

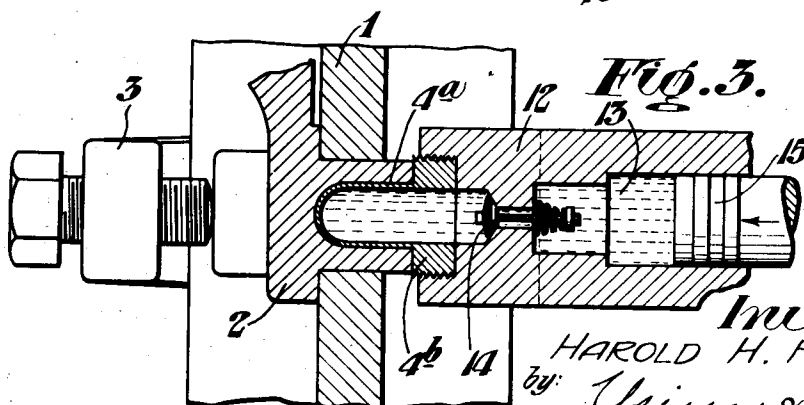
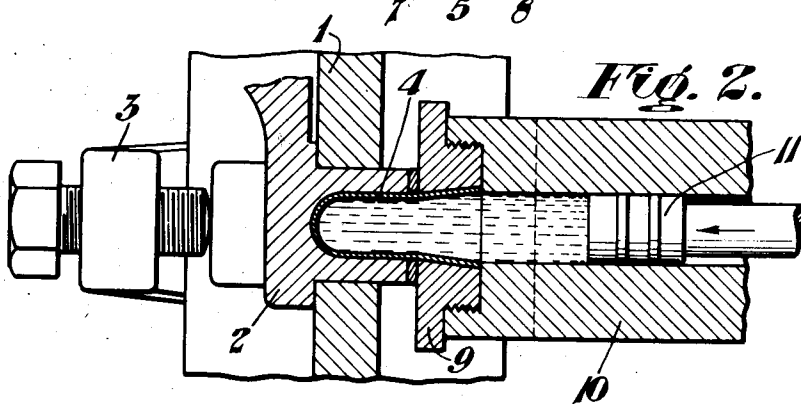
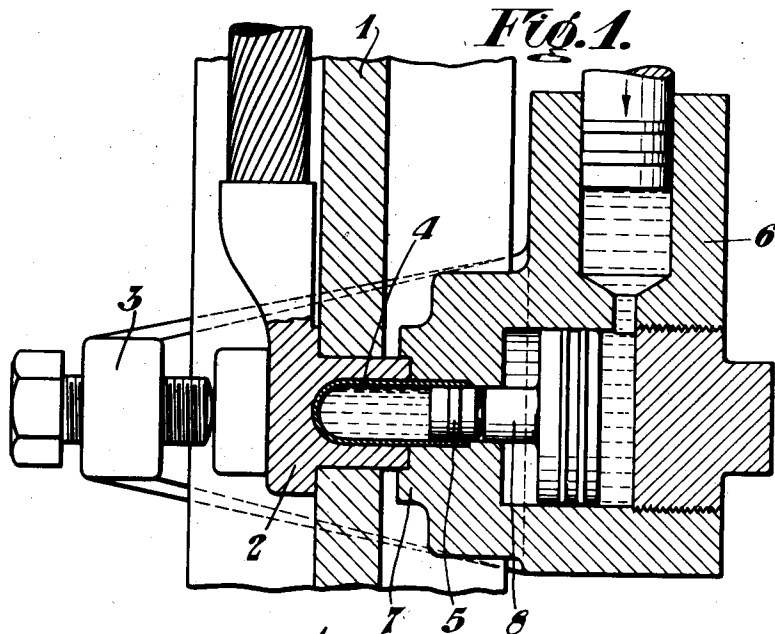
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INSTALLING RAIL BONDS

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INSTALLING RAIL BONDS

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1 Claim. (Cl. 29—155.55)

This invention relates to the installing of stud terminal rail bonds, it being understood that the terminals of this type of bond are provided with studs which are inserted and expanded in stud holes formed in the rails to be bonded. Sometimes the studs of these terminals are solid and sometimes they are hollow. It is with the latter type that the present invention is particularly concerned.

There are a number of schemes for expanding these hollow stud terminals in the stud holes. Sometimes the studs are tubular and a drift-pin is driven through them. In other instances wedge-like elements that remain permanently in the studs provide the required expansion. It is to be understood that in all instances at least one of the ends of the studs must be open to give access to their interiors. A hollow stud having opposite open and closed ends has been expanded by firing a charge of explosive into its hollow interior.

All of such schemes are operative and provide for reasonably effective bonding when the stud holes are accurately demensioned. But these holes are formed in the rails after the latter are laid. Since this work is done in the field it is a practical impossibility to accurately form the large number of holes required. In other words, the diameters and cylindrical characteristics of these holes vary. It is obviously necessary to provide studs which can be inserted in all of the stud holes regardless of their sizes. In such instances the schemes which have been described are at fault in that the expansive forces available are not of such a flexible nature as to provide proper expansion of the studs in the various sized holes.

