Oct. 25, 1955 R. C. WEIDE 2,721,920

RESISTOR GRID

Filed May 1, 1952 2 Sheets-Sheet 1

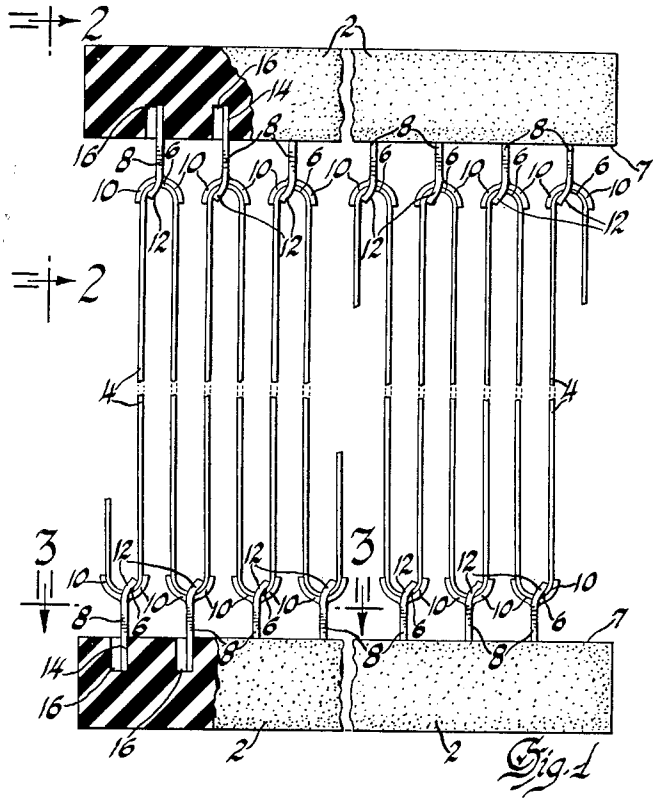

Fig. 1

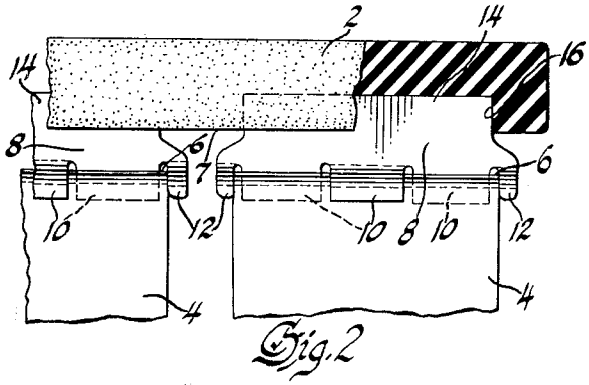

Fig. 2

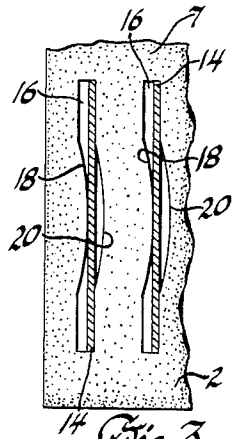

Fig. 3

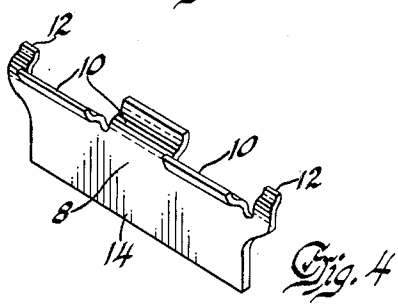

Fig. 4

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RESISTOR GRID

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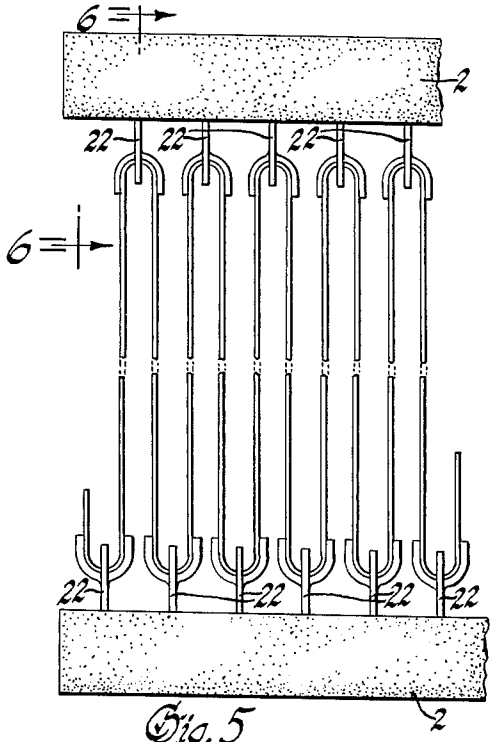

