

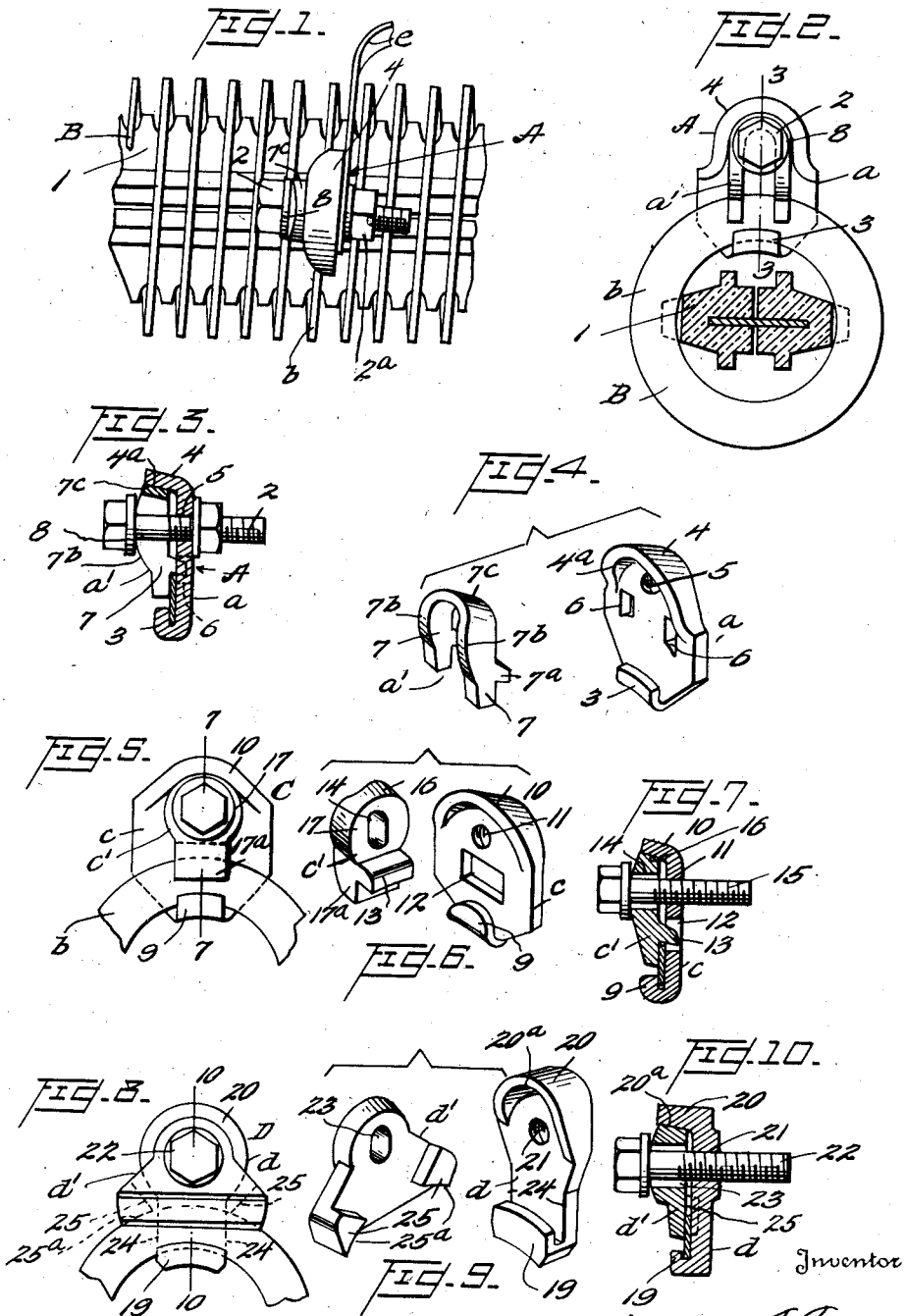
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CONNECTER FOR EDGEWISE WOUND COILS