One of the objects of the present invention is to provide for the expansion of terminal studs in a manner that is sufficiently flexible to provide for the complete and adequate expansion of the studs in holes whose sizes or shapes vary within the limits ordinarily to be expected. By this is meant that it is desired to expand the studs in their entireties rather than at localized points or portions.

Other objects may be inferred from the following disclosure of an example of the invention.

The three figures of the accompanying drawing schematically illustrate three different possible embodiments of the invention, each figure being a horizontal section of a railroad rail taken through a plane which bisects the terminal of a stud terminal bond having its stud inserted in a stud hole in this rail and in the course of being expanded.

In all instances the rail is numeraled 1 and the terminal 2. The terminal studs are hollow and have opposite closed and open ends, the open ends providing access to the studs' interiors.

The principle of the present invention is the expansion of studs of this type by means of a fluent material which is applied to the interior of the studs and to which sufficient pressure is imparted to produce expansion. When sufficient substance is used the expansion of a stud is unlimited except by the expansive capacity of the stud itself. Such an expansion may be varied at will. The expansive effect is absolutely even so that the studs are expanded in their entireties regardless of whether the stud holes provide truly cylindrical side-walls. Preferably, the fluent substance used should in each case be of sufficient volume to provide an excess. The applications of these principles illustrated by the drawing will now be described in detail.

In Figure 1 the closed end of a stud 2 is pressed toward the rail 1 by a suitable clamp 3. The fluent material used is a liquid and is contained in an elastic or ductile thimble or shell 4 which is shaped to fit the inside of the stud of the terminal 2 and which is closed by a piston 5. A press 6 has an end 7 which fits the end of the stud of the terminal 2 which projects through the web of the rail 1, and provides a pressing plunger 8 which fits against the piston 5. The use of this press provides for the forcing of the piston 5 into the thimble 4, the end 7 being shaped to support the side wall of this thimble which projects beyond the end of the terminal stud. The force should be such that the liquid in the thimble exerts an expansive force that just slightly exceeds the elastic limit of the metal from which the terminal stud is constructed, thus cold forging the terminal stud to a larger diameter and causing it to become fixed in the stud hole formed in the rail. It is obvious that the piston 5 may be pushed into the thimble the exact extent required to produce proper expansion of the terminal stud in its entirety. This piston 5 is separable from the plunger 8 and may function as a closure for the thimble 4.

Figure 2 differs from the above in that a nut 9 is provided, this nut having a bore which fits over the end of the thimble 4 and flares away therefrom. In use, the thimble is slipped through this nut and flared to fit the bore by a suitable tool. A barrel 10 screws onto this nut 9 and is adapted to contain liquid which may be forced into the thimble 4 by a plunger 11. In this instance the thimble does not contain liquid prior

to its use and requires more of the liquid used. Since it is possible to use water this does not involve any great expense.

In Figure 3 a modified form of thimble 4^a is used, this having an enlarged screw-threaded end 4^b. For the introduction of the liquid a barrel 12 is used which screws onto the end 4^b of the thimble 4^a and is provided with a liquid chamber 13 which communicates with this thimble through an opening closed by a spring-pressed valve 14, the liquid being forced out by a plunger 15. In operation, the barrel 12 is screwed onto the end of the thimble, the valve 14 preventing undue loss of liquid, it being understood that the liquid is at this time under no pressure. The plunger 15 is then used to apply pressure to the liquid in the chamber 13, this forcing the liquid through the opening by forcing open the spring-closed valve 14. The other functions involved are obvious.

It is desirable that the thimbles or shells 4 be inserted into the studs through their open ends before the bonds are sent to the locality of their installation. It is obvious that in all the examples the volumes of fluent substances used are in each instance in excess of that required for complete expansion of the terminal stud in properly sized stud holes. Then, even when oversized stud holes are encountered, the terminal studs may be expanded in their entireties. This is also true regardless of the trueness of the cylindrical shapes of these holes. It is not believed that any of the other schemes now in use provide these advantages.

A further advantage is that equalized installations may be assured regardless of rail hole size

variations providing equal application pressures are used in all instances. That is to say, a given pressure can only be reached when an equal reacting force is encountered and this can only result from the studs expanding against the rail hole insides.

Still another advantage is that the studs may be reused or tightened as desired. The only limitation to its expansion is the mass of metal it provides although it is obvious that there are expansion limits beyond which there is insufficient metal to assure safety. But up to these limits, the studs may be expanded repeatedly to successively larger diameters.

I claim:

A method of expanding a rail bond terminal stud of the hollow type in a rail hole, including providing a supply of material substantially softer than the metal of said stud, introducing said supply internally in said stud and applying pressure to said supply to cause it to exert a sufficient internal expansive force on said stud to effect its expansion, said supply being in excess of that required to effect complete expansion of said stud in a rail hole which it fits properly, and said pressure being maintained on said supply until complete expansion of said stud in its entirety is effected, whereby said stud may be completely and entirely expanded in a rail hole that is oversize or of a contour different from that of said stud, said supply being in the form of a substance that is normally liquid and which is contained in a thimble, and said stud being of the type having an externally accessible opening through which said thimble may be inserted.

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