Fig. 5

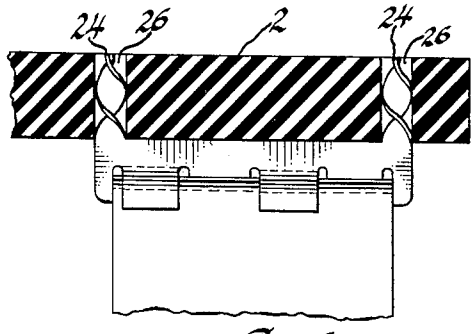

Fig. 6

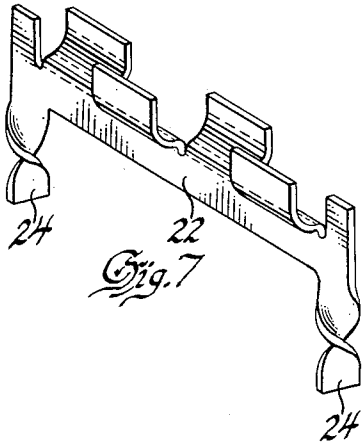

Fig. 7

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United States Patent Office 2,721,920 Patented Oct. 25, 1955

2,721,920

RESISTOR GRID

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Application May 1, 1952, Serial No. 285,460

10 Claims. (Cl. 201—69)

The present invention relates generally to electrical resistors and particularly to electrical resistors used in connection with diesel-electric locomotives equipped with dynamic braking.

Dynamic braking is an electrical means which has been devised for braking diesel-electric locomotives and consists of connecting resistances across the traction motor armatures and exciting the fields of the traction motors. These traction motors are turned by the coasting locomotive so that their function under the above conditions is to operate as a generator whereby the energy of the coasting train is converted into heat by the resistances connected across the traction motors. Because of the large amount of energy to be converted these resistances create a tremendous amount of heat which must be dissipated into the atmosphere. The problem of getting rid of this heat has merited considerable attention in the diesel-electric locomotive field.

In the systems presently used a resistor band having serpentine bends is exposed to air with the band being supported by placing the bends in recesses in insulator supports. Such construction has been objectionable because the bends in the resistor band by reason of being in the insulator support itself cannot be exposed to the same amount of air as the other portions of the resistor band. This condition results in "hot spots" which increase the resistance at the bends of the resistor band and cause variations in current flow through the resistor. These "hot spots" also cause breakdown of the insulator supports.

It is, therefore, an object of this invention to provide a construction which will allow an even distribution of air over all portions of the resistor band.

It is also an object of this invention to secure an even current flow throughout all portions of the resistor and to eliminate "hot spots" in the resistor.

It is a further object of this invention to prevent the deterioration of the insulator supports and also to provide a resistor of increased capacity and reliability.

It is a further object of this invention to provide a resistor grid assembly which is simple and inexpensive to manufacture and also which is interchangeable with resistor grid assemblies that have been used in the past.

The present invention has been developed to accomplish the above objectives by providing mounting brackets between the bends of the resistor band and the insulator support which allow adequate cooling of the bends and also locate the bends away from the insulator support.

In the drawings:

Figure 1 shows a resistor grid assembly including the insulator supports, the serpentine resistor band and an end view of the improved means for holding the bends of the resistor and connecting them to the insulator supports.

Figure 2 shows a view taken along line 2—2 of Figure 1, and discloses a partial sectional view of one of the insulator supports with the new mounting brackets residing in the recesses in the insulator support.

Figure 3 is a view taken along line 3—3 of Figure 1, and discloses the configuration of slots for fastening the improvement in the insulator support.

Figure 4 is a perspective view of the new mounting bracket.

Figure 5 shows a modification of the resistor grid assembly shown in Figure 1.

Figure 6 is a section taken along line 6—6 of Figure 5 and shows the modified means for attaching the mounting bracket to the insulator support.

Figure 7 is a perspective view of the modification.

Referring to Figure 1, a resistor grid assembly is shown having parallel insulator supports **2**. These insulator supports may be made of any strong insulation material, which is capable of withstanding a certain amount of heat. Between the parallel insulator supports a serpentine band **4** is placed, whose bends **6** are removed from the mounting surfaces **7** of the insulator supports. The outer surface of each of these bends is cradled by a mounting bracket **8** which is fastened to an insulator support **2** by a flat extension **14** adapted to snugly fit in slots **16** provided in the insulator support. The mounting bracket **8** constitutes the improved portion of the resistor grid assembly. The details of the mounting bracket are more particularly shown in Figures 2 and 4. Each of these mounting brackets which should be constructed from some heat resistant metal, such as stainless steel or chrome nickel steel consists of a flat plate, which may be stamped out of flat blanks and shaped so that alternate fingers **10** extend divergently to form a cradling support for one of the bends **6** of the serpentine band **4**. Two retaining fingers **12** are provided at each end of the bracket to prevent the band from moving transversely with respect to the mounting bracket.