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CONNECTER FOR EDGEWISE WOUND COILS

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This invention relates to connectors for attaching conductors to the convolutions of resistor elements composed of metal ribbons wound helically on edge. Connecters in the form of clamps which grip the opposite faces of a coil, as illustrated in patent to George H. Whittingham 1,550,640, have been commonly used, and these have the advantage of a large contact area between the clamping members and the coil and are satisfactory if the parts of the connector are clamped so tightly and evenly against the coil as to ensure contact throughout such area; but owing to springing of the metal or imperfect fitting of the parts of the clamp against the sides of the coil, the contact throughout the area of the clamping members is often not attained.

In carrying out my invention, I provide a connector which grips the inner and outer edges of the edgewise wound coil with a strong wedging action which causes the gripping surfaces to impinge against and bite into the thin edges of the coil, thus ensuring a good electrical contact in every case, even though the gripping surfaces are smaller than is the case with the flat clamps above mentioned.

In the accompanying drawing,

Fig. 1 is a plan view of an edgewise wound coil with one of the connectors, in its preferred form, attached thereto;

Fig. 2 is a side elevation of the connector applied to the coil, looking from left to right in Fig. 1;

Fig. 3 is a section on the line 3—3 of Fig. 2;

Fig. 4 is a perspective view of the wedge piece and body of the connector, separated;

Fig. 5 is a side elevation of a modified form of connector applied to a coil;

Fig. 6 is a perspective view of the wedge piece and body of the connector shown in Fig. 5, separated;

Fig. 7 is a section on the line 7—7 of Fig. 5;

Fig. 8 is a side elevation of another modified form of connector, attached to a coil;

Fig. 9 is a perspective view of the parts of the connector shown in Fig. 8, separated, and,

Fig. 10 is a section on the line 10—10 of Fig. 8.

Referring to Figs. 1-4, inclusive, of the drawing, A indicates the preferred form of connector, and B indicates an edgewise wound helix mounted upon a suitable insulating support 1 onto which the helix is threaded. The connector comprises a body *a*, a wedge piece *a'* and a bolt 2 for forcing the wedge piece against the body, the bolt also serving as a securing means for a conductor *e* which it may be desirable to electrically

connect to the coil. The body is relatively flat except for a hook 3 at one end and a curved flange 4 extending around the opposite end on the same side of the body as the hook. The side edges of the body taper toward its hooked end as shown and the end of the tapered portion is doubled backwardly over the body to form the hook. The central part of the flange is directly opposite the hook and adjacent this central part and in line with the hook is a threaded opening 5 adapted to receive the bolt 2. At the opposite sides of a line passing through the center of the flange and of the bolt hole and hook, the body has longitudinal slots 6. The body as well as the wedge piece are conveniently made of metal stampings, and in making the body the central portion of the flange is formed so that its inner wall 4^a slopes at a slightly obtuse angle to the flat surface of the body.

The wedge piece *a'* consists of a flat metal strip, substantially straight on one edge, bent into U-form, with similar parallel arms 7 having lugs 7^a projecting from the straight edge of the strip near the ends of the arms and adapted to extend into the slots 6 when the wedge piece is in place on the body. The opposite edges of the arms are preferably made convex between the lugs and the curved part of the strip, as shown at 7^b, and the curved part 7^c is preferably inclined at a slightly obtuse angle with respect to the lower edge of the strip so as to conform to the inclination of the inner wall of the flange 4 of the body. The bolt extends between the arms of the wedge piece into the threaded opening in the body and a washer 8 under the bolt head is adapted to bear against the convex edges of the arms and force the wedge piece toward the body when the bolt is tightened. To secure the connector shown in Figs. 1 to 4 to a coil of the resistor element, the bolt is partly unscrewed and the hooked end of the body is inserted between the coils adjacent the one, as *b*, to which it is desired to attach the connector. It is then pulled outward to engage the hook with the inner edge of the coil, as shown in Figs. 2 and 3. The wedge piece is then passed under the bolt head into the position where the lugs 7^a are within the slots 6 in the body and the curved inclined face of the wedge piece is against the inclined face of the flange. The lugs will then be close to the outer edge of the coil *b* and the ends of the arms 7 will lie against the face of said coil. The bolt is then tightened against the wedge piece and because of the co-engaging inclined surfaces of the wedge piece and flange, the wedge piece will be forced toward

