodiment of the invention is shown in the accompanying drawings, in which:

FIG. 1 is a vertical cross-sectional view of a joint bar including the improvements of the present invention and shown as it is initially fitted in the fishing space of the rail ends of the joint to be insulated, as in signal track.

FIG. 2 is an enlarged detail side elevation showing the metallic strips stacked one upon the other and also as they would appear, for example, at the location of a bolt hole.

FIG. 3 is a detail cross-sectional view of the bolt receiving ferrule.

FIG. 4 is a detail perspective view showing the stacked strips with one form of interlocking rib and groove arrangement.

FIG. 5 is a similar detail perspective view showing strips with a different form of interlocking formation, not only to facilitate assembly, but to increase resistance to bolt pressure.

Similar reference characters designate corresponding parts throughout the several figures of the drawings.

Referring first to FIG. 1, it will be observed that the rail R is typical of a section with which the present invention will be used.

The fabricated joint bar is designated generally as A and includes a laminated core B having at appropriate spaced locations, bolt receiving ferrules C. As shown in FIG. 1, the core B and ferrules C are encapsulated in a coating of synthetic insulating material D such as, for example, polyurethane, which covers all of the exposed surfaces of the bar.

The laminated core B includes a series of superimposed relatively thin flat strips **1** whose wide mating side surfaces are bonded together by a synthetic adhesive such as, for example, a thermosetting resin of the epoxy type designated generally as **1***a*. This bonding of the strips or leaves together eliminates motion between them in bending by putting the adhesive layer into shear.

As will be seen from FIG. 1, the top and bottom cap strips **2** and **3** have their outer face portions inclined at an angle corresponding to an angle of the fishing spaces at the head and foot of the bar. In FIG. 1 these faces are designated respectively as **2***a* and **3***a*.

The metal strips **1** may be of any desired length to permit handling and manipulation with reference to the bolt-hole locations. That is to say, the stacked, or otherwise placed, metallic strips **1** may be assembled in relation to the ferrule C as shown in FIG. 2. The voids or interspace occurring between the ends of strip **1** and the ferrule C are filled with a synthetic resinous bonding agent to not only secure them in place but also to preserve the full insulating qualities of the bar.

The thickness of a strip **1** is preferably, for example, within the range of approximately 1/16" to 1/4". A strip whose thickness is less than 1/16" has a tendency to lose its structural quality of being able to stand by itself. A strip whose thickness is greater than 1/4" would leave too much clearance around the bolt hole and also would be difficult to laminate to the proper height.

As appears from FIGS. 1 and 3, the ferrule C includes as internal metallic thimble or sleeve **5** externally coated with an insulating material **6** preferably, but not necessarily, of the same type as the bonding material **1***a*.

Referring to FIG. 4, it will be seen that the core forming strips **7** are provided with offset rib portions **8** which mate with each other and serve further to lock the superimposed strips against relative transverse or horizontal movement even though they are bonded together at their contacting faces.

FIG. 5 is a view illustrating a different form of interlock between the strips **9**. In this case, the interlock rib and groove is of substantially Z-shaped or stepped formation with the crest **10** of the interlock occurring in a manner to further resist bolt pressure even though the strips are adhesively bonded together.

In addition to the means shown in FIGURES 4 and 5 for mechanically interlocking the stacked strips, the flat strips shown in FIGURES 1 and 2 may be provided with a plurality of spaced holes which are aligned when the strips are stacked, and pins or pegs are then inserted through the aligned openings to provide an additional locking feature.

From the foregoing, it will now be understood that the internal core B is composed of a plurality of superimposed strips made fast together by bonding and/or having mechanically interlocked portions which also prevent lateral displacement, while the outer faces of the top and

bottom members are inclined to insure that the entire assembly, both the strips and cover, readily match the angle of the rail fishing surfaces.

A further distinctive feature of the invention is to stack or place flat metal strips so that their relatively narrow side-edge portions effectively resist bending under bolt pressure, while the relatively flat side portions are bonded and/or interlocked relative to each other and hold the bolt ferrule C in position, to enable the encapsulated material to be readily applied.

The principle of using thin strips rather than thicker sections, is that by changing the length of each piece in the area of the bolt holes, it is possible to vary their spacing without involving the use of another set of tools or materials.

I claim:

1. An insulated rail joint bar, comprising in combination, a core including a plurality of metal strips having their narrow side edges disposed toward the outer and inner faces of the bar and at right angles to the bolting forces to be applied to the bar,

said metal strips extending the entire length of the core and provided with intermediate layers of adhesive material bonding all juxtaposed surfaces of said strips into a unitary core,

ferrules disposed at spaced intervals transversely of the laminated core to receive bolts and having external insulating sleeves,

and an insulation cover surrounding said core and ferrules.

2. An insulated rail joint bar according to claim 1, wherein the top and most of said strips have their upper and lower faces formed at substantially an angle in the range of 13° to 14° to insure the overlying insulation cover fitting the related opposed faces of the rail fishing.

3. An insulated rail joint bar according to claim 1, wherein the laminae of said core have mating interfitting portions parallel with at least one end of the laminae to assume shearing stresses in the core imposed by bolt pressure.

4. An insulated rail joint bar, comprising, in combination,

a laminated metal core,

ferrules disposed at spaced intervals transversely of the laminated core to receive bolts and having external insulating sleeves,

the laminae of said core have substantially Z-shaped medial ribs extending longitudinally thereof with the V-shaped pocket of one rib receiving the mating shoulder of the adjacent rib, thereby to absorb shearing stress in the core by pressures exerted in a horizontal plane by the bolts,

and an insulation cover surrounding said core and ferrules.

5. An insulated rail joint bar, comprising in combination,

a laminated metal core,

ferrules disposed at spaced intervals transversely of the laminated core to receive bolts and having external insulating sleeves,

an insulation cover surrounding said core and ferrules,

and the interspace between the laminae and the adjacent ferrules is filled with nonconductive bonding material.

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