Shown in Figures 2 and 3, the bracket is mounted in the insulator supports by means of the flat extension **14**, which extends into the slots **16** provided in the insulator support. These slots have mating concave and convex surfaces **18** and **20** which are spaced so as to tightly grip the flat extension **14** and slightly distort it.

Referring now to Figures 5, 6 and 7, a modification of the mounting bracket is shown. These modified mounting brackets **22** are fastened to the insulator supports **2** by means of twisted elongations **24**. These elongations are wound by a suitable tool. While being held wound they are inserted in holes of the insulator support, after which the elongations **24** are released and their subsequent unwinding causes them to tightly grip the surfaces of the holes **26** and securely hold the mounting brackets **22** to the insulator supports.

When the resistor grid is completely assembled it can be seen that any air which is directed around the resistor band will contact the bends of the band as freely as its other portions. This, of course, will mean that the band will be uniformly cooled, thereby preventing the development of "hot spots," and increased resistance at the bends of the resistor band.

I claim:

1. In combination with an insulator support and an electrical resistor having a bend therein, a member having a plurality of alternately diverging fingers forming a supporting socket around said bend and provided with means for fastening the member to said insulator support so that said bend is supported remote from said insulator support, whereby said bend as well as the other portions of said resistor may be uniformly exposed to air or other cooling media, thereby eliminating the build up of heat and resistance at said bends relative to the other portions of said resistor.

2. In combination with an insulator support and an electrical resistor having a bend therein, a member having a preformed socket which receives and supports

said bend, said member being provided with means for fastening the member to said insulator support so that said bend is supported remote from said insulator support.

3. In combination with an insulator support and an electrical resistor having a bend therein, a member having a plurality of diverging fingers cradling said bend, said member being provided with means for fastening the member to said insulator support so that said bend is cradled in a location removed from said insulator support.

4. In combination with an insulator support and an electrical resistor having a bend therein, a member having a plurality of diverging fingers cradling said bend, and means for fastening the member and said insulator support together so that said bend is cradled in a location removed from said insulator support, said means including a prolongation of said member adapted to be inserted in a slot in said insulator support, said slot having mated surfaces spaced to frictionally engage said prolongation and retain it therein.

5. In combination with an insulator support and an electrical resistor having a bend therein, a member having a plurality of diverging fingers cradling said bend, and means for fastening the member and said insulator support together so that said bend is cradled in a location removed from said insulator support, said means including a prolongation of said member adapted to be inserted in a slot in said insulator support, said slot having mated concave and convex surfaces spaced to frictionally engage each side of said prolongation and retain it therein.

6. In combination with an insulator support and an electrical resistor having a bend therein, a member having a plurality of diverging fingers cradling said bend, and means for fastening the member and said insulator support together so that said bend is cradled in a location removed from said insulator support, said means including a resilient twistable prolongation insertable in a hole in said insulator support when resiliently twisted by a twisting force, and friction surfaces in said hole frictionally engageable with said prolongations when released from said twisting force.

7. A resistor grid including an insulator support, an electrical resistor band having a bend therein forming an inner concave surface at said bend, and supporting means to allow all portions of said inner concave surface to be uniformly exposed to cooling media, said means being connected to said insulator support to support said bend in a position removed from said insulator support.

8. An electrical resistor grid assembly comprising oppositely disposed insulators, an electrical resistor interposed between said insulators, said resistor having a plurality of bends formed thereon with convex surfaces facing said insulators, resistor supports secured to said insulators and interposed between said insulators and said convex surfaces, and socket means formed on said supports remote from said insulators, said socket means being formed to receive said convex surfaces and support said resistor remote from said insulators.

9. A resistor support for a serpentine resistor having bends formed on either side of its longitudinal axis comprising oppositely disposed insulators on either side of and more remote from said longitudinal axis than said bends, and resistor supports secured to said insulators and interposed between said insulators and said bends, said supports having a cradle formed at one end thereof remote from said insulators, said cradle forming a socket support for said bends.

10. Supporting means for a resistor having a convex surface formed thereon comprising an insulator spaced from said convex surface, a resistor support secured to said insulator and interposed between said insulator and said convex surface, and socket means on said resistor support remote from said insulator forming a cradling support for said convex surface.

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