the hook and the coil will be gripped tightly at its edges by the hook and the lugs on the wedge piece, the latter engaging the outer edge of the coil. At the same time, the ends of the wedge piece beyond the lugs will be forced tightly against the face of the coil and the latter will be clamped against the flat portion of the body, so that the connector will be held firmly on the coil. While clamping the coil at its sides adds to the electrical conductivity of the joint, the forceful gripping of the coil at its edges makes a much more perfect electrical connection between the connector and the coil. The convex surfaces of the arms of the wedge piece ensure a relatively small contact with the washer on the bolt so that as the bolt is tightened the wedge piece may slide toward the coil without being hindered by a large surface contact with the washer or bolt head.

The connector C, shown as a modification in Figs. 5, 6, and 7, comprises a body *c* which, in so far as the hook 9, flange 10 and threaded bolt hole 11 are concerned, are substantially the same as in the body *a* of the previously described figures. Instead of having two slots for receiving lugs on the wedge piece, as described in the previous figures, the body of the connector has a single wide slot 12 between the bolt hole and hook to receive a single relatively wide lug 13 on the wedge piece *c'*. The U-shaped wedge piece *a'* of Figs. 1 to 4 might be used with the body of Figs. 5 to 7 because the two lugs on the arms of the U-shaped piece would fit within and be guided by the ends of the wide slot 12. The wedge piece *c'* is a solid piece having a slightly elongated bolt hole 14 through which the bolt 15 extends into the threaded opening in the body and it has a slightly inclined curved end 16 adapted to fit against the inclined inner face of the flange. The part of the wedge piece 17 through which the bolt extends is circular in form and the part 17^a which carries the lug and engages the coil is shown with parallel side edges, the width of this part being, for convenience of manufacture, the same as the length of the lug. The surface of the wedge piece which is engaged by the washer on the bolt is made convex, as in the previously described figures and for the same purpose.

In this form of connector, the wedge piece cannot be removed or applied to the body without removing the bolt. When assembled, the connector can be applied to a coil by unscrewing the bolt far enough to allow the wedge piece to be turned thereon, then engaging the hook with the inner edge of the coil and then moving the wedge piece into its position with the lug thereon in the slot 12, and then tightening the bolt to force the lug on the wedge piece against the outer edge of the coil. The slightly enlarged bolt hole 12 allows the wedge piece to move toward the coil without obstruction by the bolt.

The connector D, shown in Figs. 8 to 10, comprises the body *d* having the hook 19 at one end and the curved flange 20 at the opposite end, the latter having the inclined wall 20^a, as in the previously described figures, and it has the threaded bolt hole 21 to receive the bolt 22, as in said figures. The wedge piece *d'* has a semi-circular end with an inclined edge adapted to engage the inclined surface of the flange and it has an elongated opening 23 through which the bolt extends. The body is not provided with a slot or slots to receive lugs on the wedge piece, as in the previously described figures. The side edges 24 of the body between its curved portion

and the hook are straight and parallel, and the wedge piece diverges from its curved end and extends laterally beyond said edges in triangular form. At its widest part, lugs 25 are provided, these lugs being close to the side edges 24 of the body so as to be guided thereby, and having curved edges 25^a for engaging the outer edge of the coil. The application of the connector to the coil is made by unscrewing the bolt so that the wedge piece can turn thereon; then engaging the hook with the inner edge of the coil, then turning the wedge piece into the position where the lugs are at opposite sides of the wedge piece and in position to engage the outer edge of the coil, and then tightening the bolt to cause the wedging action which forces the lugs against the edge of the coil. The coil is then clamped at its sides between the body of the connector and the end portion of the wedge piece which lies between the lugs.

While I have described the connectors as applied to the convolutions of an edgewise wound coil, it is evident that they may be applied to the flat resistance ribbon of which the coils are made, such as straight extensions of the ribbon at the ends of the coil.

What I claim is:

1. A connector for edgewise wound resistor coils comprising a relatively flat body having a hook at one end adapted to engage the inner edge of a coil and a curved flange at its opposite end having its concave surface opposed to said hook, said body having also a threaded opening adjacent the flange and having a slot in that part between the said opening and the hook, a wedge piece having a curved surface at one end engaging the concave surface of the flange and having a lug projecting through said slot and adapted to engage the outer edge of the coil, one of said surfaces being inclined with respect to the plane of the body, and a bolt extending into said threaded opening and adapted to clamp the wedge piece against the body.

2. A connector for edgewise wound resistor coils comprising a relatively flat body having a hook at one end adapted to engage the inner edge of a coil and a curved flange at its opposite end having its concave surface opposed to said hook and inclined at an obtuse angle with respect to the plane of the body, said body having also a threaded opening adjacent the flange and having a pair of laterally spaced slots in that part between said opening and the hook, a wedge piece comprising a U-shaped metal strip having its central part engaging the concave surface of the flange and having lugs projecting from its arms through said slots and adapted to engage the outer edge of the coil, and a bolt extending between the arms of the wedge piece into said threaded opening and adapted to clamp the wedge piece against the body.

3. A connector for edgewise wound coils comprising a flat body having a hook at one end adapted to engage the inner edge of the coil and having a curved flange extending around its opposite end and opposed to said hook, the inner face of said flange sloping toward the body, said body having also a threaded opening there-through adjacent the central portion of the flange and having longitudinal slots in its central portion spaced laterally apart, and a wedge member comprising a U-shaped metal strip having its central portion adapted to fit against the sloping face of the flange and the ends of its arms adapted to lie against the side of the

coil and having projections adjacent said ends fitting in said slots and adapted to engage the outer edge of the coil, and a bolt extending between the arms of said wedge piece into said threaded opening and adapted to force the wedge piece toward the body.

4. A connector for edgewise wound coils comprising a flat body having a hook at one end adapted to engage the inner edge of the coil and having a curved flange extending around its opposite end and opposed to said hook, the inner face of said flange sloping toward the body, said body having also a threaded opening there-through adjacent the central portion of the flange and having a transverse slot in its central portion, and a wedge piece having a rounded end adapted to fit against the sloping face of the flange and its opposite end adapted to lie against the side of the coil and having a projection extending into said slot and adapted to engage the outer edge of the coil, said wedge piece having also an opening therethrough larger than said threaded opening and a bolt extending through the opening in the wedge piece and into said threaded opening in the body and adapted to force the wedge piece toward the body.

5. A connector for edgewise wound coils comprising a flat body having a hook at one end adapted to engage the inner edge of the coil and having a curved flange extending around its op-

posite end and opposed to said hook, the inner face of said flange sloping toward the body, said body having also a threaded opening there-through adjacent said central portion of the flange and a wedge piece having a rounded end adapted to fit against the sloping face of the flange and having its opposite end adapted to lie against the side of the coil and having spaced projections at the latter end adapted to engage the outer edge of the coil, said wedge piece having an opening therethrough larger than said threaded opening, and a bolt extending through the opening in the wedge piece and into said threaded opening in the body and adapted to force the wedge piece toward the body.

6. A connector for flat resistor ribbons comprising a relatively flat body having a hook at one end adapted to engage one edge of the ribbon and a flange at its opposite end having a surface opposed to said hook, a wedge piece having a surface at one end adapted to bear against said surface of the flange, one of said surfaces being inclined with respect to the plane of the body, said wedge-piece having adjacent its opposite end a lug or shoulder projecting laterally from one side thereof adapted to bear against the opposite edge of the ribbon and having a part adapted to overlap and lie against one side of the ribbon, and means for clamping the wedge-piece against the body.

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